2. International Congress on Fisheries and Aquatic Research

Abstract Book

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Nevşehir

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Dear Participants,

We are inviting all the participants from all over the world to attend 2nd INTERNATIONAL CONGRESS ON FISHERIES and AQUATIC RESEARCH (2018) during July 12-15, 2018 in Nevşehir, TURKEY. This global conference includes prompt keynote presentations, Oral talks, Poster presentations and Exhibitions.

Our aim in this Conference that brings together a unique and International mix of experts, like aquaculture engineers, researchers and decision makers both from academia and industry across the globe to exchange their knowledge, experience and research innovations to its world fisheries and aquatic research Conference.

As beginning of the word, it will give us great pleasure to extend greetings and a warm welcome to everyone to attend the 2nd international Conference on Fisheries and Aquatic Research.

Water, from creation, to be the most basic necessity of the life, and to be a source of major economic activities, is a vital element. The 105,000 km\(^3\) portion of the world’s existing 35 million km\(^3\) of freshwater, which is less than 1\%, is consist of freshwater resources suitable for human use. According to UN and UNESCO, water demand will increase by about 50 % in 2030 when factors such as rising population, global warming, and drought are taken into consideration. They reported that demanding water will increase about 6,900 km\(^3\), which will be more than 40\% of the available and reliable supply.

And so, aquaculture plays an important role in ensuring a sufficient supply of nutritious food to feed the world’s growing population. However, this requires a corresponding increase in the feed supply. Knowing the available resources is not enough to overcome their problems. In our world, Water ecosystems, which are the not endless resource, will be able to exist constantly with the detection and protection of adverse effects that occur there.

Why to attend???: Conduct presentations, distribute information, meet with current and potential scientists, make a splash with new Aquaculture developments, and receive name recognition at this 3-day event. Invited speakers, the most recent techniques, developments, and the newest updates in Fisheries & Aquatic Research are hallmarks of this conference. Besides, you will be settled in beauty great SPA thermal hotel and it will be Fantastic relaxing travel in the last day touristic city Nevşehir.

Under the info given above, the main theme of our congress of this year is “Sustainable Aquaculture”. We believe that once again emphasize the importance of fisheries and aquatic research and their problems will be useful to discuss on the congress. We will be honored to see our precious scientists, who work on Fisheries and Aquatic science and its advances from various regions of the world and the share in 2nd INTERNATIONAL CONGRESS ON FISHERIES and AQUATIC RESEARCH.

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ORAL PRESENTATION

Fish Biomarkers, Suitable Tools for Water Quality Monitoring

Aliakbar Hedayati

Faculty of Fisheries and Environmental Sciences, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran

Corresponding author e-mail: Hedayati@gau.ac.ir

Abstract

A large number of biomarkers and indicator organisms have been suggested for the assessment of ecotoxicity of man-made compounds on aquatic environments. The physiological and biochemical indices in fishes are sensitive for detecting potential toxic effects, and also are obvious from the same reports that studies on the impact of pollutants on the physiological and biochemical status of aquatic organisms. In an attempt to define and measure the effect of pollutants on an ecosystem, biomarkers have attracted a lot of interest. The underlying principle of the biomarker approach is the analysis of an organism’s physiological or biochemical response to pollutant exposure. The measurement of biochemical and physiological parameters is a diagnostic tool commonly used in aquatic toxicology and bio-monitoring, so hematological and immunological parameters are suitable biomarkers in mercury studies. During stress, fish respond in a number of ways in order to regain homeostasis and two important physiological processes which are modulated when fish are exposed to stress, are hormonal status and immune function. In this paper, our previous research’s on effects of different pollutants (heavy metals, pesticides, nanoparticles, organic pollutants and etc.) on many fish species (marine and freshwater) was studied to detect new biomarkers (enzymatic, hormonal, immunological, hematological, histopathological and etc.) for water quality monitoring. In this study we examined markers of hematology, enzyme, hormone and histopathology in different fishes. The aim of this study was to test a multi-trial biomarker approach for evaluating toxicological risk due to the major toxicant in the water, using fishes as bio-indicator organism. The main objectives of this researches were: to identify the tissues and biological materials useful for biomarker studies; to evaluate various biochemical biomarkers in different tissues; to identify the most suitable biomarkers for evaluating chemical stress due to the contaminants explored in this study.

Keywords: Biomarker, fish, pollutants, water quality monitoring.
ORAL PRESENTATION

The Bioaccumulation of Different Micropollluting Agents in Common Carp (Cyprinus carpio)

Gergely Bernáth¹, Erna Balogh¹, Illés Bock¹, Edina Garai¹, Adrienn Micsinai², László Zanathy³, Béla Urbányi¹, Zsolt Csenki-Bakos¹

¹Department of Aquaculture, Szent István University, Páter Károly u. 1., H-2100 Gödöllő, Hungary
²Westling Hungary Ltd., Anonymous utca 6., H-1045, Budapest, Hungary

Corresponding author e-mail: Bernath.Gergely@mkk.szie.hu

Abstract

During our work emphasis was laid on the environmental analytics monitoring of carp fish ponds. Water and mud of fish ponds provide an environment for the accumulation of different micropollluting agents directly affects negatively the quality of fish meat. Sampling (n=15) was carried out at 6 farms in Hungary during spring and autumn as well. Total RNA isolation was performed from liver and flesh in all samples. In our future, toxicological effects induced by micropollluting agents will be examined on carp liver, flesh and blood samples at the level of microRNA. The 15 tested chemicals will be selected on the basis of analytical studies of the most important Hungarian pond contaminants. Changes in the microRNA profile will be determined after subchronic studies at the concentration of 1/50 part of the 96 h LC50 values. With the analysis of the results a database can be built up and a risk and quality assessment and prediction system can be created.

Keywords: Bioaccumulation, Common carp, miRNA, Environmental analytics, Fish meat quality

The study was supported by the NVKP_16-1-2016-0023 and by the EFOP-3.6.3-VEKOP-16-2017-00008 projects. The project is co-financed by the European Union and the European Social Fund.
ORAL PRESENTATION

Prebiotics, Probiotics and Synbiotics for Sustainable Aquaculture

Seyed Hossein Hoseinifar¹, Tahereh Bagheri²

¹Department of Fisheries, Faculty of Fisheries and Environmental Sciences, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran.
²Offshore Fisheries Research Center, Iranian Fisheries Science Research Institute, Agricultural Research Education and Extension Organization, Chabahar, Iran.

Corresponding author e-mail: Bagheri1360@gmail.com

Abstract

Better resistance to pathogens, reduction in blood lipids, improving lipid metabolism, hormonal regulation and immune stimulation, supplying energy sources may all be possible through digestive tract microflora manipulation. The ways that has been suggested for digestive tract normal microflora alteration are: probiotics, prebiotics, and synbiotics. Probiotics are alive micro-organisms with health benefit to the host, improving growth and survival rate. A wide range of microalgae, yeasts, and Gram-positive bacteria has been evaluated. The modes of action of the probiotics are competitive exclusion, i.e. the probiotics actively inhibit the colonization of potential pathogens in the digestive tract by antibiosis or by competition for nutrients and/or space, alteration of microbial metabolism, and/or by the stimulation of host immunity. However, the survivability/viability of new microorganisms introduced to digestive tract is difficult to guarantee. New strategies have been using prebiotic as feed ingredient in fish nutrition to improve stability of gastrointestinal microflora. Presently researchers are investigating the use of synbiotics which is combination of pro- and prebiotics. The present review summarizes and discusses the topic of potential application of pro-, pre- and synbiotics for sustainable aquaculture.

Keywords: Aquaculture, microbiota, probiotic, prebiotic, synbiotic.
Sex Determination and Sex Control in Teleost Fishes

Tülin Arslan
Mugla Sitki Kocman University, Department of Aquaculture, Mugla Turkey
Corresponding author e-mail: atulin@mu.edu.tr

Abstract

Introduction: Teleost fishes show various types of reproductive strategies, including gonochorism, sequential and simultaneous hermaphroditism, and unisexuality. Underneath all these reproductive strategies, genetic factors operate to determine the sex, but sex chromosome evolution in primitive stage and majority of teleosts do not have heteromorphic sex chromosomes. Although both male and female heterogametic systems, even their combination are present, no single master sex determining gene homologous to mammalian sry or birds’ dmrt genes has been demonstrated in teleosts. Additionally, sexual differentiation even in gonochoristic teleosts show such a high plasticity to environmental and social cues that individuals with phenotypic sex opposite to their genetic sex can develop. This high diversity and lability of sex determination and differentiation mechanisms in teleost fishes is amazing, but their reproductive characteristics have tremendous impacts in their culture efficiency and economics. As a consequence, sex control has become the most commonly employed biotechnology in aquaculture. This biotechnology has helped to aquaculture industry in solution of the problems such as precocious maturation and spawning in grow-out systems, deterioration of meat quality upon maturation. Additionally, it has provided opportunities for choosing the faster growing and economically more valuable sex, controlling the numbers of male and female brooders and minimizing the risk of environmental impact. Techniques such as direct or indirect hormonal sex-reversal, manipulation of environmental and social factors, gynogenesis, polyploidy, hybridization and marker assisted selection has been commonly employed to control sex and sexual differentiation in teleost fishes. This presentation will summarize our current knowledge on sex determination mechanisms in teleost and strategies developed for the sex control and sexual differentiation will be discussed with an emphasis on the fishes cultured in Turkey and researches conducted in our institution.

Materials and Methods: Over the years, several studies have been conducted in our institution in order to develop the most practical and effective monosex female production procedure for rainbow trout (Oncorhynchus mykiss). With this aim we employed indirect hormonal sex-reversal technique which requires production of XX males. We administered variable dosages of androgens (11β-hydroxyandrostenedione, 17α-methyltestosterone (MT) and 17α-methylhydrotestosterone (MDHT)) at different developmental stages (changing from one week after hatching to first feeding) in different intensities either orally or through rearing water. Then, we determined the effects of these hormone treatments on gonadal morphology and function via direct evaluation of gonadal development and fertilization trials.

Results and Discussion: Results of our studies demonstrated that the most effective androgens in control of sexual differentiation of rainbow trout were MT and MDHT. Both androgens were effective at dosages as low as 0.5 mg/L of rearing water or 1 mg/kg diet. Higher dosages and extended treatment periods reduced the size of gonads and even induced sterility, while low dosages and shorter treatment periods yielded XX males with intact sperm ducts. However, high level of XX male production required a treatment period covering the last two weeks of pre-larval and first month of post-larval stages.

Keywords: Sex Determination, Sex Control, Sex-Reversal, Triploidy, Marker Assisted Selection
ORAL PRESENTATION

Potential Impact of Different Endocrine Disrupting Compounds (EDC) on Fish Assemblage Composition – Preliminary Results

Ádám Staszny1, Gábor Maász2, Péter Dobosy3, Zsolt Pirger2, Vera Juhász1, Lilianna Olimpia Pap1, Attila Csaba Kondor3, Béla Urbányi1, Árpád Ferincz1

1Department of Aquaculture, Szent István University, Gödöllő
2Balaton Limnological Institute, Centre for Ecological Research, Hungarian Academy of Sciences, Tihany
3Danube Research Institute, Centre for Ecological Research, Hungarian Academy of Sciences, Budapest

Corresponding author e-mail: Staszny.Adam@mkk.szie.hu; Ferincz.Arpad@mkk.szie.hu

Abstract

Analytical methods became more and more sensitive in the past decade, therefore became able to detect and quantify compounds, characterized by very low (1-100 ng/l) environmental concentrations in natural waters. One of the most important compound groups are Endocrine Disruptors, which contains numerous chemically distinct molecules exerting serious impact on the endocrine system of organisms. The occurrence of these EDC’s are strongly related to the human population, since most of them could be derived from pharmaceuticals, excreted by the users and cannot be eliminated in wastewater treatment plants. A comprehensive screening study was conducted in 2017, including all the constant watercourses in the commuting zone (agglomeration) of Budapest (Hungary). Fish assemblage surveys were conducted and water samples for analytical measurements (EDC, nutrient content, heavy metals) were collected from 54 localities. Specimens belonging to 38 fish species were caught on 43 sampling sites. Analytical measurements found 40 compounds, which reached 10ng/l concentration at least at one sampling site. Data were analysed using multivariate methods: variable selection, redundancy analysis (RDA) and variance partition were used to determine the potential effects of EDC concentrations and water physical-chemical characteristics on the fish assemblage composition. Nine significantly effective compounds were identified by the variable selection, which were associated with the 23% of the total variance of fish assemblage composition. This relation may identify a new factor affecting the biodiversity of natural waters.

This project was financed from the Hungarian National Research, Development and Innovation Fund (project name: NVKP_16-1-2016-0003: Water quality, ecological, and food safety risks of some endocrine disruptors (EDCs) found in treated and untreated sewage of Budapest Metropolitan Region and risk mitigation development;”); and the “EFOP-3.6.3-VEKOP-16-2017-00008” projects. Árpád Ferincz, Zsolt Pirger and Ádám Staszny was supported by the Bolyai János Postdoctoral Fellowship of the Hungarian Academy of Sciences.

Keywords: Endocrine Disruptor Compounds, variance partitioning, fish assemblage structure, environmental concentration.
ORAL PRESENTATION

Nay-Band Coastal - Marine National Park; Missed opportunity for Iran

Ali Jafari¹, Roya Rahnama²

¹Assistant professor, Department of Fisheries and Environment, Faculty of Natural Resources and Earth Sciences, Shahrekord University, Iran.
²Department of Aquatic Animal Health and Diseases, Faculty of Veterinary medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran.

Corresponding author e-mail:: jafari.ali@nres.sku.ac.ir

Abstract

Nayaband coastal protected area with approximately 49815 ha area, south of Iran, was the best opportunity to become the first and only Iranian coastal-marine national park due to its special geographical location and diversity of habitats and species. But with the onset of natural gas extraction as the largest energy zone in Iran since about 20 years ago, and the emergence of extensive environmental impacts of the project’s activities, this opportunity should be considered forever to be lost. In this article, the criteria for selecting the coastal-marine national parks and then matching the ecological characteristics of the Nayband Strait with these criteria are discussed. Based on a review of the literature carried out, the most important criteria for choosing coastal-marine national parks are biodiversity (both species and habitat) and ecological integrity. Nayband coastal protected area with a variety of plant and animal species including avicennia, cashaw, bo tree, nubk tree, acacia, palm, Eagle muzzle turtle, jebeer gazelle, caracal, Indian gerbil greater cormorant, dalmation pelican, gray heron, gray partridge, Bonelle’s eagle, kestrel, falcon, fish species such as javelin grunter, Jhon’s snapper, bigeye croaker, etc, and the diversity of habitats from mangrove forest habitats, sandy and rocky beaches to terrestrial savanna likes habitats could earn points for the title of the national park. Unfortunately, as a result of the development of industrial infrastructure in the offshore area, it lost its ecological integrity and receives waste from the region in the form of sewage containing oil and oil products; waste and atmospheric pollution containing various sulfur and Nitrate gases and gradually it is also reducing the biodiversity values of the region.

Keywords: Asalouyeh, Coastal-marine National Park, Biodiversity, Mangrove.
ORAL PRESENTATION

The Effects of Some Phenolic Compounds on Biogenic Amines Development in Lysine Decarboxylase Medium

Ali Serhat Özkütük¹, Gülsün Özyurt², Esmeray Küley Boğa², Ali Rıza Köşker², Fatih Özoğul²

¹Department of Fisheries, Yumurtalık Vocational School, Çukurova University, Adana, Turkey
²Department Fisheries and Seafood Processing Technology, Faculty of Fisheries, Çukurova University, Adana, Turkey

Corresponding author e-mail: aliserhat@cu.edu.tr

Abstract

Phenolic compounds such as carnosic acid, kaempferol and luteolin were used in preparation of lysine decarboxylase medium. Spoilage bacteria in the flora of aquatic organisms such as Photobacterium damsela, Proteus mirabilis, Enterobacter cloaceae, Serratia liquefiction and Pseudomonas luteola and pathogenic bacteria such as E.coli, Staphylococcus aureus, Yersinia enterocolitica, Salmonella paratyphi A and Enterobacter faecalis have been investigated in lysine decarboxylase medium using HPLC method. Significance differences were observed by bacteria in terms of ammonia, histamine and other biogenic amines production (P < 0.05). It was observed that luteolin was more effective in the inhibition of biogenic amines than carnosic acid and kaempferol in the study. The major amines produced in the lysine medium were putrescine, cadaverine, serotonin, tyramine and dopamine. The highest histamine and tyramine production was achieved by P.luteola supplemented with carnosic acid and kaempferol, respectively (58.05 and 318.82 mg/L, respectively). The highest putrescine production was by the control group of Y. enterocolitica (173.79 mg/L) and the highest cadaverine production was by the kaempferol group of S.aureus (278.77 mg/L). The highest serotonin and dopamine production was observed by P. mirabilis (288.87 and 40.09 mg/L, respectively), which is a spoilage bacterium. While bacterial production of histamine, cadaverine, spermidine, tyramine and agmatine was significantly inhibited by luteolin supplementation, putrescine, tryptamine, serotonin and dopamine productions were largely inhibited by carnosic acid supplementation.

Keywords: Luteolin, kaempferol, carnosic acid, biogenic amine, lysine decarboxylase.
ORAL PRESENTATION

Effects of Zinc Oxide Nanoparticles on Histopathological and Ultrastructural Lesions of Gill and Mantle Organs of *Corbicula fluminea* (O. F. Müller, 1774)

Amir Qadermarzi\(^1\,^2\), Mojtaba Pouladi\(^1\,^2\), Fateh Moezzi\(^3\), Maryam Yavar\(^4\), Aliakbar Hedayati\(^1\)

\(^1\)Department of Fisheries, Faculty of Fisheries and Environment Sciences, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Golestan, Iran
\(^2\)Young Researchers and Elite Club, Gorgan Branch, Islamic Azad University, Gorgan, Iran
\(^3\)Department of Fisheries, Faculty of Natural Resources, Tehran University, Karaj, Iran
\(^4\)Islamic Azad University, Science and Research Branch, Tehran, Iran

Corresponding author e-mail: Mojtabafishery1987@gmail.com

Abstract

During this research, histopathological and ultrastructural changes in gill and mantle organs of freshwater bivalve *Corbicula fluminea* in expose of sub-lethal levels of zinc oxide nanoparticles were investigated for a period of 14 days. *C. fluminea* was collected from Tajan River. Bivalves were exposed to the concentration 25 ppm of zinc oxide nanoparticles for 4, 9 and 14 days in the laboratory environment. Tissue samples were obtained to survey optical microscopy and scanning electron microscope (SEM). The results of the light microscopic images showed significant histological effects on the exposed organs of *C. fluminea* in compared to the control group. These changes were included hyperplasia, hypoplasia, changes in shape and measure of filaments, gills atrophy and hemolymph channels. Also in the mantle, it was included increasing the number of cells, mucosal epithelium, and hyperplasia. Outer ultrastructural images confirmed widespread destruction of gill filaments, blocking the water channels in the gills and necrosis on a mantel. These lesions were led to the obvious break in the structure of mantle and wrinkle in the outer layer that completely changed and led to the emergence tissue break at the level of the organs.

Keywords: *Corbicula fluminea*, Zinc Oxide, gill, mantle, nanoparticle
ORAL PRESENTATION

Investigation of Changes in the Weight and Blood Parameters of Trout (*Oncorhynchus mykiss*) during Breeding Period

Başar Altinterim¹, Önder Aksu², Mehmet Şen¹

¹İnönü University, Fisheries Faculty
²Munzur University, Fisheries Faculty

Corresponding author e-mail: basaraltinterim@gmail.com

Abstract

In this study, trout (*Oncorhynchus mykiss*) from the facilities located in Doğanşehir Sürgü, Malatya was used. Samples were received between November 2017 and January 2018. During the study, a total of 60 fish, 10 female, 10 male, 10 female, 10 male and 10 female, were studied in the pre-milking period. After the fish were anesthetized with 0.25% phenoxethanol, blood was taken from the tail end with the help of the injector. Blood samples were taken from the alveolar vessels and measured with the PROKAN 6800 VET device. Hematological analyzes were performed using the Cell DN 1700 coulter counter to determine blood parameters. The weight of male fishes before breeding was 359.5±32.7 g, increased to 453 ± 74.09 g during the breeding period and decreased to 354 ± 99.35 g at the end of breeding period. In females, before breeding period weights were 421 ± 28.46 g, decreased to 375 ± 54.62 g during the breeding period and increased to 392 ± 75.69 g after the breeding period. The blood parameters obtained for male fish are as follows; white blood cells (WBC): 50.8 ± 14.82 10³/µL before breeding, 55.79 ± 2.79 10³/µL during breeding, 54.61 ± 3.052 10³/µL after breeding; red blood cells (RBC): 1.95 ± 0.59 10⁶/µL before breeding, 2.25 ± 0.20 10⁶/µL during breeding, 2.24 ± 0.35 10⁶/µL after breeding; hemoglobin (HGB): 10.11 ± 3.07 g/dl before breeding, 11.02 ± 1.02 g/dl during breeding, 9.79 ± 0.84 g/dl after breeding; hematocrit (HCT): 26.38 ± 8.04% before breeding, 28.73 ± 2.70% during breeding, 29.62 ± 3.77% after breeding; leucocyte (GRAN): 1.664 ± 0.81 10³/µ before breeding, 1.22 ± 0.29 10³/µ during breeding, 1.33 ± 0.36 10³/µ after breeding. The blood parameters obtained for female fish are as follows; white blood cells (WBC): 54.57 ± 4.86 10³/µL before breeding, 47.2 ± 8 10³/µL during breeding, 42.65 ± 7.11 10³/µL after breeding; red blood cells (RBC): 1.94 ± 0.18 10⁶/µL before breeding, 1.75 ± 0.33 10⁶/µL during breeding, 1.39 ± 0.33 10⁶/µL after breeding; hemoglobin (HGB): 10.17 ± 0.78 g/dl before breeding, 8.89 ± 1.59 g/dl during breeding, 6.74 ± 1.57 g/dl after breeding; hematocrit (HCT): ± 2.07% before breeding, 22.44 ± 4.54 % during breeding, 18.04 ± 4.03% after breeding; leucocyte (GRAN): 1.54 ± 0.47 10³/µ before breeding, 1.18 ± 0.26 10³/µ during breeding, 1.09 ± 0.22 10³/µ after breeding.

Keywords: *Oncorhynchus mykiss*, rainbow trout, blood parameters, weight, breeding
ORAL PRESENTATION

Utilisation of R&D Project in the Aquaculture Sector, Presentation of Possible Outputs through a Hungarian Example

Béla Urbányi, Zoltán Bokor

Department of Aquaculture, Szent István University, Gödöllő, Hungary

Corresponding author e-mail: urbanyi.bela@mkk.szie.hu

Abstract

The National Research, Development and Innovation Fund has supported the implementation of the project with appr. 3 900 000 EUR. The project was carried out by a consortium of 8 partners, 6 production companies and 2 research institutions between 01.01.2014 and 31.12.2017. The development of activities focusing on the challenges of the national aquaculture sector since the beginning of the project. The partners have carried out all 101 subtasks and have reached all targeted professional indicator measures. As a result of the research and development work, 7 technology descriptions have been prepared for fish breeding, rearing, and processing, and 2 prototype descriptions have also been made one of which was granted utility model protection. One focus point of the project was the development of new fish products, and as result 10 new products will broaden the fish product range in the country based on trout, carp, perch, catfish and grass carp. 73 national and international scientific publications (scientific communication, conference presentations, scientific student forum theses, final theses, PhD theses etc.) were prepared from the R&D results of the project for the presentation of the results and to strengthen the knowledge and technology transfer processes. As a closure of the project, an information leaflet was prepared summarising the most important results of the project. Overall it can be said that the project has reached its goals, the undertaken tasks have been carried out with the effective cooperation of the consortium partners, both the companies and the research institutions.

Keywords: R&D project, freshwater aquaculture, research output, technology transfer

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ORAL PRESENTATION

Biological Synthesis of Silver Nanoparticles from *Escherichia hermannii* and Antimicrobial Behaviour against Human Pathogens

Belgin Erdem¹, Esin Kıray², Alpaslan Dayangaç³, Dilek Yalçın Duygu⁴, İlkay Açıkgoz Erkaya⁵

¹Department of Medical Services and Techniques, Health Services Vocational College, Ahi Evran University, Kırşehir, Turkey
²Departments of Midwifery, School of Health, Ahi Evran University, Kırşehir, Turkey
³Department of Nutrition and Dietetics, School of Health, Osmaniye Korkut Ata University, Osmaniye, Turkey
⁴Department of Biology, Faculty of Education, Gazi University, Kırşehir, Turkey
⁵Department of Environmental Engineering, Faculty of Engineering and Architecture, Ahi Evran University, Kırşehir, Turkey

Corresponding author e-mail: berdem@ahievran.edu.tr

Abstract

This study aims to synthesize, characterize silver nanoparticles (AgNPs) using a cell free extract of *Escherichia hermannii* fish isolates. The obtained AgNPs measured by UV-Visible spectrophotometer (420-480 nm) and the antimicrobial activity of AgNPs produced was evaluated against some human pathogenic bacterial isolates using well diffusion method. AgNPs were produced by *E. hermannii* under study and the synthesized AgNPs proved antibacterial activity with zone of inhibition ranged between 8 to 25 mm. The highest antibacterial activity was observed against *L. monocytogenes, S. typhimurium* and *S. dysenteriae*. The lower activity was found against *P. mirabilis* no zone of inhibition was recorded. To the best of our knowledge, this is the second report of synthesis of AgNPs by *E. hermannii* species, and we believe that AgNPs may be considered a potential source of novel antibacterial agent against the emerging antimicrobial resistant pathogenic bacteria.

Keywords: *Escherichia hermannii*, antimicrobial activity, silver nanoparticles
ORAL PRESENTATION

The Effect of Gibberellic Acid on Germination and Seedling Growth of *Amaranthus retroflexus* L. in Tissue Culture Conditions

Betül Akın

Dumlupınar University, Science and Art Faculty, Department of Biology, Kutahya, Turkey

Corresponding author e-mail: betul.akin@dpu.edu.tr

Abstract

*Amaranthus retroflexus* L. is a common weed species in agricultural areas. *A. retroflexus*, also known as the redroot pigweed, is a cosmopolitan and an invasive plant species belong to Amaranthus genus and has been used as a food source for centuries. Because of the *A. retroflexus* plant produces a large number of long viable and dormant seeds, seeds can remain in the soil for many years without germination. The aim of our study is to determine the effect of different concentrations of gibberellic acid on in vitro germination and seedling growth of *A. retroflexus*. Therefore, we planned to investigate different concentrations of GA₃ effects on growth of *A. retroflexus* using tissue culture technique. Seed germination was carried out in the plant growth chamber under conditions of 16/8 hours (light/dark) photoperiods, 25°C temperature and 70% relative humidity. Seed germination and seedling growth were provided in tissue culture using Murashige and Skoog (MS) nutrient medium. GA₃ was added into the media at different concentrations in the range of 0-100 mg l⁻¹. As a result of different GA₃ treatments, 100% seed germination was obtained at 50 mg l⁻¹ GA₃ application and the highest germination rate was determined at this concentration. Consequently, while the most effective treatments on root length and number of leaves were MS and 50 mg l⁻¹ GA₃ respectively, the highest shoot length (5.09 cm) was obtained in 50 mg l⁻¹ GA₃. On the other hand, 75 and 100 mg l⁻¹ GA₃ concentrations resulted in weak and yellowish seedlings.

Keywords: *Amaranthus retroflexus*, germination, giberellic acid, tissue culture
ORAL PRESENTATION

Effects of Nitrogen Deficiency and High Salinity on Growth, Lipid and Fatty Acid Compositions of *Spirulina platensis* Cultured in Outdoor Ponds

Burcu Ak Çimen, Oya Işık, Leyla Uslu

Department of Basic Sciences, Faculty of Fisheries, Cukurova University, Adana, Turkey

Corresponding author e-mail: bak@cu.edu.tr

Abstract

In the present study, the effects of nitrogen deficiency [100% N(-)] and high salinity (35‰) on growth, lipid and fatty acid compositions of *Spirulina platensis* (Cyanophyceae), cultured under in outdoor ponds under greenhouse conditions were investigated. *Spirulina* was cultured in *Spirulina* medium, in 1x5x0.2 m sized fiberglass ponds and 1m³ volume for each. The specific growth rate, biomass and biomass productivity, cell density, chlorophyll *a*, total carotenoid, protein, lipid and lipid productivity, fatty acid methyl esters were determined. Biomass of *Spirulina platensis* were harvested at the stationary phase and 5.13%, 20.85%, 12.15% lipids were recorded for the groups of control, nitrogen deficiency (100% N(-)), and high salinity (35‰), respectively. As a result, it was observed that nitrogen deficiency and high salinity increased the lipid content whereas significant decreases were recorded in the biomass, cell density, chlorophyll *a*, total carotene and protein. The fatty acid composition of the *Spirulina platensis* cultured show that decanoic, palmitic, stearic, myristoleic, palmitoleic, oleic, linolenic, linoleic and gamma-linolenic acids were then most prevalent. Nitrogen deficiency and high salinity increased the lipid content together with certain saturated and unsaturated fatty acids especially the polyunsaturated fatty acids (Stearic, myristoleic, oleic, linoleic and gamma-linolenic acid values).

**Keywords:** *Spirulina platensis*, nitrogen deficiency, high salinity, lipid, fatty acid composition
ORAL PRESENTATION

Alternative Protein Sources for Life Quality and Welfare of Zebrafish

Çetin Yağcılar¹, Nilay Seyidoglu²

¹Tekirdag Namik Kemal University, Faculty of Veterinary, Tekirdag, Turkey
²Department of Physiology, Tekirdag Namik Kemal University, Faculty of Veterinary, Tekirdag, Turkey

Corresponding author e-mail: cyagcilar@nku.edu.tr, nseyidoglu@nku.edu.tr

Abstract

The source and quantity of protein are important for growth and developmental stages of ornamental fishes. The protein intake and energy requirements are also increasing belong to increase in body size with age-related. For this reason, adequate and balanced nutrition in these processes is crucial to ensure the vitality and continue the vital functions. In our research, the effects of 6 different protein sources (commercial powered meal, peas, whey, Spirulina platensis, isolated soybean, nutritional yeast and wheat) on growth and welfare of zebrafish, which is being popular in scientific world for studies of cancer, toxicology, drug and gene due to its anatomical structure, was investigated in their developmental stage. The length of fishes were measured under microscope by micrometer method. Also, the pH, conductivity, salinity and TDS of water were determined. It was investigate that supplementation of peas (7.24 ± 0.137 mm), soy (6.83 ± 0.206 mm), wheat (6.40 ± 0.167 mm) and nutritional yeast (5.89 ± 0.116 mm) were more effective during the developmental stages. There were significant differences in the average response between groups (p<0.05). There was also no effect occurred in groups S. platensis and whey protein, and also mortality rates were found very high in these groups. This study is expected to provide the life quality and welfare of zebrafish and to support the use of alternative additives in ornimental fishes.

Keywords: Zebrafish, ornamental fishes, protein source, Spirulina platensis, whey protein
ORAL PRESENTATION

Detection of *Mycobacterium* sp. in Cultured Sea Bream (*Sparus aurata*) in Turkey

Cigdem Urku¹, Gonca Erkose Genc², Zayre Erturan²

¹Department of Fish Disease, Faculty of Aquatic Sciences, University of Istanbul, Istanbul, Turkey
²Department of Medical Microbiology, Istanbul Faculty of Medicine, Istanbul University, Istanbul/ Turkey

Corresponding author e-mail: curku@istanbul.edu.tr

Abstract

During the last decades, mycobacteriosis agents have become important fish pathogens. In present study describes mycobacteriosis in farmed sea bream (*Sparus aurata*) caused by *Mycobacterium* sp. in Turkey.

**Keywords:** *Mycobacterium* sp, sea bream, Genotype Mycobacterium CM/AS assay

**Introduction**

Occurrence of systemic fish mycobacteriosis, causing high mortality, has increasingly been reported in the past decade (Avsever et al., 2014; Kent et al.,; 2004; Timur et al., 2015). This is a systemic disease among both wild and cultured fish species (Gauthier & Rhodes, 2009; Jacobs et al., 2009). The aim of the study is to investigate an infectious disease which induced high mortalities (40%) in the culture sea bream farm in the Agean Sea.

**Material and Methods**

Fifteen affected fish (15-20 g) that generally showed loss of appetite, lethargy, and emaciation were obtained from a floating marine cage farm located on the coast of the Aegean Sea in Turkey. Samples of kidney, liver, and spleen were streaked onto Tryptic Soy Agar (TSA) supplemented with 1.5% NaCl and Löwenstein-Jensen (L-J) medium. Plates were incubated at 24-25 C° for 2 weeks. Physiologic characteristics were determined using some biochemical tests such as catalase, nitrate reduction, urease activity, hydrolyse Tween 80, and growth on MacConkey Agar (Buller, 2014). The isolated acid-fast bacteria (n=15) were identified using commercially available line probe assays, the Genotype CM and AS (HainLife Science, Germany). The GenoType Mycobacterium CM/AS assay was performed in accordance with the manufacturer’s instructions.

**Results**

Fifteen moribund sea bream exhibited external clinical signs that included extreme emaciation pale skin, loss of scales, and dorsal and pectoral fins necrosis. Internally, the moribund fish showed pale liver, enlargement of the spleen, and yellow gelatinous fluid in the intestine. After the two-week incubation period, only yellow to orange pigmented colonies were observed both on L-J medium and also on TSA. Smooth, photochromogenic colonies were examined for acid-fastness and Gram staining. The ZN stained bacterial smear from these colonies revealed acid-fast and short rod or coccoid-shaped bacteria. There was also a positive reaction for catalase and nitrate reduction; the test for urease was negative and there was no growth on MacConkey Agar (MCA).

The Genotype CM yielded bands on position 1, 2, 3, and 10, resulting in *Mycobacterium* species, and Genotype AS test bands were detected at position 1, 2, 3, and 12, again yielding Mycobacterium species. According to these results, all mycobacterial isolates were not identified to the species level with Genotype AS and CM kits.
Discussion

The clinical signs of mycobacteriosis in fish have been reported to be unspecific (Jacobs et al., 2009). But in this study macroscopic grayish-white miliary granulomas were not observed on the visceral organs as described in previous reports (Noga 2000; Avsever et al., 2014, Timur et al., 2015). Phenotypic characteristics such as photochromogenic yellow to orange-pigmented colonies, a shorter incubation period (2-3 weeks), and conventional methods such as catalase, nitrate reduction, urease were not sufficient for identification of the isolates.

Also, the colony formation and color of the isolates were very similar to those of *M. marinum*, as described in previous reports (dos Santos et al., 2002; Avsever et al., 2014; Timur et al., 2015). The most important differentiation between the our isolates and *M. marinum* was the incubation period because the isolates in the present study had a shorter incubation period compared with the incubation period of *M. marinum*. *Mycobacterium* species have been identified to the species level using Genotype Mycobacterium AS and CM assays in previous reports (Gitti et al., 2005; Avsever et al., 2015). However, Timur et al. (2015) reported that *M. marinum* species isolated from meagre were identified as *M. ulcerans* according to AS assay. In the present study, these molecular assays were insufficient to identify our isolates, because our isolates were only identified as *Mycobacterium* species according to both AS assay and CM assay.

In conclusion, in Turkey, *M. marinum*, the causative agents of mycobacteriosis, has been reported from diseased sea bass and meagre. In this study, the pathogen causing mycobacteriosis in the cultured young sea bream was isolated and identified as *Mycobacterium* sp. This pathogen bacterium is important risk for the fish health so our further study will be carried out on pathogenesis of this bacterium.

References


ORAL PRESENTATION

Research on the Impact of the Modified Nutrition Media over the Cell Growth of Microalga *Dolichospermum affine* (Lemmermann) Wacklin, L.Hoffmann & Komárek

Dilek Yalçın Duygu¹, Figen Ünlü Erkoç¹, İlkay Açıkgöz Erkaya², Tülay Özer³, Özge Sızmaº⁴

¹Department of Biology Education, Faculty of Education, Gazi University, Ankara, Turkey
²Department of Environmental Engineering, Faculty of Engineering and Architecture, Ahi Evran University, Kırşehir, Turkey
³Department of Food Technology, Kaman High of Applied Science, Ahi Evran University, Kırşehir, Turkey
⁴Department of Animal Nutrition and Nutritional Diseases, Faculty of Veterinary Medicine, University of Ankara, Ankara, Turkey

Corresponding author e-mail: dilekduygu06@hotmail.com

Abstract

Cell contents and growth dynamics of microalgae can be modified by means of nutrition limitation (lack or absence of nitrogen and phosphate) and environmental stresses (light, warmth, salinity, pH and heavy metals). In this study, BG-11 nutrition media has been modified in six different ways and its impact on the cell density, specific growth rate, lipid and pigment amount of *Dolichospermum affine* (Lemmermann) Wacklin, L.Hoffmann & Komárek. The species had been used in the culture collection (CCA01Ana01) of Ahi Evran University (AEU-CCA). By using FTIR spectrometer, its molecular characterisation has been executed. BG-11 nutrition media has been prepared through the modification in terms of (1) Control; (2) 50% N(-); (3) 50% P(-); (4) 50% N(-)/50% P(-); (5) 100% N(-); (6) 100% N(-)/100% P(-). Total cell density was microscopically determined by using Sedgewick-Rafter Counting Cell Slide. In the beginning, the cell numbers of the cultures ranged between (1.45x10⁶ - 1.65 x10⁶ cells/mL). A linear regression equation was obtained to determine the relationship between the optical density and the cell density. Optical density was detected at 681 nm for *D. affine* strains. The biomass of microalgae sample was estimated from their chlorophyll-a and carotene content measured through use of acetone method. Cell density exhibited differences during the course of the study in accordance with six conditions and they have been identified in the gap between 4.14x10⁶ - 9.67x10⁶ cells/mL. In the nutrition medium No: (4) chlorophyll-a (3.761 μg L⁻¹) and carotene (12.985 μg L⁻¹) has been identified as the highest. Measurements were carried out during 15 days with 3 parallels.

Keywords: *Dolichospermum affine*, N limitation, P limitation, growth kinetics, specific growth rate
ORAL PRESENTATION

The Scrutinising of Changes in the Aquaculture Supports

Durali Danabaş

1Munzur University, Fisheries Faculty, TR62000, Tunceli, Turkey.

Abstract

In the world, aquaculture is seen as the fastest growing and developing food production sector and however, in the near future, it is estimated that the rates of fisheries and aquaculture will be equalized. In 2015, the fisheries production of the world amounted to 170.345,641 tons (fisheries; 93,704,616 tons and aquaculture; 76.641,025 tons) according to the FAO records. The aquaculture in Turkey started in 1970s and its rate in total fisheries production has rapidly increased as of 2000. In our country, the amount of aquaculture, which was 79,943 tons in 2003, reached 253.395 tons in 2016. The aquaculture rate in the total production of our country has increased by more than 310%. As one of the most important reasons for this rate increase, it is seen to be providing some support policies with various incentive systems by the government for support and encourage the aquaculture in country. Directly product support for aquaculture farmers was started in 2003. According to the total capacity of the farms, total product and fry supports were provided. In 2008, the total capacity supported was limited to 2000 tons/year. However, in 2012, different tonnage application (whole unit price to 250 tons/year and ½ unit price from 251 to 500 tons/year) were brought to the total product support and the fry support was removed. At the same time, the processed product support was brought at the rate of twice the amount specified in the invoices of the total product. In the present, the support system is still continuing. The types of product support, prices, supported capacities and the expense criteria are applied annually by issuing the “Aquaculture Support Communiqués” in the Official Gazette.

Keywords: Aquaculture, fisheries, support, communiqués.
ORAL PRESENTATION

Can Opportunistic Sampling Provide Information for Conservation of Sharks and Rays?
Elasmobranch Biology in Turkish Seas

Elizabeth Grace Tunka Bengil1,2, Fethi Bengil1,2

1Girne American University, Marine School, Girne, TRNC via Turkey
2Akdeniz Koruma Derneği, Urla, Izmir, TURKEY

Abstract

There are questions going around, rather scientific sampling should be questioned, or all stopped due to status of a shark and ray species populations and suggest on a hands-off approach, on the other hand some votes lethal sampling is important for obtaining information on life history for more effective management or conservation strategies. Producing science base biological information on endangered species is crucial for species conservation. In case of sharks and rays, this need increases since these species are the species that have are unpopular and marked as monsters by public, feared throughout most part of the history. Though it is important to obtain biological information, it is also as important to do little damage as possible to the populations since most of elasmobranch species are in a declining trend in the world seas as well as the Mediterranean Sea. Growing concern for shark and ray populations increases the pressure not to kill these animals. This raises concern about how research on sharks should be conducted. Regarding this, aim of this study is to determine if opportunistic sampling methodology is enough to obtain or produce biological information on eight endangered elasmobranch species (9 sharks and 6 rays) without adding more pressure on their populations. As part of two “The Rufford Foundation Small Grant Program” projects, individuals of 15 species were obtained through the project. Critically Endangered Squatina squatina, Isurus oxyrinchus, Gymnura altavela; Endangered Carcharhinus plumbeus, Glaucocephalus cemiculus, Rhinobatos rhinobatos; Vulnerable Mustelus mustelus, Mustelus punctulatus and Mustelusasterias; Near Threaten Raja clavata, Dasyatis pastinaca, and Myliobatis aquila; Least concern Scyliorhinus canicula and a Data Deficient species Torpedo marmorata and Raja radula were collected from coasts of Izmir Bay to Iskenderun Bay, eastern Mediterranean, between May 2015-January 2018. Individuals either were obtained frozen or fresh from fishermen, and only bycatch individuals which died due to fishing activities were collected or bought from local fish mongers. Each individual was examined and morphological measurements, stomach contents and maturity stages were recorded. Among these individuals, M. asterias, Raja radula and Torpedo marmorata were pregnant individuals and rest were either neonates or fully mature. In conclusion, present study demonstrates that though opportunistic sampling methodology for population dynamic studies on elasmobranch species is not enough in certain cases (such as for length and weight relationship), but it is still a useful tool to obtain biological data on especially endangered species.

Keywords: Elasmobranch, biology, opportunistic sampling, Eastern Mediterranean
Comparison of Silverfish \textit{(Atherina boyeri)} with Rainbow Trout \textit{(Oncorhynchus mykiss)} as an Alternative Protein Source

Emre Yavuzer\textsuperscript{1}, Sertan Aytaç\textsuperscript{1}, Özlem Gündoğdu\textsuperscript{1}, M. Nuket Yavuzer\textsuperscript{2}

\textsuperscript{1}Department of Food Processing, Kaman Vocational School, Ahi Evran University, Kırşehir, Turkey
\textsuperscript{2}Institute of Science and Technology, Çukurova University, Adana, Turkey

Corresponding author e-mail: emreyavuzer@ahievran.edu.tr

Abstract

Depending on population growth, there is a trend towards alternative protein sources in the world. Tasting and traditional culture are the most important factor in receiving the protein requirements. \textit{Atherina boyeri} exists commonly in many water sources in Turkey and the sand smelt, which is often not consumed by consumers of our country, is being exported extensively. Although sand smelt is a very healthy protein source (76.2\% moisture, 3.5\% lipid and 16.8\% protein), rich in fatty acids and tasty it is sold abroad quite cheaply. The trout which analysed in this study has same proximate values (76.32\% moisture, 5.7\% lipid and 17.13 protein\%). Countries that import sand smelt from our country can sell it at very high prices with processing them as chips. In this study, sensory analysis of whole roasted sand smelt and trout fillet were done. Cooked fishes’ analyses were made by Paulus et al. (1979). For the analysis of cooked fish, samples were cooked in sunflower oil. There were significance differences between sand smelt and trout group (p<0.05). Sand smelt group preferred more by panellist because of its attractive flavour like chips and it can be demonstrated that sand smelt can be use a cheaper source of protein since they have better consumer acceptance.

Keywords: Sand smelt, alternative protein source, rainbow trout, sensory analyses
ORAL PRESENTATION

The Effect of Curcumin on Oxytetracycline-induced Blood Parameters in Rainbow Trout

(Oncorhynchus mykiss)

Erdinç Şahinöz¹, Zafer Doğu¹, Faruk Aral²

¹Department of Fisheries and Aquaculture, Bozova Vocational High School, Harran University, Şanlıurfa, Turkey
²Faculty of Art and Science, Niğde Ömer Halisdemir University, Niğde, Turkey

Corresponding author e-mail: zaferdogu@harran.edu.tr

Abstract

The aim of this study was to determine the effects of Curcumin on oxytetracycline (OTC)-induced some blood parameters in rainbow trout. The experimental fish analysed in this study were divided into 3 different experimental groups. Group 1 was the control group, and groups 2 and 3 received Curcumin and OTC, respectively, for 14 days. Group 2 received OTC for 14 days after Curcumin pre-treatment for 14 days, while group 3 received OTC for 14 days before lycopene posttreatment for 14 days. Blood samples were collected at the end of the experiment and analysed some blood parameters. Results showed that WBC, LYM, MON, MCH, HB, MCV, GRA and MPV in blood increased compared to control. The administration of curcumin after oxytetracyclin did not changed significantly the RBC, PCT, HTC, MCHC, RDW and THR when compared to control. Curcumin ameliorated oxytetracyclin –induced toxicosis in the RBC, PCT, HTC, MCHC, RDW and THR. It can be concluded that curcumin has beneficial influences and could be able to antagonize oxytetracyclin toxicosis only on the RBC, PCT, HTC, MCHC, RDW and THR in the blood.

Keywords: Curcumin, oxytetracycline, blood, rainbow trout
ORAL PRESENTATION

Histological Examination of Sublethal Effects of Methyl Parathion on Liver, Gill, Gonads of Chalcalburnus tarichi (Pallas, 1811)

Ertuğrul Kankaya¹, Güler Ünal²

¹Faculty of Fisheries, Van Yuzuncu Yil University, Van, Turkey
²Faculty of Health Sciences, Adnan Menderes University, Aydın, Turkey

Corresponding author e-mail: ekankaya@yahoo.com

Abstract

Organic phosphorus methyl parathion (MP) is widely used as an agricultural insecticide. This study was conducted to determine the histological effects of the sublethal concentration of MP on liver, gill, ovary and testicular tissues of Chalcalburnus tarichi. Fish weighing 3–7 g and 8–10 cm in length were used. Semi static test method is used. Fish were exposed to a concentration of 4.28 mg L⁻¹ of MP. Bioassay was continued for 30 days. At the end of the test, the fish were dissected. Liver, gill, ovary and testicular tissue were removed for histological examinations. In fish exposed to MP, fat accumulation in the liver cells, enlargement of the veins and local necrosis, usually around the vein, yellow droplets and eosinophilic cell groups were observed. Thickening in the primary lamella epithelium and twisting of the tip of the secondary lamellae and breaks in the epithelial layer were determined in gill structures. No histopathological findings were found in the ovaries. Blood in the testes, especially in the mitotic stage, deteriorates in the growth of the follicle lumen has been observed. Presence of eosinophilic cell groups was observed in the interstitial tissue of the testis that did not enter the mitotic stage. As a result, MP is a chronic toxic substance according to histological criteria for C. tarichi. The concentration of MP should not exceed 0.1144 mg L⁻¹ in the fresh water environments of C. tarichi. MP should be used as a control in agriculture.

Keywords: Methyl parathion, Chalcalburnus tarichi, histological examination, fish
ORAL PRESENTATION

Probiotic Potential of Lactobacillus Strains with Isolated from Different Sources Antagonistic Activity Against Bacterial Fish Pathogens

Esin Kiray¹, Belgin Erdem², Ergin Kariptas³

¹Ahi Evran University, Faculty of Science and Arts, Department of Biology, Kirsehir, Turkey
²Ahi Evran University Vocational School of Health Services / Medical Services and Techniques
³Ahi Evran University, Faculty of Medicine, Department of Medical Microbiology, Kirsehir, Turkey

Corresponding author e-mail: esin.kiray@ahievran.edu.tr

Abstract

In this study, four Lactobacillus and Pediococcus isolates (Lactobacillus GG, Lactobacillus brevis, Lactobacillus plantarum and Pediococcus acidilactici) isolated from different sources such as vaginal tract of healthy women, pickle and shalgam. These strains were identified using 16S rDNA gene sequencing and characterized by biochemical methods. Probiotic strains were investigated for their antagonistic activity against different pathogenic microorganisms (Aeromonas veronii, Hafnia alvei, Aeromonas hydrophila, Pseudomonas oleovorans, Citrobacter braakii, Escherichia hermanii, Aeromonas sobria, Providencia rettger, Morganella morganii subsp. siboni, Enterobacter cloacae and Escherichia coli) isolated from fishes. The bacteria were isolated from the organs of Cyprinus carpio and Tinca tinca collected from Hirfanlı Dam Lake. Bacterial fish pathogens were resistant to sulbactam ampicillin, rifampin, ceftazidime and cefazolin antibiotics. The pathogens were isolated, characterized and identified using the VITEK 2 system. Probiotic organisms demonstrated that antimicrobial activity against pathogenic microorganisms isolated from fishes including, A. veronii, A. sobria and C. braakii. Among the 4 isolates, L. plantarum showed significant antagonistic activity against A. sobria, E. cloacae and M. morganii subsp. Siboni alone. The study concluded that the Lactobacillus isolates will be helpful in the management of bacterial disease fish. Lactobacillus plantarum growth and their in vivo effect on pathogen in fish under pathology status will be a further course of work.

Keywords: Lactobacillus, probiotic, bacterial fish pathogens
The Function of Sugar Beet Peel Extract on the In Vitro Biogenic Amine Production by Food Borne Pathogens

Fatih Özogul*, Yılmaz Uçar, Mustafa Durmuş, Ali Rıza Köşker, Esmeray Küley Boğa, İlyas Özoğul, Yeşim Özogul

Department of Seafood Processing Technology, Faculty of Fisheries, Çukurova University, Adana, Turkey
Corresponding author e-mail: fozogul@cu.edu.tr

Abstract

Seafood, which has a vital value in human nutrition, can contain foodborne pathogens and spoilage bacteria. Especially unsuitable production with the cross contamination of pathogens and processing applications on seafood supports growth of pathogenic bacteria in such products. Biogenic amines (BA) are present in various foods such as fishery products, meat, wine, chocolate, dairy products, etc. BAs are biologically active compounds that can be toxic to humans and animals and cause various disorders. When seafood or similar susceptible foods are kept in improper production and storage conditions, bacteria can rapidly develop and these bacteria can decarboxylate free amino acids, leading to the formation of BAs. Depending on the growth rate of these bacteria, which are also affected by environmental factors, most of the BAs form rapidly by pathogen in seafood and become unsuitable for human consumption. Biogenic amine formation through the microbial decarboxylation of amino acids is related to the specific bacterial strain(s) present, the level of decarboxylase activity, and the availability of the amino acid substrate. The most common BAs found in foods are histamine, tyramine, cadaverine, 2-phenylethylamine, spermine, spermidine, putrescine, tryptamine, and agmatine. Histamine is the most commonly known toxic amine, while the presence and level of other biogenic amines such as cadaverine and putrescine are also very important due to increasing the toxicity of histamine. The growth of the vegetative bacterial cells in foods as well as the prevention of toxin production is of great importance in food sector. Several researches have reported that sugar beet peel extracts have antibacterial and antioxidant properties on some pathogens. However, studies related to the effect of sugar beet peel extracts that is non-economic on BAs are inadequate. Therefore, the effects of sugar beet peel extracts at different doses (0.5 and 1mL/100 mL) by adding into the medium (histidine and tyrosine decarboxilase broth) on BAs and ammonia (AMN) production of foodborne pathogens (Staphylococcus aureus, Escherichia coli, Klebsiella pneumoniae, Enterococcus faecalis, Pseudomonas aeruginosa, Aeromonas hydrophila and Salmonella enterica serovar Paratyphi A) were investigated. All foodborne pathogens have ability to decarboxylate amino acids (histidine and tyrosine). There were differences on the production of AMN and other BAs between gram negative and gram positive pathogens in both amino acid decarboxylase broth. These differences were observed depending on the concentration of extracts used in HDB and TDB and pathogens. The impact of sugar beet peel extracts used at different doses on the production of AMN and BAs by FBP in TDB showed significant increase compare to HDB under the same conditions. These results showed that HDB has a more inhibitory effect on the production of BAs and AMN by food-borne pathogens.

Keywords: Biogenic amines, amino acid decarboxylase broth, foodborne pathogens, sugar beet peel extract.
ORAL PRESENTATION

Length-Weight Relationship and Condition of Redcoat *Sargocentron rubrum* (Forsskål, 1775) in Iskenderun Bay (Southeastern Mediterranean, Turkey)

Ferhat Kabaklı, Deniz Ergüden

Faculty of Marine Science and Technology, Iskenderun Technical University, 31220 Iskenderun, Hatay, Turkey

Corresponding author e-mail: asilkabakli@hotmail.com; deniz.erguden@iste.edu.tr

Abstract

In this study a total of 165 (10.0-21.0 cm TL, 17.40-180.10 g TW) Redcoat, *Sargocentron rubrum* (Forsskål, 1775) were caught in Iskenderun Bay between September 2017 and April 2018 using a longline. As a result, length-weight relationships (LWRs), sex ratio and condition the estimates for b parameter of the LWR ranged between 3.076 and 3.71 for males, females and both sexes, respectively. Positive allometric growth was observed for male, female and both sexes. Fulton’s condition (KF) factor values also revealed not significant variations (P>0.001) for females (1.904) and males (1.926) specimens of *S. rubrum*. No information currently exists on the length weight relationship of *S. rubrum* in the Mediterranean coast of Turkey. This paper is an important contribution to the science and fisheries management applications for this species.

Keywords: Redcoat, length-weight parameters, condition factor, Mediterranean Sea.
ORAL PRESENTATION

Genetic Identification of *Oxynoemacheilus* species from Çoruh River

Gökhan Kalaycı, Davut Turan, İsmail Aksu, Cüneyt Kaya, Esra Bayçelebi

Department of Basic Sciences, Faculty of Fisheries and Aquatic Sciences, Recep Tayyip Erdoğan University, Rize, Turkey

Corresponding author e-mail: gokhan.kalayci@erdogan.edu.tr

**Abstract**

The generic position of *Oxynoemacheilus* sp. distributed in Çoruh River is reviewed through a comparison of COI barcoding region. Four species of *Oxynoemacheilus* (*O. kosswigi, O. banarescui, O. samanticus, O. angorae*) reported from the Black Sea drainages, two species (*O. cyri* and *O. brandtii*) from Kura-Aras drainage and *O. simavicus* from Simav River were included in phylogenetic analysis. Nucleotide sequences of the COI barcode region were examined in 27 individuals sequenced by this study and five individuals from Genbank. The phylogenetic analysis showed that these *Oxynoemacheilus* species are divided into six clades. One of these was consisted of *Oxynoemacheilus* sp. from Çoruh River which is thought as a new species. *Oxynoemacheilus* sp. constituted a highly supported clade sister to *O. cyri*. Maximum likelihood and Bayesian inference analyses of mitochondrial COI resulted in trees congruent with each other, supported by high bootstrap values. Intrageneric K2P distances between species ranges from 2.2% (*O. simavicus* and *O. banarescui*) to 12.8% (*O. sp* and *O. brandtii*). In total, 37 variable nucleotide positions in the COI barcode region were identified between *Oxynoemacheilus* species studied here. *Oxynoemacheilus* sp. was distinguished from most genetically close species *O. cyri* by 31 unique and diagnostic nucleotide substitutions sites in the mtDNA COI barcode region. Based on the analysis of a molecular marker (COI barcode region), we concluded that the Çoruh population forms a distinct, unnamed species.

**Keywords:** mt DNA, Barcoding region, taxonomy, Anatolia
ORAL PRESENTATION

Determination of the Fish Consumption Habits of Batman Province

Gülderen Kurt Kaya, Saadet Akkuş

Munzur University, Faculty of Fisheries, Department of Fisheries and Fish Processing Technology, Section of Seafood Processing, Tunceli-Turkey

Corresponding author e-mail: gkurtkaya@munzur.edu.tr

Abstract

This study was carried out in order to determine the consumption habits of fish products and meat preferences on people living in Batman province. According to the survey results, meat consumption habit amount of 350 people living in Batman was 46% for red meat, 42% for chicken meat and finally 10% for fish meat. 2% of the survey participants stated that they did not consume any kind of meat. It was determined that the people of the region provided 55% of their fish products from fishermen. Participants preferred marine fish (51%) at most. It was determined that the participants were interested in purchasing fish, fresh (64%), taste (22%), price (7%), boned (6%) culture or hunting (1%). It was determined that the participants’ consumption habits were 47% frying, 31% grilling, 17% oven, 1% fish boiling, 4% canning and so on. In this study, fish consumption in Batman was found to be below the country and world average. This is thought to be due to the fact that the region is far from the water resources and also from the traditional food culture.

Keywords: Fish consumption, consumption habits, meat consumption preferences, Batman
ORAL PRESENTATION

Frankfurter Production with Pony Fish (*Equulites klunzingeri*) Protein Isolates and Determination of Chemical, Sensorial and Microbiological Changes During Shelf-life

Gülsün Özyurt, Çağın Gayde, Yılmaz Uçar, Mustafa Durmuş, E. Tuğçe Aksun Tümkeran, Esmeray Kuley Boğa

Çukurova University, Faculty of Fisheries, Department of Seafood Processing Technology, Adana, Turkey

Corresponding author e-mail: yucar@cu.edu.tr

Abstract

Fish protein isolate is a kind of protein concentrate which is prepared from discard and seafood processing by-product. It is generally used as raw material for production of value added products. To provide both add value to the discard fish species and to enlarge the nutritional quality of the final product, it was aimed to combination of fish protein concentrate and chicken meat for frankfurter production in this study. The amount of chicken meat used in frankfurters was reduced by 10%, 20% and 30%, and pony fish (*Equulites klunzingeri*) protein isolates were added instead. The chemical, microbiological and sensory characteristics of frankfurters developed by adding fish protein isolates were examined during shelf life at cold storage (4°C). Peroxide, free fatty acid and thiobarbituric acid values were determined below the acceptable limits during storage for 47 days, while all frankfurter groups were found to reach to the limit of non-consumption on day 26 according to TVB-N and TVC values. However, according to the sensory evaluations, the G4 group with the highest addition of fish (30%) had a shelf life of 33 days, while the G3 (20%) and G2 (10%) groups had a shelf life of 40 days and the G1 (FPI free) group had a shelf life of 47 days. According to the results of the research, the addition of fish protein isolate to chicken frankfurthers has improved the nutritional quality and they can be stored for 26 days in cold conditions like control group.

Keywords: Frankfurter, fish protein isolation, shelf life, lipid oxidation, quality
ORAL PRESENTATION

Blue Biotechnology

Hasan Hüseyin Atar¹, Mehmet Karataş²

¹Ankara University, Faculty of Agriculture, Fisheries&Aquaculture Department, Ankara Turkey
²Necmettin Erbakan University, Konya Turkey

Abstract

Blue biotechnology is generally considered the use of marine bioresources as the source of biotechnological applications. In other words, marine resources and marine organisms are used to develop products or services for biotechnological gain. In contrast, marine biotechnology also includes the application of biotechnology developed using any resource (marine, terrestrial, freshwater or a combination) to the marine environment, and human activities therein. The blue biotechnology sector is unique amongst biotechnology sectors in terms of the way that it is defined. For example, whereas red (medical, health and pharmaceutical), green (agricultural), yellow (environmental) and white (industrial) biotechnologies are delineated on the basis of the processes they entail or the markets they serve, blue biotechnology is the only biotechnology sub-sector to be defined by its source material, i.e. marine resources. Blue biotechnology has the potential to contribute to a variety of other biotechnology and industry areas. As such, blue biotechnology is not a clear-cut sector. There are important overlaps associated with products of blue biotechnology feeding into other sectors of different colour, such as energy (marine algal biofuels), pharmaceuticals (novel antibacterials), cosmetics, aquaculture, food and nutrition, environmental protection and depollution.

Keyword: Biotechnology, marine resources, blue biotechnology.
ORAL PRESENTATION

Screening of Lactic Acid Bacteria Strains from Fermented Fish, Meat and Dairy Products by Biochemical and Molecular Methods

Hatice Yazgan¹, Esmeray Kuley Boğa², Tülin Güven Gökmen³

¹Department of Food Hygiene and Technology, Faculty of Veterinary Medicine, Cukurova University, Adana, Turkey.
²Department of Seafood Processing Technology, Faculty of Fisheries, Cukurova University, 01330, Adana, Turkey
³Department of Preclinical Science, Faculty of Veterinary Medicine, Cukurova University, Adana, Turkey.

Abstract

Fermented fish (marinated fish, smoked fish and seafood salad), meat (sausage, soujouk and salami) and dairy products (yoghurt, butter, kefir and cheese) have important nutritional properties and health benefits to consumers due to presence of lactic acid bacteria (LAB) which possess probiotics properties. Lactic acid bacteria produce acetic acid, ethanol, aroma compounds, bacteriocin, exopolysaccharides and several enzymes and enhance shelf life and microbial safety in fermented food product. In this study, lactic acid bacteria from four fermented seafood, twelve dairy, and twelve meat products was isolated and identified. The preliminary diagnosis of the isolated bacteria was determined by Analytical Profile Index (API) test kit. Verification of pre-diagnosed bacteria was done by the PCR method. As a result of the API test kit, 30 isolates were predefined, whilst five isolates were not identified. The bacteria strains identified by PCR were Pediococcus acidilactici, Lactobacillus fermentum, Lactobacillus brevis, Lactobacillus rafinolactis, Lactobacillus paraplanantarum, Leuconostoc mesenteroides and Lactobacillus pentosus. The size of the amplicons were 872bp for Pediococcus acidilactici, 337bp for Lactobacillus fermentum, 145bp for Lactobacillus brevis, 172bp for Lactobacillus rafinolactis, 107bp for Lactobacillus paraplanantarum, 1150bp for Leuconostoc mesenteroides and 218bp for Lactobacillus pentosus.

Keyword: Lactic acid bacteria, fermented food, PCR, Lactobacillus spp., Leuconostoc spp.
ORAL PRESENTATION

Identification of Some Rotifer Species in Hazar Lake (Elazığ-Turkey) with Electron Microscope

Hilal Bulut, Serap Saler

Fırat University, Fisheries Faculty, 23119 Elazığ, Turkey

Corresponding author e-mail address: hilahlhaykir@gmail.com

Abstract

This study was conducted between March 2017 and February 2018 to determine the rotifer fauna of Hazar Lake provide clear diagnosis of suspected rotifers in electron microscopy. Totally 24 species from Rotifera, were identified in this study. Scanning electron microscope photographs of some Rotifera species have been taken. Scanning electron microscopy (SEM) of the trophy structure (SEM), which is an important part of the species identification of monogonous rotifers, has also been performed in this study. The diagnosis of rotifers was made in accordance with the characteristics of lorica, korona and trophy in planktonic species. Especially, the semi-illorikat rotifers were exploited by trophic morphology. For this purpose, a light microscope was used to remove the trophy from another slide, the coverslip was covered and a drop of NAOCl, KOH or NaOH (4%) was added. Thus, the cleaned trophy was made ready for diagnosis. Preparations called transient preparations were obtained by directly inserting the coverslips onto samples taken on the slide during the study. In the preparation of permanent preparations, one drop of glycerin was dropped on the slide, and the organism to be diagnosed was placed under the microscope in the glycerin drop on the slide. The organism was set in the middle of the slide, and the sides of the lamellin were labeled with entellane. The use of SEM was tested by Koehler and Hayes (1969 a, b) in 1969 and then developed by De Smet (1998). The method used in this study is developed by applying De Smet (1998) method.

Keywords: Rotifera, identification, Scanning Electron Microscopy.
Some Aquarium Plants Production in Trout Aquaculture Waste Water Treatment with the Use of Hybrid Artificial Wetland and Adsorbent Column Systems

İbrahim Diler¹, Serkan Erkan²

¹Süleyman Demirel University, Fisheries Faculty, East campus, Isparta, Turkey
²MFAA, Institute of Mediterranean Fisheries Research Training and Production, Antalya, Turkey

Corresponding author E-mail address: idiler32@gmail.com

Abstract

In the present study, it was aimed to retain nitrogen (N) and phosphorus (P) of effluent water from a land-based rainbow trout culture system by means of flowing the output water through a subsurface-flow (Typha latifolia) followed by a surface-flow (Elodea canadensis) and a mineral bed (clinoptilolite) at various hydraulic loads (5, 10 and 20 m/day). It was also aimed to investigate the possibilities of a commercial production of Elodea, as a foliage plant under these conditions. With the use of this integrated system during a 180-day period between March and August 2011, turbidity, suspended solids, total ammonia, total nitrogen, dissolved reactive phosphorus and total phosphorus of the output water were removed by 60, 57, 67, 34, 40 and 70% respectively and nitrite was increased by 285% (p<0.05) whereas nitrate was numerically reduced by 14% after the system. When an estimation was made with removal of the mineral bed from the system, turbidity, suspended solids, total ammonia, nitrate, total nitrogen, reactive phosphorus and total phosphorus of the output water was eliminated by 62, 64, 63, 14, 46, 43, and 77% respectively whereas nitrite was increased by 229% (p<0.05). At the end of the experiment, dry matter and wet weight of Elodea canadensis per tank increased 318 g (25 times) and 1826.6 g (4.2 times) respectively. In addition, increase in the number of plant was 154. In other words, there was 4 times increase in the plant size and 6 times in the plant quantity. Consequently, the integrated constructed wetland was remarkably successful in treatment of the effluent, with a concomitant economic benefit from the macrophytes cultured.

Keywords: rainbow trout, aquarium flora, Elodea, Typha, waste water, water treatment, zeolit
ORAL PRESENTATION

Toxic Elements (As, Cd, and Pb) in *Chamelea gallina* along the Black Sea Coast of Turkey

Kenan Gedik¹, Rafet Çağrı Öztürk²

¹Recep Tayyip Erdogan University, Vocational School of Technical Sciences, Rize 53100, Turkey
²Karadeniz Technical University, Faculty of Marine Sciences, Trabzon 61530, Turkey

Corresponding author e-mail: rafetcagriozturk@gmail.com

Abstract

Level of toxic elements (As, Cd, and Pb) in *Chamelea gallina* collected from 8 different cities along the Black sea coast of Turkey were measured and assessed for potential human health risk. Concentration of As, Cd, and Pb in *C. gallina* ranged between 0.68-3.14, 0.17-1.03, and 0.09-1.35 mg kg⁻¹ wet weight, respectively. The toxic elements did not pose a potential risk to humans for consumption of the *C. gallina*, considering provisional tolerable weekly intake described by the Joint FAO/WHO Expert Committee on Food Additives (JECFA). In addition, Target Hazard Quotient and Hazard Index were found to be lower than 1 for average consumer.

**Keywords:** Striped venus clam, hazard quotients, health risk, metal, metalloid.
ORAL PRESENTATION

Effect of Different Salinity and Light Intensity on the Growth of *Porphyridium cruentum*

Leyla Uslu, Oya İşık, Burcu Ak Çimen

Çukurova University, Fisheries Faculty, 01330, Balcalı, Adana, Turkey

Corresponding author e-mail: hizarcil@cu.edu.tr

Abstract

In the study, *Porphyridium cruentum* was cultured under laboratory conditions at 20±2°C, 16:8 (light:dark) photoperiod and continuous aeration to different salinity (20‰, 30‰, 40‰) and two different light intensities (37μmolm⁻²s⁻¹ photon and 110 μmolm⁻²s⁻¹ photon) and growth was determined. Dry matter, optical density and chlorophyll *a* parameters were used to determine growth. The best growth was determined in culture with a salinity of 30‰ at 110μmolm⁻²s⁻¹ photon light intensity. In this group, the optical density (OD) was 1.504±0.003 and the dry matter amount was 1.327 gL⁻¹. In the case of 37 μmolm⁻²s⁻¹ photon light intensity, the optical density values were found to be similar in groups with 30‰ and 50‰ salinity and were found to be 1.234±0.004 and 1.215±0.002, respectively. The amounts of dry matter were also similar; 1.168gL⁻¹ and 1.159gL⁻¹, respectively. While the lowest growth was in the culture at 37μmolm⁻²s⁻¹ photon light intensity and 20‰ salinity. The optical density obtained on the last day of this group was 1.165±0.004 and the dry matter amount was determined as 0.986 gL⁻¹. The amount of chlorophyll *a* was determined in the cultured groups at the best 37μmolm⁻²s⁻¹ photon light intensity.

Keywords: *Porphyridium cruentum*, salinity, light intensity, growth.

Acknowledgement: This work was supported by the Resource Fund of the University of Cukurova, (Turkey) Project number: FBA-2016-7057.
ORAL PRESENTATION

Rehabilitation of Streams, Rivers and Fish

Mehmet Kocabaş¹, Filiz Kutluyer², Elif Dursun¹, Emine Ahsen Gök¹

¹Karadeniz Technical University Faculty of Forestry, Department of Wildlife Ecology and Management 61080, Trabzon, Turkey.
²Munzur University, Fisheries Faculty, 62000, Tunceli, Turkey.

Corresponding author e-mail: mkocabas@hotmail.com

Abstract

In this study, it was aimed to explain the rehabilitation of streams, rivers and fish and the data obtained from the world and our country, as well as on-site observations and photographs taken as a result of comparative analysis and conclusions and recommendations have been made. DSİ, Ministry of Forestry and Water Works, General Directorate of Nature Conservation and National Parks, Ministry of Environment and Forestry are in charge of stream improvement works in our country. It has been seen that the river improvement work started with good intentions but the wrong projects made negatively affect the natural habitats, aquatic plant and animal communities, especially fish. They have lost their original form and functions to make for humanity fever. It was determined that the projects were planned in such a way that the negative effects of the delirium were reduced and the nature and wildlife were ignored so as to prevent the loss of soil. Consequently, changes could lead to loss that would not be recycled if it does not take due precautions.

Keywords: Rehabilitation, streams, rivers, fish.
**ORAL PRESENTATION**

**Effect of Gamma Radiation on the Microbial Quality of Rainbow trout’s Fillets during Refrigerated Storage**

Mehran Moslemi¹, Tahmine Naderi², Seyed Vali Hosseini³*, Rozbeh Abedi⁴

¹Department of Fisheries, Islamic Azad University, Joybar Branch, Joybar, Iran
²Department of Fisheries, Institute of Higher Education Tajan, Ghaemshahr, Iran
³Department of Fisheries, College of Agriculture & Natural Resources, University of Tehran, Karaj, Iran
⁴Department of Fisheries, Institute of Higher Education Tajan, Ghaemshahr, Iran

Corresponding author e-mail: hosseinisv@ut.ac.ir

**Abstract**

Microbial quality of Rainbow trout (*Oncorhynchus mykiss*) fillets including total volatile counts (TVC), *Entrobacteriaceae*, *Pseudomonaceae* and lactic acid bacteria (LAB) were evaluated by different doses of gamma irradiation (0 (un-irradiated), 2, 3 and 4 kG) during 21 days of refrigerated (4±1°C) storage. With the comparison of irradiated samples, un-irradiated samples have had the higher microbial counts (P<0.05). The obtained results were shown that with increasing of the radiation’s dose, the microbial counts were decreased (P<0.05). Samples treated in 4 kG of irradiation, haven’t shown any LAB and *Entrobacteriaceae* in the all occasional time. The results indicated that gamma irradiation inhibit bacterial growth in Rainbow trout during refrigerated storage and irradiation with 4 kG, is the best dose on microbial quality control of Rainbow trout fillets.

**Keywords:** Fish quality, gamma radiation, microbial quality, rainbow trout, *Oncorhynchous mykiss*.
ORAL PRESENTATION

The Impact of Nanoemulsion Based on Olive Oil on The Fatty Acid Profiles of Rainbow Trout (Oncorhynchus mykiss)

Mustafa Durmus

Cukurova University, Faculty of Fisheries, Department of Seafood Processing Technology, Adana, Turkey

Corresponding author e-mail: mdurmus@cu.edu.tr

Abstract

Lipid oxidation is undesirable in most seafood because it causes to the development of undesirable off-flavors known as rancidity. Therefore, in this study, the effects of oil-in-water nanoemulsion based on different levels of olive oil as a preservative on the fatty acid composition of rainbow trout fillets stored at 4±2°C were investigated. The oil phase of the oil-in-water (O/W) nanoemulsions contained olive oil (15, 30, 45% of the total emulsion), ethanol (3%), and a surfactant (Tween 80.3%). The mixture was homogenized by an ultrasonic homogenizer for 15 min. Fish fillets were treated with nanoemulsion and stored for 16 days. Lipid samples were converted to their constituent fatty acid methyl esters and fatty acids were detected by GC. The results showed that myristic acid (C14:0), palmitic acid (C16:0), palmitoleic acid (C16:1n7), stearic acid (C18:0), vaccenic acid (C18:1n7), oleic acid (C18:1n9), linoleic acid (C18:2n-6), eicosapentaenoic acid (C20:5n-3) and docosahexaenoic acid (C22:6n-3) were the most important fatty acids in fish oil. In the control and the treatments groups, the concentrations of monounsaturated fatty acids (MUFAs), and PUFAs decreased in all groups whereas saturated fatty acids (SFAs) showed increases during storage period. Regardless of levels of olive oils, application of nanoemulsion maintained the PUFA content of fish. This study indicated that the use of nanoemulsion prevented oxidation of fish oil, thus has potential as a preservative for fish oil.

The author would like to thank the Scientific Research Projects Unit in Cukurova University for their financial support (Research Project: FBA-2017-7405).

Keywords: Nanoemulsion, fish oil, fatty acid, lipid oxidation
ORAL PRESENTATION

The Socio-economic Structure of Fishermen in Fisheries Cooperatives in the Karakaya Dam Lake

Mürşide Dartay, Erdal Duman

Fırat University, Fisheries Faculty, Department of Fisheries and Processing Technology, 23119, Elazığ

Corresponding author e-mail: mdartay@firat.edu.tr

Abstract

This study has been carried out in order to investigate the socio-economic conditions of fishermen in Karakaya Dam Lake. The research was obtained by questionnaire through face to face interviews with 79 fishermen in the Karakaya Dam Lake. As a result of study, fishermen has been identified between 28 and 68 in age in the region and that 62.02% of them are primary school graduates, 25.32% are secondary school graduates 12.66% are fishermen who do not go to school. It has been confirmed that 97.47% of fishermen are married, 2.53% of them are single and the number of children varied between 1 and 7, 2.59% of the married fisherman have not got children. It has been stated that 1.26% of fishermen the civil servants, 5.06% the retirees, 32.92% the farmer to be fishing the main occupation of 60.76%. The reasons selection fisheries of the fishermen are found that 60.76 % of them due to the unemployment, 39.24% of them addition income. The income average monthly of fishermen has been found ₺ 700 -1399 to 26.58 %, ₺ 1400-2999 to 49.37%, ₺ 3000-3999 to 24.05 %

Keywords: Socio-economic structure, fisheries cooperative, fishermen, Karakaya Dam Lake
ORAL PRESENTATION

The influence of Leaf Litter on the Distribution of Aquatic Chironomidae Pupae (Diptera) Fauna in Tunca River Edirne Turkey

Nurcan Özkan

Department of Mathematics and Science Education, Faculty of Education, Trakya University, Edirne, Turkey

Corresponding author e-mail: nurcanozkan@hotmail.com

Abstract

This study was designed to compare the potential differences in the colonization of Chironomid pupae in various leaf packs. The study was carried out in Tunca River (Edirne). Three stations were selected in the river and 5 different leaf pack (Platanus orientalis, Ulmus leavis, Morus alba, Juglans regia and Buxus sp.) were used to take samples. A 20 kg potato bag was used during leaf packaging and a total of 25 packets were placed in each of the stations. Chironomid pupae samples were collected from May 2012 to October 2012. The collected samples were placed in 70% alcohol and brought to the laboratory and diagnosed under stereomicroscope. Then ANOVA test was used in the analysis of Chironomid pupae in time, station and leaf packs and 0.05 α statistical significance was used in all tests. When there was a meaningful difference, the reason was revealed by the Tukey test. Chironomid pupae were found at most 3, 1 and 2 stations and leaf species in blackwood and walnut. Seven species were identified in leaf packs. The Polypedilum nubeculosum and Polypedilum pedestre are the most common species. Tunca River does not have basin studies in this regard.

Acknowledgement: I would like to express my appreciation to the Trakya University Scientific Research Project Commission, which supported this study (TÜBAP-2011-130).

Keywords: Chironomid pupae, community structures, leaf pack, Tunca River
ORAL PRESENTATION

The Effect of Zinc on Growth Parameters of *Lythrum salicaria* L.

Nüket Akanıl Bingöl, Betül Akın, Onur Meşeli

Department of Biology, Faculty of Sciences and Arts, Dumlupinar University, Kütahya, Turkey

Corresponding author e-mail: nuket.abingol@dpu.edu.tr

Abstract

In parallel with industrialization, discharge of industrial wastes to rivers and lakes cause water pollution. Anthropogenic activities such as tanneries and textile industry contaminate aquatic ecosystems with heavy metals including Pb, Cr, Cd and Zn. In this study, the effect of Zn on root, shoot, leaf development and fresh weight of *Lythrum salicaria* L. were investigated by using hydroponic culture method. *L. salicaria* seeds were germinated in pots, seedlings were transferred to pots of hydroponic system and grown in 10% Hoagland solution for 7 days. At the end of 7 days, seedling were transferred to pots containing 10% Hoagland with 0, 5, 10, 20, 30, 40 and 50 mg Zn/L for 7 days to determine the root length, shoot length, number of leaves, and fresh weights of the *L. salicaria*. When root, shoot, leaf development and fresh weight of *L. salicaria* are compared to each other, it was found that percent changes of root, shoot length, number of leaves and fresh weight were increased at 5 and 10 mg Zn/L. However, root length was decreased at 40 and 50 mg Zn/L treatments. Roots of *L. salicaria* were shorter than the initial length and the colors of the roots were black in these treatments. As a result, because *L. salicaria* is a tolerant plant to Zn, it will be able to use in phytoremediation studies in the future.

Keywords: Hydroponic culture, purple loosestrife, Zinc.
ORAL PRESENTATION

Effect of Pretreatment and Temperature on Drying of Rainbow Trout (Oncorhynchus mykiss)

Osman İsmail¹, Özlem Gökçe Kocabay¹,²

¹Department of Chemical Engineering, Faculty of Chemical and Metallurgical Engineering, Yıldız Technical University, Davutpaşa Campus, 34210, Esenler, Istanbul, Turkey
²T.R. Ministry of Culture and Tourism, Directorate of Central and Laboratory for Restoration and Conservation, İstanbul, Turkey

Corresponding author e-mail: ozlemgokce@hotmail.com

Abstract

Effects of pretreatment and drying conditions on fish fillet samples, namely Rainbow trout (Oncorhynchus mykiss), in a cabinet laboratory type dryer at temperature range of 40–60 °C was investigated. Results indicated that the moisture content was influenced by the pretreatment and drying air temperature. The shortest drying time was obtained with fish samples pretreated with blanching. The drying data for the moisture ratio over time was fitted to four thin-layer models with the best performances coming from the Midilli et al. model.

Keywords: Rainbow trout, hot air drying, pretreatment, mathematical model
ORAL PRESENTATION

Short-term Cold Storage of Sperm of Rainbow Trout *Oncorhynchus mykiss*: Evaluation of Effects Different Extenders

Önder Aksu¹, Filiz Kütüyer¹, Abdullatif Ölçülü¹, Mehmet Kocabaş²

¹Department of Aquaculture, Faculty of Fisheries, Munzur University, Tunceli, Turkey
²Department of Wildlife Ecology & Management, Faculty of Forestry, Karadeniz Technical University, Trabzon, Turkey

Corresponding author e-mail: onderaksu@munzur.edu.tr

Abstract

Experiments were designed to clarify the effect of different extenders on sperm motility of rainbow trout *Oncorhynchus mykiss* after short-term cold storage at 4°C for 6 days. Sperm collection was performed through gentle abdominal massage. Sperm was suspended in different extenders at 1:3 dilution ratio. The motility and survival of sperm cells were assessed in all the treatments daily. Our results indicated that sperm remained as motile in glucose and dimethyl sulfoxide (DMSO) based extender at day 6. This study would be beneficial for cryopreservation and reproduction management.

Keywords: *Oncorhynchus mykiss*, sperm, motility, survival.
ORAL PRESENTATION

Social, Structural and Economic Assessment of Crayfish (Astacus leptodactylus Eschscholtz, 1823) Hunting in the Çıldır Lake

Önder Aksu, Ahmet Koçyiğit

Munzur University, Fisheries Faculty, 62000. Tunceli, Turkey
Corresponding author e-mail: onderaksu@munzur.edu.tr

Abstract

This study was carried out to investigate the socio-economic analysis of fishermen of Çıldır Lake (Ardahan/Kars) cooperative. It has been determined that all fishermen are members of these cooperatives and that they are not members of any other non-governmental organization. It has been determined that the ages of fishermen vary between 34 and 74, 100% are married and their spouses are between 20 and 70 years old. They were found to be primary school graduates with a rate of 74%. 65.21% of fishermen received a special training on their professions. It was found that 17.4% of fishermen had no sources of income other than fishing, and the remaining 82.6% were active in agriculture, animal husbandry or other fields. It is generally determined that they have 1 boat, the majority of the boats are 6 m in length and made of iron. It was seen that 43.47% of family members participated in hunting activities. Ownership of all of the boats belonged to the fishermen themselves and 30.4% of them were informed that they were receiving them with the help of their boat families. It was found that fishermen used pinters in crayfish hunting and fennel nets in fish hunting. Although Çıldır Lake fishermen `s professions are found to be economically inadequate, it has been determined that 14 fishermen with 60.87% of their income are happy to do this job due to their presence in one or more of the reasons for additional income, habit, passion / hobby.

Keywords: Crayfish, Çıldır Lake, fishery, socio-economic analysis, survey
ORAL PRESENTATION

Comparison of Efficiency of Natural and Synthetic Antioxidants in Fish Conservation

Özlem Gündoğdu, Emre Yavuzer, Sertan Aytaç

Department of Food Processing Technology, Kaman Technical and Vocational School,
Ahi Evran University, Kirşehir, Turkey

Corresponding author e-mail: ogundogdu@ahievran.edu.tr

Abstract

Depending on the industrialization, the production and consumption of ready-to-eat foods has increased, and the use of food additives has become widespread to prevent food spoilage and quality losses. Antioxidants are natural or synthetic substances that prevent the loss of nutrients and quality losses due to lipid oxidation that may occur during the production, storage, transport and marketing of vegetable and animal foods, and to prolong shelf life. Synthetic antioxidants such as BHA, BHT, TBHQ and PG are used to control lipid oxidation and increase the storage times of food. However, due to the possible toxic effects of the antioxidants used, interest on natural antioxidants has increased. In human nutrition, aquatic products are the most important animal foods. These products have low resistance to chemical degradation due to their rich amino acids and essential fatty acids. In all stages from fish hunting to processing and consumption, the freshness and nutritional value of the fish must be maintained. In addition to traditional methods, there are also chemical preservation methods in which antioxidants are used. When the literature is examined, natural antioxidants of plant origin such as thyme, garlic, fenugreek and nettle are used as an alternative to synthetic antioxidants in the preservation of fish. In fact, plant originated antioxidants are sometimes reported to be more effective than synthetic antioxidants. In this review, a comparison was made between the activities of natural and artificial antioxidants used in the preservation of fish and fish products.

Keywords: Synthetic antioxidant, natural antioxidants, fish, conservation
ORAL PRESENTATION

Phylogeny of the Genus *Garra* in Iran using Caudal Fin Skeleton

Paria Jalili, Soheil Eagderi

Department of Fisheries, Faculty of Natural Resources, University of Tehran, Karaj, Iran.

Corresponding author e-mail: pariya.jalili@yahoo.com

Abstract

Among cyprinid family, little information is available about the phylogenetic relationships of the members of genus *Garra* in Iran. The structure of caudal skeleton as a valuable source in taxonomic studies of fishes can help to determine their systematic position. Hence, this study was conducted to compare the osteological features of caudal fin skeleton and reconstructing phylogenetic tree of the Iranian members of genus *Garra*. For this purpose, five specimens of every selected (except Iran blind carp with two specimens from each morphotype) taxon were cleared and stained to examine the osteological characteristics of their caudal fin skeleton. Also, Kura barbel (*Barbus cyri*) and Barzam (*Capoeta trutta*) were designed as outgroup. The results showed that members of *Garra* constitute a monophyletic group. The results revealed that the caudal skeleton features cannot discriminate the members of genus *Garra* at the level of species because of small number of extractable characters and their states.

Keywords: Phylogeny, Osteology, Iran blind carp, *Garra*. 
ORAL PRESENTATION

Isolation and Identification of Lactic Acid Bacteria from Intestine of Common Carp and Determination of Probiotic Capabilities of them

Rahim Peyghan¹, Zahra Ziafati¹, Mohammad Hossin Modarasi², Elahe Motavasely², Masood Ghorbanpour¹

¹Clinical Sciences Department - Veterinary Faculty- Shahid Chamran University of Ahvaz- Ahvaz- Iran
²Genetics department- Tehran University of Medical Sciences- Tehran - Iran

Corresponding author e-mail: Peyghan2014@gmail.com

Abstract

In this study, several lactic acid bacteria of intestine of common carp from cultivated ponds in Khuzestan province were isolated and identified. For this purpose a total of thirty fish were sampled and lactic acid bacteria were isolated by specific culture media and identified by biochemical and molecular tests. After testing the ability of the selected bacteria by routine probiotic tests, final identification was performed by sequencing of 16SrRNA gene. The sequencing results indicated that the isolated bacteria included Enterococcus gallinarum, Enterococcus casseliflavus, Lactococcus lactis, and Staphylococcus hominis. These sequences were compared with sequences in the Gene bank and had 99% similarity with reference strains. Also, their genetic similarity was studied based on the phylogenetic tree, and the bacteria were genetically similar to bacteria isolated from fermentation products, as well as aquatic organisms in Indonesia, China, Japan, The United States and India. Eventually, these sequences were submitted in the gene bank. Optimum growth of these bacteria was at pH 7 and 8, and the growth pattern of these bacteria showed a significant difference in acidic pH with alkaline pH (P<0.05). Bacterial growth was suitable in salinities of 1-3% and there was a significant difference between low NaCl and 4% salinity percentages (P<0.05). The Enterococcus bacteria isolated in this study have the ability to grow better in different percentages of bile than Lactococcus and Staphylococcus isolated bacteria. These bacteria were sensitive to commonly used antibiotics in aquatic animals such as enrofloxacin, penicillin, gentamicin, ciprofloxacin, ampicillin, erythromycin, chloramphenicol and amoxicillin. The in vitro results of this study showed that these isolates are a suitable candidate for use in aquaculture as probiotics.

Keywords: Lactic acid bacteria, Common carp, probiotic, Ahvaz
ORAL PRESENTATION

Comparative Toxicity of Paraquat and 2, 4-Dichlorophenoxy Acetic Acid in Adult Artemia franciscana

Roya Rahnana, Zahra Tulaby Dezfuly, Mojtaba Alishahi

Department of Aquatic Animal Health and Diseases, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran.

Corresponding author e-mail: royrannahama60@yahoo.com

Abstract

Herbicides are being used widely in agriculture and aquaculture for controlling noxious weeds. Paraquat and 2,4-Dichlorophenoxyacetic acid (2,4-D) have been the most widely used herbicide during the past three decades. Toxicological properties of Paraquat are attributed to its ability to produce reactive oxygen species such as superoxide anion that may directly or indirectly cause cell death. 2,4-Dichlorophenoxyacetic acid (2,4-D) is a broad-leaf, systemic, phenoxy herbicide used as the active ingredient in several commercially available aquatic herbicide products. Bioassay technique has been the cornerstone of programs on environmental health and chemical safety. The application of environmental toxicology studies on non-mammalian vertebrates is rapidly expanding. So the present study investigated the acute toxicity of Paraquat and 2,4- Dichlorophenoxy acetic acid (2,4-D) as aquatic ecosystems pollutants on Artemia franciscana. Artemia is one of the most suitable test organisms available for ecotoxicity testing and research and most commonly used live food in aquaculture. Acute toxicity (48 h LC50) of two herbicides (Paraquat, 2,4-dichlorophenoxy acetic acid) were determined. A. franciscana exposed to Serial concentrations of both mentioned herbicides. Mortalities at 12, 24, 36 and 48 hours after exposure were recorded and LC50 were calculated using Probit software. The results obtained indicate that the acute toxicity of these herbicides is significantly different in adult A. franciscana. The lethal concentration of Paraquat and 2,4-D were calculated 2.701, 14.475 mg/L in A. franciscana respectively. So The LC50 of two examined herbicides was significantly different and the mortality rate was increased by increasing exposure time. Finally, these data support the hypothesis the possible risks associated with the presence of herbicides particularly Paraquat residues in the aquatic animals and their environment.

Keyword: Artemia franciscana, herbicides, toxicity.
ORAL PRESENTATION

Seasonal Variation in the Condition Index of the Edible Oyster *Saccostrea cucullata* (born 1778) from the Northern Coasts of the Persian Gulf

Rouhollah Zare¹, Ehsan Kamrani², Ali Nasrolahi³, Roger L. Mann⁴

¹Department of Marine Biology, Chabahar Maritime and Marine Science University, Iran,
²Fisheries Department, Hormozgan University, Iran
³Department of Marine Biology, Shahid Beheshti University, Iran
⁴Department of Fisheries Science, Virginia Institute of Marine Science, College of William and Mary, USA

Corresponding author e-mail: ru_zare@yahoo.com

Abstract

The condition index (CI) is a tool that has been used for assessment of ecophysiological situation of oysters and also the effects of different environmental factors on the population parameters. This study was conducted seasonally from March 2015 to August 2016 and CI for 9 locations of oyster beds in the northern part of the Persian Gulf was calculated. Average annual CI for all oyster beds was calculated 15.4 and amounts of 14.06 for spring, 16.34 for summer, 15.32 for autumn and 15.95 was determined for winter. No seasonally difference was found in CI between different locations. Investigation of the oyster CIs in the northern coasts of the Persian Gulf comparing with other areas showed that CI of edible oysters is low. Due to its high-latitude position, its shallow nature, and its position within the great desert belt, the Persian Gulf and its oysters are exposed to extremes in temperature, salinity and other physical factors. But despite these factors, the oyster populations have been shown to exhibit remarkable resilience. Due to functional services of oyster beds in marine ecosystems and also their role in buffering ocean acidification, study of population parameters and restoration programs in the Persian Gulf is needed.

**Keywords:** Oyster bed, *Saccostrea cucullata*, condition index, Persian Gulf
ORAL PRESENTATION

Use of Nettle (Urtica dioica L.) in the Treatment of Fish Diseases

Sertan Aytaç, Özlem Gündoğdu, Emre Yavuzer

1Department of Food Processing Technology, Kaman Technical and Vocational School, Ahi Evran University, Kırşehir, Turkey

Corresponding author e-mail: saytac@ahievran.edu.tr

Abstract

The increase in demand for fish and fish products has led to the spread of the culture fish. Fish breeders have used some chemicals or plant extracts that stimulate or enhance the immune system to protect fish from diseases. Although the use of chemical medicines has many negative effects on the environment and human health, chemotherapy is widely used in the prevention and treatment of diseases. As an alternative to chemical treatments, the use of plant extracts in combating diseases seen in water products has become widespread. Various plant species such as thyme, garlic, fenugreek and nettle are used in the treatment of different diseases in traditional folk medicine as well as in fish health and increase disease resistance and efficiency in aquaculture. Nettle is a perennial plant of the Urticaceae family, abundant in our country. Root, stem, leaves, flowers and seeds of nettle are used as herbal medicines. Nettle has many biocomponents such as polysaccharides, lignans, flavonoids, coumarins, terpenoids, phenol and Urtica dioica aglutinin (UDA) which is a lectin, and it has been reported that nettles generally have antiinflammatory, antiallergic, antibacterial, antifungal, antiviral and anticarcinogenic effects. There are studies in the literature that have found positive effects on the immune system and growth performance of nettle on experimental animals. In this review, a study has been conducted on the use of nettle as an alternative to chemical medicines in the prevention and treatment of fish diseases.

Keywords: Nettle, fish diseases, herbal medicine, immune system.
Body Shape Variation in the Endemic Killifish, *Aphanius isfahanensis* with Insights from Geometric Morphometric Analysis

Saeed Panahi, Salar Dorafshan, Yazdan Keivany

Department of Natural Resources (Fisheries Division), Isfahan University of Technology, Isfahan 84156–83111, Iran

Corresponding author e-mail: keivany@cc.iut.ac.ir

**Abstract**

Morphometric character analyses were used to compare four populations of the endangered Isfahan toothcarp, *Aphanius isfahanensis*. A total of 227 specimens were collected from four geographically distinct areas (Hasanabad, Malvajerd, Varzaneh, and Zarrinshahr). The geometric morphometric method was used to investigate variation in body shape of this species complex. Left sides of the specimens were photographed using a digital camera and fifteen landmark points were digitized on two dimension images using TpsDig2. Landmark data of two sexes of four populations analyzed separately using DFA and MANOVA after GPA superimposition. The patterns of body shape differences between two sexes of the populations were illustrated. Results revealed significant differences between the body shape of two sexes of the populations (P<0.001). A geometric morphometric analysis yielded higher resolution in the assessment of phenotypic divergence among four populations than either body measurement or meristic analyses. Findings of this study suggest that different characteristics of habitats have driven changes in the morphological attributes of inhabitant killifish populations along with geographical separation as evolutionary factors. The growth exponential (b) values were different for both sexes, an isometric growth (b=3) and positive allometric pattern (b>3) were observed in males and females, respectively.

**Keywords:** Cyprinodontidae, geometric morphometrics; multivariate analysis; population structure
**ORAL PRESENTATION**

**Evaluation Genotypic variation of* Escherichia coli* with Pulse Field Gel Electrophoresis**

Sevda Altıntaş, Rafet Çağrı Öztürk, İlhan Altınok, Erol Çapkı

Karadeniz Technical University, Faculty of Marine Sciences, 61530, Çamburnu/TRABZON

Corresponding author e-mail: rafetcagriozturk@gmail.com

**Abstract**

Pulse Field Gel Electrophoresis (PFGE) has been used for differentiation and epidemiological characterization of* E. coli* isolated from different sources. In this study, variation in genotypic structure of* E. coli* isolates (n=75) obtained from entry and exit waters of 7 different rainbow trout farms located in Rize and Trabzon were evaluated based on resistance against erythromycin (ereA and ereB gene) and florphenicol (flor gene). Genomic template DNA was digested with* XbaI* and* ApaI* restriction enzymes and run on pulse field gel electrophoresis. According to PFGE analysis, based on %93 similarity ratio of genomic DNA digested with* XbaI* grouped in 4 clusters (X1-X4). According to this results similarity ratio among all of the isolates was found as 79.1%, similarity ratio was found as 85.1% after excluding TASWG 0411, TASSC 0811, TASSC 0211, SURWG 1010 ve AASG 0810 strains. Genomic DNA digested with* ApaI* grouped in 4 clusters (A1-X4). A1 was the biggest group containing %51 of the strains. ereB was the most abundant resistance gene in* E. coli* strains. There was no relation between the presence of ereA, ereB, and fluorR genes and PFGE genotype

**Keywords:** *E. coli*, PFGE, restriction enzyme, antibiotic resistance gene
ORAL PRESENTATION

Phylogeny of the genus *Squalius* (Cyprinid) in Iran using osteological characters

Soheil Eagderi*, Pariya Jalili
Department of Fisheries, Faculty of Natural Resources, University of Tehran, Karaj, Iran

Corresponding author e-mail: soheil.eagderi@ut.ac.ir

Abstract

Iranian members of the genus *Squalius*, including *S. namak* (Namak lake basin), *S. berak* (Tigris basin), *S. turcicus* (Caspian Sea and Urmia lake basins) and *S. lepidus* (Tigris basin) were collected (30 specimens per species) using electrofishing device and fixed into 10% buffered formalin after anaesthetizing. For osteological examination, 7 specimens of each species were cleared and stained using alizarin red and alcian blue stains. Then, their skeletal structures were photographed using a scanner equipped with a glycerol bath and studied under a stereomicroscope. The skeletal elements were drawn based on digital pictures using CorelDraw X6 software. After extraction of osteological differences, i.e. character states within the studied taxa and *Alburnus mossulensis* as outgroup, the distribution of 11 character states was examined by employing the accelerated transformation optimization in TNT. According the results, a large diversity of skeletal structures was observed in studied taxa. Based on the osteological characters, there are two subclades for Iranian members of the genus *Squalius*, including (*S. berak + (S. namak + (S. turcicus)) and *S. lepidus*. In addition, proper osteological characters for species identification was proposed.

Keywords: Cladogram, Parsimony, Cyprinid, Inland water.
ORAL PRESENTATION

Catch and Release Method Applied to Amateur Fishing Tournament in the Inland Waters
Tuncay Ateşşahin
Fırat University, Fisheries Faculty, Elazığ-Turkey
Corresponding author e-mail: tatessahin@firat.edu.tr

Abstract

In this study, the tournament organized by Urfa Sportive Fishing Association (ASOBDER) was taken up. The tournament area has been selected as Bozova region of Atatürk Dam Lake and 100 angling fishers participated in the tournament. The tournament has been planned for 24 hours during 17-18 March 2018. All the rules determined by Republic of Turkey Ministry of Food, Agriculture and Livestock for the tournaments has applied and the fishing anglers participating in the competition were limited with 2 hooks. All captured fishes have been kept alive during the competition and all the morphological characteristics of them have been recorded by the referees at the end of the competition. At the end of the tournament, the biggest fish captured was a Cyprinus carpio species with 72.5 cm in length and 6901 g in weight. During the tournament, only 6 fish have been caught and the total weight of them was 30610.5 g. All fishes captured were above the legal threshold length given in the Turkish fishing communiqué. The CPUE for per angling fisherman was found to be 12.75 g and for per hook was found to be 6.37 g. The catch and release method applied in developed countries was also applied in this tournament. None of the fish captured in this tournament was dead and all of them have been returned to the water alive. Taking the models used European countries as an example, it is necessary to overcome the shortcomings of the catch and release rules in the communiqué for the sustainability of amateur fisheries in our country.

Keywords: Fisheries tournament, catch and release, catch efficiency, inland water.
ORAL PRESENTATION

Evaluation of Effectiveness of Emulsions Based on Essential Oils of Orange and Mandarin against Fish Spoilage Bacteria and Food Borne Pathogens

Yeşim Ozogul, Ali Rıza Köşker*

Department of Seafood Processing Technology, Faculty of Fisheries, Çukurova University, Adana, Turkey

Corresponding author e-mail: akosker@cu.edu.tr

Abstract

Antimicrobial effects of emulsions from orange and mandarin essential oils on fish spoilage bacteria isolated from spoilage fish (Photobacterium damsela, Proteus mirabilis, Pseudomonas luteola, Serratia liquefaciens and Vibrio vulnificus) and food borne pathogens (Staphylococcus aureus, Klepsiella pneumoniae, Salmonella Paratyphi A, and Enterococcus faecalis) were investigated. Antimicrobial activity of emulsions based on orange and mandarin and essential oil against identified fish spoilage and pathogen bacteria were performed using disc diffusion method. The results showed that emulsion from orange essential oil had the highest antimicrobial activity against K. pneumoniae, S. paratyphi A, P. mirabilis and S. liquefaciens with diameter zone of 9.75, 9.75, 7.50 and 5.75 mm, respectively whilst emulsion from mandarin essential oil had only the highest antimicrobial activity against V. vulnificus with diameter zone of 1.65 mm. The highest antimicrobial activity of orange essential oil based emulsion were observed for S. aureus (13.0 mm), S. paratyphi A (11.25 mm), P. damsela (11.0 mm) whereas the highest antimicrobial activity of mandarin essential oil based emulsion was observed S. aureus (13.75 mm). These results indicate that conversion of essential oil into a emulsion enhanced its ability for the destruction of bacterial cell membranes, thus increasing antibacterial activity.

Keywords: Emulsion, essential oils, antimicrobial activity, food borne pathogen
ORAL PRESENTATION

Preliminary Data on the Population Genetic Structure of *Hyla savignyi* from Turkey Revealed by Microsatellite Variation

Tuğba Ergül Kalaycı

Department of Biology, Faculty of Art and Science, Recep Tayyip Erdoğan University, Rize, Turkey

Corresponding author e-mail: tugba.ergul@erdogan.edu.tr

Abstract

Genetic diversity is a key factor enabling adaptation, and therefore survival, of natural populations in changing environments. Evaluations of genetic diversity are common in population genetics and are particularly important in conservation genetics. Microsatellites have been the marker of choice for most applications in population genetics and molecular ecology. *Hyla savignyi* is widespread amphibian species in western Asia and southern Transcaucasia. Demography, phylogenetic definition and ecological situation of this species is unearthed of its distribution area. Unfortunately, genetic structure of Turkey population remains mystery. This study was conducted in the southern part of the Turkey in the provinces of İskenderun and Şanlıurfa. In total, 44 tissue samples from two population were studied. DNA was extracted from samples manufacturing procedure's. Three previously described microsatellite markers WHA5-22A, WHA1-104, and WHA1-25 were used to genotype each individual. Alleles were scored using GeneMarker software (Soft Genetics LLC). We tested for the presence of null alleles, with MICRO-CHECKER. Estimates of allelic diversity, number of alleles, their frequency and private alleles (unique allele) made using GENALEX 6.1. Significant deviation from Hardy-Weinberg equilibrium (HWE) expected and observed heterozygosity (H$_o$ and H$_e$) was obtained using program with ARLEQUIN. The allelic richness per locus ranged from 2.712 (WHA1-104) to 11.106 (WHA1-25). The number of different alleles in the İskenderun and Şanlıurfa populations were determined as 9.00 and 7.33. The average expected and observed heterozygosity were found as a 0.640 and 0.557, respectively. This study serve as basic study for population genetic structure of Turkish *Hyla* populations.

Keywords: *Hyla savignyi*, genetic variation, İskenderun, Şanlıurfa, microsatellite
**ORAL PRESENTATION**

**Effects of Photoperiod Manipulation on Reproductive Performance and Egg Quality of Female Brood Stocks in an Established Rainbow Trout Hatchery**

Tülin Arslan

Mugla Sitki Koçman University, Department of Aquaculture, Mugla, Turkey

Corresponding author e-mail: atulin@mu.edu.tr

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**Abstract**

**Introduction:** Reproductive performance of brood stock determines the production capacity of a fish hatchery and the strategies will be used to achieve desired production numbers. In order to make accurate and efficient production plans, hatchery managers have to know the reproductive performance of brood stock in close approximation. Reproductive biotechnologies such as photoperiod manipulation can affect the reproductive performance of brood stock. Therefore, aim of this study was to evaluate the effects of photoperiod manipulation on reproductive performance of female brood stocks in an established rainbow trout hatchery using photoperiod manipulation for year around fingerling production.

**Materials and Methods:** Reproductive performance of 2-5 years old brood females ovulated in natural spawning season or out of season via photoperiod manipulation were evaluated in terms of spawning ratio, total and relative fecundities and egg quality. Females were lightly sedated before stripping and total volume of stripped eggs was assessed by means of volume replacement method. Afterwards, eggs were fertilized from a pool of sperm stripped from 10-20 males. after water hardening, each egg batch were placed into partitioned vertical incubators. The eyeing ratio of each batch were determined from eye spots developed in between 230-250 degree-days.

**Results and Discussion:** Photoperiod manipulations via constant day-lengths was effective and allowed to obtain mature brood fish in any time of a year. Total fecundity of females showed increase by age and size. As expected, their relative fecundity followed an opposite pattern of continues decline with increasing age and size from 3138 eggs/kg (for 1300 g and 2 years old fish) to 1390 eggs/kg (for 4113 g 3-4 years old fish). Eyeing ratio of eggs showed variations based on the stripping time, age of females, and individual females. Overall, fecundities and egg quality were comparable among in season and out of season maturing females if their ovulation times were manipulated to slide only 2-3 months backward or forward from their natural autumn spawning season. Production projections in photoperiod manipulations sliding ovulation time more than couple of months (such as to July), should consider 15-20% lower eyeing ratios, 5-10% lower hatching ratios and 5-10% lower pre and post larval survival rates and losses due to increased larval deformation rates.

**Keywords:** Rainbow trout, *Oncorhynchus mykiss*, photoperiod manipulation, fecundity, eyeing ratio.
POSTER PRESENTATIONS
POSTER PRESENTATION

Sub-lethal Effects of Heavy Metals Toxicity on Pathological Lesions of Marine Bream

Aliakbar Hedayati

Faculty of Fisheries and Environmental Sciences, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran

Corresponding author e-mail: Hedayati@gau.ac.ir

Abstract

Histopathological indices have been largely used as biomarkers in the monitoring of fish health status during exposure to heavy metals, both in the experimental and environmental studies. The aims of the present study was to provide baseline data on the prevalence of histopathological liver lesions in marine fishes (case study of liver histopathology at mercury exposure) under experimental mercury exposure and to compare the sampling areas in terms of the types and prevalence of lesions present, for monitoring purposes. Experimental study was at seawater re-circulatory tanks. Mercury concentrations were determined using a standard cold vapor atomic absorption. Histopathological analyses were done in tissue processor and the slides were stained with haematoxylin and counter stained with eosin. There were many liver lesions in both area include enlarged and lateral nuclei, nuclear degeneration and vacuolation; oncotic, apoptic, focal, massive, centrilocular and periportal necrosis; atrophy, lipidosis, hydropic and cloudy swelling, oval cell proliferation; bile stagnation, dilation of sinusoid, intracellular edema and dark granules. In conclusion the present investigation indicated that mercury is a toxic substance in seabream and the sub-lethal mercury concentrations tested may cause several changes in the histological indices of the studied fish and we can use these changes as biomarkers of mercury detection.

Keywords: Cell, fish, histopathology, Mercury, toxicology.
POSTER PRESENTATION

Morphometric and Meristic Characterization of Short Snouted Seahorse *Hippocampus hippocampus* (Actinopterygii: Syngnathidae) in Turkey

Ahmet Şahin¹, Rafet Çağrı Öztürk¹, Mehmet Kocabaş²

¹Department of Fisheries Technology Engineering, Faculty of Sürmene Marine Sciences, Karadeniz Technical University, Trabzon, Turkey
²Karadeniz Technical University Faculty of Forestry, Department of Wildlife Ecology and Management 61080, Trabzon, Turkey.

Corresponding author e-mail: asahin74@gmail.com

Abstract

The objective of this study was to determine the morphometric and meristic features of Short snouted seahorse *Hippocampus hippocampus* in Turkey. Seahorse samples were obtained from by-catch of seine fishing in south-eastern coast of Black Sea. The standard length and weight, trunk length, snout length, coronet height, head length, snout length, snout depth, diameter of eye orbital, post orbital length, head depth and dorsal fin base length of 77 specimens (43 females and 33 males), were assessed morphologically. Dorsal fin spines, pectoral fin spines, trunk rings supporting the dorsal fin and tail rings supporting the dorsal fin of the sea horse samples were counted. Our results indicated that number of trunk rings supporting the dorsal fin was 11 in most of the specimens. The number of tail rings ranged from 29 to 38. The mean length and weight of females and males were 9.42±0.74 cm and 1.93±0.55; 9.27±0.769 cm and 1.96±0.61 g, respectively. The number of pectoral fin spines varied in direct proportion to number of dorsal fin spines. The shadows were observed in the dorsal parts of 1ˢᵗ and 5ᵗʰ trunk rings in males while they were not found in females. The data from the study will provide benefits or the restoration and conservation of seahorse populations.

Keywords: *Hippocampus hippocampus*, morphology, seahorse
Abstract

Tetrodotoxin (TTX) is a new phenomenon for the Mediterranean region. However, it is an important risk factor for public health worldwide, especially in the Far East countries. TTX is the most powerful marine toxin and there is no known antidote for TTX, which is a powerful sodium channel inhibitor. This toxin, which is not a protein structure, is therefore a thermostable molecule. How TTX is produced today is still a matter of debate. TTX has been reported to be present in living species such as pufferfish, gastropods, crabs, crustaceans, blue-ringed octopuses, ribbon worms, starfishes and sea slugs. The biosynthesis and taxonomic distribution mechanism has not yet been fully clarified, although many issues have been explained. Many researchers support the idea that toxins are produced by bacteria and that they reach marine organisms through food chains and that these organisms are accumulated in their bodies. Another widely accepted opinion is that the TTX molecule is produced by symbiotic bacteria living in the marine ecosystem. A large number of bacterial species isolated from marine species and numerous studies of TTX production of these bacteria are available. As a result, this review focused on TTX producer bacteria and their presence in living marine organisms.

Keywords: Tetrodotoxin, marine toxins, pufferfish, TTX producer bacteria
POSTER PRESENTATION

Effects of Zinc Oxide Nanoparticles on Histopathological and Ultrastructural Lesions of Gill and Mantle Organs of Corbicula fluminea (O. F. Müller, 1774)

Amir Qadermarzi 1,2, Mojtaba Pouladi 1,2, Fateh Moezzi 3, Maryam Yavar 4, Aliakbar Hedayati 1*

1Department of Fisheries, Faculty of Fisheries and Environment Sciences, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Golestan, Iran
2Young Researchers and Elite Club, Gorgan Branch, Islamic Azad University, Gorgan, Iran
3Department of Fisheries, Faculty of Natural Resources, Tehran University, Karaj, Iran
4Islamic Azad University, Science and Research Branch, Tehran, Iran

Corresponding author e-mail: hedayati@gau.ac.ir

Abstract

During this research, histopathological and ultrastructural changes in gill and mantle organs of freshwater bivalve Corbicula fluminea in expose of sub-lethal levels of zinc oxide nanoparticles were investigated for a period of 14 days. C. fluminea was collected from Tajan River. Bivalves were exposed to the concentration 25 ppm of zinc oxide nanoparticles for 4, 9 and 14 days in the laboratory environment. Tissue samples were obtained to survey optical microscopy and scanning electron microscope (SEM). The results of the light microscopic images showed significant histological effects on the exposed organs of C. fluminea in compared to the control group. These changes were included hyperplasia, hypoplasia, changes in shape and measure of filaments, gills atrophy and hemolymph channels. Also in the mantle, it was included increasing the number of cells, mucosal epithelium, and hyperplasia. Outer ultrastructural images confirmed widespread destruction of gill filaments, blocking the water channels in the gills and necrosis on a mantel. These lesions were led to the obvious break in the structure of mantle and wrinkle in the outer layer that completely changed and led to the emergence tissue break at the level of the organs.

Keywords: Corbicula fluminea, Zinc Oxide, gill, mantle, nanoparticle
The Effect of Feed Added with Wheat (Triticum vulgare) Oils Obtained by Masere and Cold Pressing Methods on FCR (Feed Conversion Rate) and NBT (Nitroblue Tetrazoliyum) Values of Trout (Oncorhynchus mykiss)

Başar Altinterim¹, Önder Aksu², Mustafa Dörücü³

¹İnönü University Fisheries Faculty, Malatya, Turkey, basaraltinterim@gmail.com
²Munzur University Fisheries Faculty, Tunceli, Turkey, onderaksu@munzur.edu.tr
³Firat University Fisheries Faculty, Elazig, Turkey, mdorucu@firat.edu.tr

Corresponding author e-mail: basaraltinterim@gmail.com

Abstract

Rainbow trout (O. mykiss) (n: 10) with an average live weight of 39.8 ± 4 g was used in the study. The cold-pressed wheat oils used in the study were obtained from a transporter. Wheat (T. vulgare) was kept in sunflower oil (1/10) for 15 days to obtain masere oil. The obtained wheat was added to the feeds of cold-pressed wheat oil trout which were purchased with wheat by 2%. During the entire study the fish were fed for two days with a commercial trout diet for 21 days, morning and evening. Feeding was applied on an average of 2% of live weight of fish daily. Feed conversion ratio (FCR) was determined at the end of the study. As a result of this study, it was determined that the maximum weight increase was in the control group (154%), this group was determined as weight gain of fish fed with masere oil added diet (150%) and fishes fed with cold pressing oil at least weight gain (122%). In addition, FCR values were found to be 1.11 in control group, 1.12 in wheat masere oil-added feed group and 1.53 in wheat cold-pressed oil group. The highest NBT value was obtained in the masere oil group and followed by control and cold-pressed oil groups, respectively.

Keywords: wheat, masere oil, cold-pressed oil, Oncorhynchus mykiss, FCR, NBT.
POSTER PRESENTATION

Determination of FCR (Feed Conversion Rate) and NBT (Nitroblue Tetrazoliyum) Values of Rainbow Trout (*Oncorhynchus mykiss*) Fed with Supplemented Feeds at Different Rates Macerated *Trigonella foenum graecum* Oils

Başar Altinterim¹, Önder Aksu², Mustafa Dörücü³

¹İnönü University Fisheries Faculty, Malatya, Turkey, basaraltinterim@gmail.com
²Munzur University Fisheries Faculty, Tunceli, Turkey, onderaksu@munzur.edu.tr
³Firat University Fisheries Faculty, Elazig, Turkey, mdorucu@firat.edu.tr

Corresponding author e-mail: basaraltinterim@gmail.com

Abstract

Rainbow trout (*O. mykiss*) (n: 30) with an average live weight of 25.79 ± 1.5 g was used in the study. *T. foenum graecum* was kept in sunflower oil (1 / 10th) for 15 days in order to obtain the fat used in the study. The obtained macerated *T. foenum graecum* oil was added 1% and 2% to the feed of trout. During the entire study the fish were fed for two days with a commercial trout diet for 21 days, morning and evening. Feeding was applied on an average of 2% of live weight of fish daily. Feed evaluation ratio (FCR) was determined at the end of the study. Blood collection was done without feeding from fish and the fishes were anesthetized (Benzocaine 30 mg / L) before the blood collection. Experiments were conducted in accordance with ethical rules (Inonu University, Faculty of Medicine, Experimental Animal Ethics Committee, Protocol No: 2017 / A-24). Blood samples were taken from the tail veins of the infected fish by injector and transferred to tubes containing EDTA. On the same day of EDTA blood samples, nitroblue tetrazolium (NBT) activity (total oxidative radical production of neutrophils) was determined spectrophotometrically. At the end of the study, FCR values were determined as 0.77 in the control group, 1.14 in the diet group with *T. foenum graecum* oil added at 1% and 1.04 in the diet group supplemented with *T. foenum graecum* oil at 2%. NBT values in the control group were 0.296 ± 0.095 on the 1st day and 0.323 ± 0.62 in the control group at the end of 21 days, 0.332 ± 0.03 in the diet group with *T. foenum graecum* oil added with 1% and 0.305 ± 0.056 in the diet group with *T. foenum graecum* oil added at 2%.

**Keywords:** Feed Conversion Rate, NBT, *Trigonella foenum graecum, Oncorhynchus mykiss, macerated oils*
Poster Presentation

The Effect of Feed Added with Flax Seed (Linum usitatissimum) Oils and Chia Seed (Salvia hispanica) Obtained by Macerated Methods on FCR (Feed Conversion Rate) and NBT (Nitroblue Tetrazolium) Values of Trout (Oncorhynchus mykiss)

Başar Altinterim¹, Önder Aksu², Mustafa Dörücü³

¹İnönü University Fisheries Faculty, Malatya, Turkey, basaraltinterim@gmail.com
²Munzur University Fisheries Faculty, Tunceli, Turkey, onderaksu@munzur.edu.tr
³Firat University Fisheries Faculty, Elazig, Turkey, mdorucu@firat.edu.tr

Abstract

Rainbow trout (O. mykiss) (n: 26) with an average live weight of 37.09 ± 0.9 g was used in the study. Flax seed (L. usitatissimum) and chia seed (S. hispanica) were kept in sunflower oil (1/10) for 15 days to obtain macerated oils. The resulting oils were added to the feed of the trout at 2%. During the entire study the fish were fed for two days with a commercial trout diet for 21 days, morning and evening. Feeding was applied on an average of 2% of live weight of fish daily. Feed evaluation ratio (FCR) was determined at the end of the study. Blood collection was done without feeding from fish and the fishes were anesthetized (Benzocaine 30 mg/L) before the blood collection. Experiments were conducted in accordance with ethical rules (Inonu University, Faculty of Medicine, Experimental Animal Ethics Committee, Protocol No: 2017 / A-24). Blood samples were taken from the tail veins of the infected fish by injector and transferred to tubes containing EDTA. On the same day of EDTA blood samples, nitroblue tetrazolium (NBT) activity (total oxidative radical production of neutrophils) was determined spectrophotometrically. As a result of this study, it was determined that the maximum weight increase was in the fishes fed with chia seed oil (123%), this group was determined as weight gain of control group (121%) and fishes fed with flax seed oil at least weight gain (114%). In addition, FCR values were found to be 1.26 in control group, 1.5 in flax seed oil-added feed group and 1.22 in chia seed oil group. The highest NBT value was obtained in the flax seed oil group (0.52±0.058) and followed by control (0.51±0.075) and chia seed oil groups (0.47±0.052), respectively.

Keywords: Linum usitatissimum, Salvia hispanica, macerated oil, Oncorhynchus mykiss, FCR, NBT.
POSTER PRESENTATION

Carbapenems Resistance in Gram-Negative Bacteria Isolated from Fishes

Belgin Erdem¹, Esin Kıray² Alpaslan Dayangaç³

¹Department of Medical Services and Techniques, Health Services Vocational College, Ahi Evran University, Kırşehir, TURKEY
²Departments of Midwifery, School of Health, Ahi Evran University, Kırşehir, TURKEY
³Department of Nutrition and Dietetics, School of Health, Osmaniye Korkut Ata University, Osmaniye, TURKEY

Corresponding author e-mail: berdem@ahievran.edu.tr

Abstract

The emergence and spread of gram-negative bacteria resistant to carbapenems are a continuing public health problem in global dimensions. This type of antimicrobial resistance is rapidly spread through genes encoding transcribable carbapenemase, causing severe outbreaks and severely limiting treatment options. In this study, carbapenem-resistant bacteria obtained from fish marketed in Kırşehir province were investigated. Escherichia hermannii, Aeromonas sobria, Providencia rettger and Morganella morganii subsp. siboni were isolated from fish. Gram negative bacteria resistant to carbapenems were isolated from the gills and intestines of fish. As a result, it was concluded that the presence of carbapenem-resistant Gram-negative bacteria in the fishes that were presented for consumption in the city center of Kırşehir was risky for public health and was regularly checked by the competent authorities. This data may be considered alarming because fish consumed as food products may be carriers of resistant gram-negative bacteria.

Keywords: Carbapenems, fish pathogen, antibiotic resistance, Gram negative bacteria
POSTER PRESENTATION

Effects of Different Light Path Length on the Growth of *Spirulina platensis* Cultured in Flat Plate Photobioreactors

Burcu Ak Çimen, Leyla Uslu, Oya Işık
Department of Basic Sciences, Faculty of Fisheries, Cukurova University, Adana, Turkey

Corresponding author e-mail: bak@cu.edu.tr

Abstract

In this study, the effects of different light path lengths (1, 3, 5, 7, 10, 13, 15 and 20 cm) on the growth of *Spirulina platensis* cultivated in outdoor flat plate photobioreactors (PBRs) were investigated. *Spirulina platensis* was cultured in *Spirulina* medium. Outdoor flat plate PBRs were performed using 10 mm thickness transparent glass material. Flat plate glass PBRs, 50.0 cm wide and 50.0 cm high with 1, 3, 5, 7, 10, 13, 15 and 20 cm light paths, were used to grow in batch cultures. The specific growth rate, biomass and biomass productivity, cell density, chlorophyll *a*, total carotenoid contents of *Spirulina* cultures were determined. Temperature, pH and light intensity of the culture were recorded during the experiment. The biomass for flat plate PBRs with 1, 3, 5, 7, 10, 13, 15 and 20 cm light path lengths were determined as 1.25±0.02 gL⁻¹, 1.27±0.01 gL⁻¹, 1.32±0.04 gL⁻¹, 1.55±0.05 gL⁻¹, 1.66±0.06 gL⁻¹, 1.72±0.08 gL⁻¹, 1.91±0.01 gL⁻¹, and 1.95±0.02 gL⁻¹, respectively. Consequently, *Spirulina platensis* cultured successfully completed in flat panel photobioreactor system at Cukurova Conditions. The best growth obtained from 20 cm light path photobioreactor system.

Keywords: *Spirulina platensis*, growth, light path, flat plate photobioreactors.
**POSTER PRESENTATION**

Aeromonas Septicemia in the Guppy (*Poecilia reticulata*)

Çiğdem Ürkü

Department of Fish Disease, Faculty of Aquatic Sciences, University of Istanbul, Istanbul, Turkey

Corresponding author e-mail: curku@istanbul.edu.tr

**Abstract**

This study was carried out to determine the reason of mortalities in guppies (*Poecilia reticulata*) kept in an aquarium fish-rearing farm in Istanbul province. Externally moribund guppies (n=15) showed ulcerative skin lesions on the body surface and abdominal distension; internally pale liver and accumulation of a liquid in the abdominal cavity were observed. Bacteriological inoculation from internal organs such as liver, spleen and kidney of fifteen guppies were made onto Tryptic Soy Agar (TSA) and Brain Heart Infusion Agar (BHIA after incubation, all isolated bacteria were identified as *Aeromonas hydrophila* according to their psychological, morphological and biochemical characteristic and Api 20 E profile. Also these isolates (n=15) were determined to be sensitive to chloromphenicol and florfenicol. Histopathologically, multifocal liquefactive necrosis in the spleen, liver, kidney and heart, tubular epithelium degeneration and necrosis in the kidney, desquamation of mucosa epithelium and necrotic gastric glands in the stomach, desquamation of the lamina propria and mucosal epithelium, discharge of the white pulp in the spleen and sloughed of the necrotic gill epithelium cells were observed.

**Keywords:** *Aeromonas hydrophila*, *P. reticulata*, histopathology, Api 20E.

**Introduction**

Ornamental fish production is a profitable industry in the world. In Turkey, this industry is particularly involved in production of fish such as guppy (*Poecilia reticulata*), angelfish (*Pterophyllum scalare*) and gold fish (*Carassius auratus*) (Savaş, 1996). However, it has been reported that bacterial infections in the aquarium fish industry cause severe economic losses at every step of the production (Barker, 2001). The aim of the study is to determine the reason of mortalities in guppies (*P. reticulata*) kept in an aquarium fish rearing farm in Istanbul province.

**Material and Methods**

Fifteen moribund guppy were obtained from commercial aquarium in Istanbul. For bacteriological analysis, samples were taken from liver, spleen and kidney from all moribund guppies. They were inoculated onto Brain Heart Infusion Agar (BHIA) and Tryptic Soy Agar (TSA). Plates were incubated during 24-48 h at 24-25 °C. The isolates (n=15) recovered from guppies were identified by using conventional bacteriological method and API 20E (Buller, 2004; Austin and Austin, 2016). Tissue samples fixed in 10% buffered formalin and processed for paraffin embedding. Histological sections (4-5µm) were stained with hematoxylin and eosin (H&E) and examined by light microscopy (Bullock, 1978).

Antibacterial susceptibilities of isolates were determined by using Kiby-Bauer disc diffusion method. The antibiotics sensitivity testing was carried out according to instruction of the Clinical and Laboratory Standard Institute (CLSI, 2011). All isolates were sensitive to florfenicol, chloramphenicol, enrofloxacin, flumequine, ciprofloxacin, sulphamethoxazole and highly resistant to erythromycin, oxytetracycline and ampicillin.

**Keywords:** *Aeromonas hydrophila*, *P. reticulata*, histopathology, Api 20E.
Discussion

Bacterial disease is one of the most important diseases in ornamental fish and a significant cause of high mortality rates (Barker, 2001). *A. hydrophila*, agent of MAS, has been recovered as a pathogen from different ornamental fish species (Hettiarachchi and Cheong, 1994). The gross pathology observed in our findings bear similarities to MAS in ornamental fish species (Hettiarachchi and Cheong, 1994). Exophthalmos in the eyes of infected fish was reported by Afifi et al. (2000). However this clinical finding has not been detected in all moribund guppy.

Histopathologically, vacuolation and necrosis in the liver has been reported in different fish species because of toxins and extracellular products produced by *A. hydrophila* (Afifi et al., 2000). In present study moribound guppy showed similar histopathological finding. Resistance of *A. hydrophila* to commonly used antibiotics is an emerging problem in the ornamental fish. Tetracycline and oxytetracycline are commonly applied for the treatment of MAS (Laith and Najiah, 2013). But our isolates was resistant to oxytetracycline. This result shows that the use of uncontrolled antibiotics in ornamental fish production causes resistance of pathogenic bacteria. Because of *A. hydrophila* are commonly in the freshwater environments, fish can be exposed this threat. It can also cause infection in humans, especially through contact with infected fish.

References

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MSc Istanbul University
Poster Presentation

Occurrence of the Burrowing Goby *Trypauchen vagina* (Bloch and Schneider, 1801) in Southeastern Mediterranean, Turkey-Filling in the Gap

Deniz Ergüden¹, Ferhat Kabaklı¹, Sibel Alagöz Ergüden²

¹Faculty of Marine Science and Technology, Iskenderun Technical University, 31220 Iskenderun, Hatay, Turkey
²Imamoglu Vocational School, Cukurova University, Imamoglu, Adana, Turkey

Corresponding author e-mail: deniz.erguden@iste.edu.tr

Abstract

A single male specimen of the burrowing goby *Trypauchen vagina*, 20.6 cm in total length (TL), was caught by a commercial trammel net at a depth of 30 m on 17th October 2017 from the Arsuz coast, Turkey. Measurements of the specimen were given and the geographical distribution of the species in the Mediterranean was documented. The present paper was the third record of specimen of *T. vagina* from the Mediterranean coast of Turkey although *T. vagina* was reported from the Mediterranean Sea, Turkey. This paper also confirms the presence of the species in southern coast, Turkey (eastern Mediterranean) with the first reports of an adult male specimen of *T. vagina*. The finding of *T. vagina* in Arsuz coast suggests that the population is expanding in the south coast of Turkey (southeastern Mediterranean Sea). The aim of the present study was to fill the gap in geographic distribution of this species in the eastern Mediterranean coast of Turkey.

Keywords: Burrowing goby, Record, Arsuz coast, Mediterranean Sea
POSTER PRESENTATION

Additional Record and Confirmed Occurrence of *Pteragogus trispilus* Randall, 2013 (Labridae) in Iskenderun Bay, Southern Mediterranean, Turkey

Deniz Ergüden¹*, Ferhat Kabaklı¹, Sibel Alagöz Ergüden²

¹Faculty of Marine Science and Technology, Iskenderun Technical University, 31220 Iskenderun, Hatay, Turkey  
²Imamoglu Vocational School, Cukurova University, Imamoglu, Adana, Turkey

Corresponding author e-mail: deniz.erguden@iste.edu.tr

Abstract

A single male specimen of the *Pteragogus trispilus* Randall, 2013 (6.65 cm in total length and 3.39 g in weight) was caught by a shrimp trammel net (mesh size 22 mm) at a depth of 22 m on 13 April 2018 from Iskenderun Bay (Gokmeydan), Turkey. This species was immediately photographed and transported to the laboratory for a more detailed examination. All measurements and counts, and the morphological description and colour of the *P. trispilus* agree with previous descriptions. *P. trispilus* is lesepsian migrant to the eastern Mediterranean Sea, previously known as *Pteragogus pelycus*. Although *P. trispilus* has distributed in the Mediterranean Sea and reported from the Mediterranean coast of Turkey. The present study is the first confirmed report of the species from Iskenderun Bay, Southern Mediterranean coast of Turkey.

**Keywords:** Labridae, Occurrence, Arsuz coast, eastern Mediterranean, Turkey
POSTER PRESENTATION

Effect of L-Arginine on Sperm Quality of Rainbow Trout (*Oncorhynchus mykiss*)

Durali Danabaş¹, Mehmet Kocabaş², Filiz Kutiluyer¹

¹Munzur University, Fisheries Faculty, 62000, Tunceli, Turkey.
²Karadeniz Technical University Faculty of Forestry, Department of Wildlife Ecology & Management 61080, Trabzon, Turkey.

Corresponding author e-mail: ddanabas@munzur.edu.tr

Abstract

L-arginine is a versatile amino acid and precursor of nitric oxide (NO). NO provides protection for preventing free radical damage. Herein, experiments were designed to clarify the effect of L-arginine supplementation on sperm motility of rainbow trout, *Oncorhynchus mykiss*. We used to levels of 0 mM (Control), 1 mM, 2 mM, 4 mM and 8 mM L-arginine. To assess the effects on motility and survival of sperm cells, L-arginine was added to activation medium containing NaCl (52 mM). The higher L-arginine concentration (4 mM) has promoting-effect on sperm motility. Significant effect of L-arginine supplementation was determined on the percentage and duration of motile spermatozoa (p<0.05). Here, we showed that addition of L-arginine can improve sperm motility of *O. mykiss*.

Keywords: L-arginine, *Oncorhynchus mykiss*, rainbow trout, sperm quality.
POSTER PRESENTATION

The Myth; 3 Seconds!

Durali Danabaş¹, Mehmet Kocabaş²

¹Munzur University, Fisheries Faculty, TR62000, Tunceli, Turkey.
²Karadeniz Technical University, Faculty of Forestry, Department of Wildlife Ecology & Management, TR61080, Trabzon, Turkey.

Corresponding author e-mail: dalid07@gmail.com

Abstract

In the conventional myth, the memory of a fish is very short or just 3 seconds. This myth has been mentioned for a lot of anecdotes, idioms like drop as a carp or mullet, comics, humiliations of people, etc. That’s right, is it true or false? There are some researches about this subject. Although there are great differences between the organisms at the top and the bottom of the bio-pyramid, some developments of learning and further remember observed in different fish species (goldfish, *Carrasius auratus*; European barracuda, *Sphyraena sphyraena*; Tilapia, *Tilapia* sp.; Australia rainbow trout, *Melanotaenia eachamensis*; crimson-spotted rainbowfish, *Melanotaenia duboulayi*; paradise fish, *Macropodus opercularis*; archerfish, *Toxotes chatareus*, and moray eel, *Muraena helena*) show that there should be a significant learning and storage in their minds. The goldfish (*C. auratus*) and European barracuda (*S. sphyraena*) has able to find their feed or baits in a specially prepared labyrinth after the months. The Australia rainbow trout (*M. eeachamensis*) has been remembered the place of pathway on a dragnet, and the crimson-spotted rainbowfish (*M. duboulayi*) has showed learned escape behaviour from a net mechanism after a year. The paradise fish (*M. opercularis*) has able to remember which species have harmless after three months. The archerfish (*T. chatareus*) has able to remember the experimental human faces. In these two experiments, the fishes have made correct choice in 71% of 44 human faces being in an experimental pool. However, the moray eel (*M. helena*) have recognized a human after 3 years. On the other hands, in the fish migrations to spawn, the fish species [the salmons, *Salmo salar* as anadromous; the European eel, *Anguilla anguilla* as catadromous; the mullets, *Mugil* sp. as oceanadromous; and the pearl mullet, *Alburnus (Chalcalburnus) tarichi* and Danube bleak, *Alburnus (Chalcalburnus) calcoides* as limnodromous] can make a trip to places their hatching. Obviously, it is not possible that these trips will take place without a creative or learned memory for lives. In conclusion, various skills can be taught to fish by different methods even if it takes a long time. These facts clearly prove the existence of non-volatile memory. In the clearness of these evaluations, the myth of “fish memory” is only a prejudgment.

Keywords: Myth, fish, fish memory, 3 seconds.
PROGRESSIVE POSTER PRESENTATION

Probiotic Supplementation in Aquaculture

Esin Kiray¹, Belgin Erdem², Cigdem Er Caliskan³, Ergin Kariptas⁴

¹Ahi Evran University, Faculty of Science and Arts, Department of Biology, Kirsehir, Turkey
²Ahi Evran University Vocational School of Health Services / Medical Services and Techniques
³Ahi Evran University, Mucur Vocational Training School, Kirsehir, Turkey
⁴Ahi Evran University, Faculty of Medicine, Department of Medical Microbiology, Kirsehir, Turkey

Corresponding author e-mail: esin.kiray@ahievran.edu.tr

Abstract

Probiotics are living microbial cells (although heat-inactivated versions have been shown to retain benefits for the host). Although probiotics were initially used for disease control, their use in aquaculture has now extended to improving fish growth and reproduction through addition to the body of water or feed. Probiotics function by acting as nutrient sources, providing enzymes for better digestion, modulating the immune system and increasing the immune response against pathogenic bacteria. The most common probiotics used in aquaculture include lactic acid bacteria such as Lactobacillus-sp., Bacillus-sp., Enterococcus-sp., and yeast, Saccharomyces cerevisiae. The concept is simple; feed adequate amounts of microbes to the organism to modify the gut microflora and replace harmful microbes with beneficial ones. The effect is multipronged. By populating the gut, these exogenous bacteria compete with pathogens, preventing their adhesion to the intestinal wall, limited access to nutrients and secreting antibacterial substances such as bacteriocins and organic acids. In terms of promoting growth, the proliferation of friendly microorganisms increases digestive enzymes, such as proteases, amylases and lipases, in the gut leading to improved digestive processes and nutrient utilisation.

Keywords: Probiotic, supplementation, aquaculture.
POSTER PRESENTATION

Lethal Concentrations (LC$_{50}$-96 h) of Pb(NO$_3$)$_2$ in Common Carp, Cyprinus carpio

Fatemeh Mojoudi$^1$, Amir Hossein Hamidian$^1$, Soheil Eagderi$^2$

$^1$Environment Department, Faculty of Natural Resources, University of Tehran, Karaj, Iran
$^2$Fisheries Department, Faculty of Natural Resources, University of Tehran, Karaj, Iran

Corresponding author e-mail: soheil.eagderi@ut.ac.ir

Abstract

In this study, lethal concentration (LC$_{50}$) of Pb(NO$_3$)$_2$ on common carp, Cyprinus carpio was investigated. Experiment was designed by using a total of 210 fish in 7 treatments, including 0, 10, 20, 30, 50, 70 and 90 mg L$^{-1}$ each in three replicates i.e. 10 fish for each experiment aquarium was considered. Pb(NO$_3$)$_2$ was added into the treatment aquaria as designed concentrations and the mortality times of exposed fish were determined. The physicochemical parameters of water including D.O., hardness, pH etc. and the mortality rate were monitored daily. Based on the results, 24, 48, 72 and 96 hours LC$_{50}$ values of Pb(NO$_3$)$_2$ were 169.15, 99.64, 78.31 and 62.76 mg L$^{-1}$, respectively.

Keywords: Toxicology, aquatic environment, fish, lethal
POSTER PRESENTATION

Relationships between fish size and otolith size of redcoat, *Sargocentron rubrum* (Forsskal, 1775), in the Southeastern Mediterranean Sea, Turkey

Ferhat Kabakh*, Deniz Ergüden

Faculty of Marine Science and Technology, Iskenderun Technical University, 31220 Iskenderun, Hatay, Turkey

Corresponding author e-mail: asilkabakh@hotmail.com; deniz.erguden@iste.edu.tr

Abstract

The present study, sampling was monthly collected from commercial fishing longline boats operating in the southeastern Mediterranean Sea (Arsuz coast) during September-April 2018 and the relationship between fish size and otolith size of 151 redcoat samples was examined. Total fish lengths of females, males and all samples were ranged between 14.2-20.5, 11.4-21.0 and 11.4-21.0 cm respectively. Otolith lengths determined between 0.35-0.86 cm, otolith width 0.26-0.56 cm, for all samples. Total fish length-otolith length and total fish length-otolith width relationships were found $OL=0.0512\times TL+0.186$ ($r^2=0.865$), $OW=0.0255\times TL+0.0021$ ($r^2=0.825$) on the total of 151 specimens, respectively. Positive linear relationship between total fish length-otolith length and total fish length-otolith width were found in all fish. The results of study will be new contributed for field and useful to fisheries management.

Keywords: *Sargocentron rubrum*, Holocentridae, otolith length, otolith width, Turkey
POSTER PRESENTATION

In vitro Effect of L-tryptophan on Sperm Quality of Brook Trout Salvelinus fontinalis

Filiz Kutluyer¹, Mehmet Kocabas², Nadir Başçınar³

¹Munzur University, Fisheries Faculty, 62000, Tunceli, Turkey.
²Karadeniz Technical University Faculty of Forestry, Department of Wildlife Ecology & Management 61080, Trabzon, Turkey.
³Department of Fisheries Technology Engineering, Faculty of Marine Sciences, Karadeniz Technical University, Trabzon, Turkey

Corresponding author e-mail: filizkutluyer@hotmail.com

Abstract
The present study focused on the usefulness of L-tryptophan for brook trout Salvelinus fontinalis sperm. Different activation media (NaCl, 0.3%) were supplemented with L-tryptophan [Control (0), 0.5, 1, 2 and 4 mM]. Sperm motility and duration were determined in sperm samples. The results from the present study indicated that addition of L-tryptophan to activation medium was increased motility rate and duration in S. fontinalis compared to control group. Highest motility rate and duration of sperm for S. fontinalis were 0.5 mM. In conclusion, sperm quality was positively affected by quantitative changes different concentrations of L-tryptophan. In addition, L-tryptophan can be used in activation medium for S. fontinalis.

Keywords: Salvelinus fontinalis, brook trout, L-tryptophan.
POSTER PRESENTATION

Effect of Rosehip Sauce on Sensory Quality of Marinated Anchovy (*Engraulis encrasicolus* Linnaeus, 1758)

Reşit Bilici¹, Gülderen Kurt Kaya², Özlem Emir Çoban³

¹Fisheries Research Station, 23000, Elazığ-Turkey
²Munzur University, Faculty of Fisheries, Department of Fisheries and Fish Processing Technology, Section of Seafood Processing, Tunceli-Turkey
³Fırat University, Faculty of Fisheries, Department of Fisheries and Fish Processing Technology, Section of Seafood Processing, Elazığ-Turkey

Corresponding author e-mail: gkurtkaya@munzur.edu.tr

Abstract

This study was conducted to determine the effect of rosehip sauce on the sensory analyses of anchovy marinades. For marination; 2% acetic acid and 12% salt were used. Fish filet was placed in brine 1:1.5 (fish: marinated brine). After maturation the marinades were separated by two groups and kept in a group of olive oil and the other in a rosehip sauce at +4 °C under refrigerator conditions. For sensory evaluation, appearance, smell, color and textural properties were examined. Sensory analyzes were performed on marinades samples from each group at 0, 7, 14, 21, 28, 35, 42, 49 and 56 days. According to the results obtained in the study; it was determined that the scores of both groups were between 4.80 and 5.00 points on the 7th day and that these scores were good quality. As a result, it was determined that the olive oil group had consumable values up to 42nd day and the rosehip sauce group had consumable values up to 49th day.

Keywords: Marination, sensory, anchovy, *Engraulis encrasicolus*, olive oil, rosehip
POSTER PRESENTATION

Chicken Frankfurter Production with Fish (*Equulas klunzingeri*) Protein Isolates and Determination of Nutritional Quality

Gülsün Özyurt, Çağın Gayde, Yeşim Özoğul, Yılmaz Uçar, Mustafa Durmuş, E. Tuğçe Aksun Tümerkan, Esmeray Kuley Boğa

Çukurova University, Faculty of Fisheries, Department of Seafood Processing Technology, Adana, Turkey

Corresponding author e-mail: yucar@cu.edu.tr

Abstract

The increase in consumer demand for high-protein products has led to intensive research on ready-to-eat foods that are improved in terms of nutrition. In order to develop a healthy frankfurter-type sausage, different levels of chicken meat and fish protein isolate were combined with five different recipes in the percentage ratios of 100/0 (G1), 90/10 (G2), 80–20 (G3) and 70/30 (G4), respectively. The fish protein isolates were made using pH shifting process from pony fish (*Equulas klunzingeri*). This project was supported by research fund of Çukurova University (FYL-2016-7290). Protein content was found to be 13.32% in the group prepared with 100% chicken meat (G1) while it was 15.90%, 16.16% and 16.48% in the groups in which 10% (G2), 20% (G3) and 30% (G4) fish protein isolates were substituted. Lipid, moisture and crude ash ratios were 12.31%, 70.95% and 1.92%, respectively, for G1 prepared with 100% chicken meat; were 11.20%, 71.78% and 1.68% for G2 with 10% FPI; 10.23%, 69.65% and 2.19% for G3 with 20% FPI; and 9.94%, 71.54% and 1.92% for G4 with 30% FPI, respectively. The major fatty acids were palmitic acid (C16:0), stearic acid (C18:0), oleic acid (C18:1n9) and linoleic acid (C18:2n6) in all groups. It was revealed that a significant increase in DHA (C22:6n3) content and nutritional enrichment were determined in frankfurter groups with fish protein isolate.

Keywords: Frankfurter, fish protein isolation, nutritional quality, fatty acid composition.
POSTER PRESENTATION

Amino Acid Compositions of Three Species Captured from Iskenderun Bay:
*Liza carinata*, *Chelon saliens* and *Sardinella aurita*

Gülsün Özyurt¹, Caner Enver Özyurt¹, Ali Serhat Özkütük²

¹Department of Seafood Processing Technology, Faculty of Fisheries, Çukurova University, 01330, Balcalı, Adana, Turkey.
²Department of Fisheries, Yumurtalık Vocational School, Çukurova University, Yumurtalık, Adana, Turkey

Corresponding author e-mail: aliserhat@cu.edu.tr

Abstract

Fish is known as a source of protein rich in essential amino acids such as lysine, methionine, cysteine, threonine, and tryptophan. Plant protein sources are often deficient in some essential amino acids, therefore the composition of diets must be improved by adding protein rich products such as fish. In this study, amino acid compositions of some low-cost fish species (*Liza carinata*, *Chelon saliens* and *Sardinella aurita*) frequently consumed in Mediterranean countries were investigated. Ultra Fast Liquid Chromatography with UV detection was used for the determining of amino acid composition. This project was supported by Çukurova University Research Fund (FBA-2017-7834). The main amino acids in mullet species were lysine, glutamic acid, aspartic acid and leucine which constituted in the range of 3667-3869 mg/100 g, 2278-2621 mg/100 g, 1345-1640 mg/100 g, and 1554-1571 mg/100 g, respectively. For sardine, lysine (3809 mg/100 g), leucine (1692 mg/100 g), glutamic acid (1607 mg/100 g) and alanine (1321 mg/100 g) were the major amino acids, respectively. The aspartic acid content of sardine (457 mg/100 g) was considerably lower than mullet species. The ratio of essential amino acids (E)/nonessential amino acids (NE) was determined as 0.95 for *Liza carinata*, 1.03 for *Chelon saliens* and 1.20 for *Sardinella aurita*. For many fish species, E/NE ratio was reported range from 0.69 to 1.00. The results showed that these fish species were well-balanced and high quality protein source in respect of E/NE ratio.

Keywords: Fish, amino acid composition, *Liza carinata*, *Chelon saliens*, *Sardinella aurita*
POSTER PRESENTATION

Evaluation of Growth Indices, Hematological Parameters and Carcass Composition of Rainbow Trout (Oncorhynchus mykiss) Fed with Immunoval Prebiotic

Hasan Sahraei 1, Mojtaba Pouladi 2, Amir Qadermarzi 2, Fatemeh Zahra Jafari 2, Fazel Zoheiri 2, Ali Akbar Hedayati 2*

1Department of Fisheries, Faculty of Agriculture and Natural Resources, Gonbad Kavous University, Gonbad Kavous, Iran
2Department of Fisheries, Faculty of Fisheries and Environment Sciences, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Golestan, Iran

Corresponding author e-mail: mojtabafishery1987@gmail.com

Abstract

In this study, Immunoval prebiotic performance was studied on growth indices, hematological parameters and rainbow trout carcass composition. Immunoval prebiotic was added to the diet in 4 levels of 0.05, 0.1, 0.15 and 0.2% and a diet without prebiotic was used to feed the control group. Each diet was randomly assigned to fish with an initial weight of 13.66 ± 0.54 grams in three replicates. After 8 weeks of feeding, the final weight of fish fed with 0.1, 0.15 and 0.2% prebiotics was significantly higher than fish of the control group (P <0.05). Specific growth rate was significantly lower than control group in all treatments fed with prebiotic (P < 0.05). The specific growth rate in fish fed with prebiotic was higher than the control group (P < 0.05). Also, there were significant differences in the parameters of red blood cell, white blood cells, lymphocyte and neutrophil in fish fed with prebiotic diets and control group (P < 0.05). In the carcass analysis, protein content was significantly higher than the control group and the highest amount was seen in 0.1% treatment. The amount of fat and carcass ash decreased significantly in the control group and the lowest amount was in 0.15% treatment. The results of this experiment showed that the adding of Immunoval prebiotic (0.15-0.2%) (had positive effects on growth indices, blood parameters and carcass composition in rainbow trout.

Keywords: Rainbow trout, immunoval prebiotic, growth, blood parameters, carcass composition
A Taxonomic Study on Zooplankton Fauna of Kıgı Dam Lake (Bingol-Turkey)

Hilal Bulut

Fırat University, Faculty of Fisheries, 23119 Elazığ, Turkey

Abstract

The present study was conducted to determine zooplankton fauna of Kıgı Dam Lake between September 2012 and August 2013 seasonally. The zooplankton samples were collected by using plankton net with the mesh size of 55µm horizontally and preserved in 4% formaldehyde. Total 22 taxa (16 Rotifera, 4 Cladocera, and 2 Copepoda) were identified in Kıgı Dam Lake. Ascomorpha saltans, Asplanchna priodonta, Brachionus angularis, Cephalodella gibba, Euchlanis dilatata, Kellicottia longispina, Keratella cochlearis, Keratella quadrata, Lecane luna, Lecane lunaris, Notholca squamula, Polyarthrula dolichoptera, Rotaria rotatoria, Synchaeta pectinata, Synchaeta oblonga, Trichocerca capucina from Rotifera species; Bosmina longirostris, Chydorus sphaericus, Daphnia cucullata, Daphnia longispina from Cladocera species; Acanthodiaptomus denticornis, Cyclops vicinus from Copepoda species are new records for this dam lake. Zooplankton samples were consisted of 72.7% Rotifera, 18.2% Cladocera, and 9.1% Copepoda.

Keywords: Kıgı Dam Lake, species distribution, zooplankton
POSTER PRESENTATION

Seasonal Variations in Zooplankton Community of an Aquatic Ecosystem at Susurluk Basin (Balıkesir-Turkey)

Hilal Bulut, Serap Saler

Firat University, Fisheries Faculty 23119 Elazig, Turkey
Corresponding author e-mail: hilahaykir@gmail.com

Abstract

In this study, zooplankton community, assessment with index analysis and cluster analysis were studied seasonally, between winter 2013-autumn 2014. Zooplankton samples were collected from three different stations with plankton net, both horizontally and vertically. In the dam lake 26 zooplankton species were identified. Zooplankton samples were consisted of 17 Rotifera, six Cladocera, and three Copepoda, respectively. Rotifera was the dominant group of zooplankton with regard to species numbers and densities.

Keywords: Rotifera, Cladocera, Copepoda, index analysis
POSTER PRESENTATION

The Potential of Microalgae for Wastewater Treatment and Biodiesel Production

İlkay Açıklgöz Erkaya¹, Dilek Yalçın Duygu², Belgin Erdem³

¹Department of Environmental Engineering, Faculty of Engineering and Architecture, Ahi Evran University, Kırşehir, Turkey
²Department of Biology Education, Faculty of Education, Gazi University, Ankara, Turkey
³Department of Medical Services and Techniques, Health Services Vocational College, Ahi Evran University, Kırşehir, Turkey

Corresponding author e-mail: dilekduygu06@hotmail.com

Abstract

With global shortage of fossil fuels, especially oil and natural gas, a major focus was shifted towards renewable biofuels. Algae has got much attention due to higher yield per unit area as compared to other sources of biofuel. The biotechnology of growing microalgae in waste water is getting importance as biomass of these algae can be used as food and many other valuable products including bio-diesel. There are number of benefits of growing algae in wastewater as it assimilate large amount of organic carbon to produce its biomass which can further be processed to bio-diesel production. In the process of the refinement of wastewater and the bio-diesel production, the species with high-lipid content, rapid growth capability and swift adaptability to the variable environmental conditions have been sorted out. Later on, by collecting wastewater samples, their BOD, COD, NO³, PO⁴ analyses have been executed in line with standard methods. Identified through the methods of optical density, dry weight and so on and by measuring their protein, lipid and carbohydrate contents, rates of the growth of microalgae were evaluated for bio-diesel production. Dry algal biomass lipid extraction was realised by means of using various solvents. In this study, obtainment of biomass through some microalgae with high lipid content by using wastewater (Botryococcus braunii 25-75%, Chlorella sp. 28-32%, Crypthecodinium cohnii 20%, Cylindrotheca sp. 16-37%, Nitzschia sp. 45-47%, Phaeodactylum tricornutum 20-30%, Schizochytrium sp. 50-77%, Tetraselmis suecia 15-23% vb.) and general acknowledgements compiled on the efforts for the production of bio-diesel out of these have been presented.

Keywords: Microalgae, biotechnology, biofuels, bioethanol, wastewater
POSTER PRESENTATION

Effect of Gamma Radiation on the Microbial Quality of Rainbow trout’s Fillets during Refrigerated Storage

Mehran Moslemi¹, Tahmine Naderi², Seyed Vali Hosseini³*

¹Department of Fisheries, Islamic Azad University, Joybar Branch, Joybar, Iran
²Department of Fisheries, Institute of Higher Education Tajan, Ghaemshahr, Iran
³Department of Fisheries, College of Agriculture & Natural Resources, University of Tehran, Karaj, Iran

Corresponding author e-mail: hosseinisv@ut.ac.ir

Abstract

Microbial quality of Rainbow trout (Oncorhynchus mykiss) fillets including total volatile counts (TVC), Entrobacteriaceae, Pseudomonaceae and lactic acid bacteria (LAB) were evaluated by different doses of gamma irradiation (0 (un-irradiated), 2, 3 and 4 kG) during 21 days of refrigerated (4 ± 1°C) storage. With the comparison of irradiated samples, un-irradiated samples have had the higher microbial counts (P<0.05). The obtained results were shown that with increasing of the irradiation’s dose, the microbial counts were decreased (P<0.05). Samples treated in 4 kG of irradiation, haven’t shown any LAB and Entrobacteriaceae in the all occasional time. The results indicated that gamma irradiation inhibit bacterial growth in Rainbow trout during refrigerated storage and irradiation with 4 kG, is the best dose on microbial quality control of Rainbow trout fillets.

Keywords: Fish quality, Gamma radiation; Microbial quality; Rainbow trout.
POSTER PRESENTATION

Future Key Living of Aquaculture: Bivalves

Muhammet Hayati Kayhan, Öznur Görmez, Ufuk Gürkan Yıldırım, İbrahim Diler

Eğirdir Fisheries Faculty, Süleyman Demirel University, Isparta, Turkey

Corresponding author e-mail: muhammetkayhan@sdu.edu.tr

Abstract

Our national aquaculture is based entirely on the breeding of fish species. This situation leads to the use of dense inputs such as fish meal and fish and to the environmental effect of production. Due to these reasons, the world has been turning to alternative species and significant improvement has been made especially in bivalve culture. While 16% of world aquaculture production is bivalve farming, the cultivation of this livestock group with great potential comes from ignoring the idioms in our country. Because of having no environmental impact on its breeding, having a positive effect on water quality, no need of harvesting, rapid breeding and short consumption time, availability in sustainable aquaculture, high nutritional value and need potency, bivalves important livestock group should be directed towards breeding. Increasing direct and indirect consumption and use of bivalves will also encourage widespread breeding.

Keywords: Bivalves, bivalve culture, advantages of bivalves
POSTER PRESENTATION

Significance of Nanoemulsion for Seafood Safety

Mustafa Durmus, Yesim Ozogul, Yilmaz Ucar, Ali Riza Kosker, Esmeray Kuley Boga, Fatih Ozogul

Cukurova University, Faculty of Fisheries, Department of Seafood Processing Technology, Adana, Turkey

Corresponding author e-mail: mdurmus@cu.edu.tr

Abstract

The way of the protection of seafood has been a major problem for many years. Despite the application of various conservation techniques in the food industry, food deterioration caused by microorganisms is one of the big concern. Thus, researchers are trying to develop new preservation techniques to prolong the shelf-life and improve the safety and quality of seafood. One of the applications that could contribute to extend the shelf life of seafood is nanoemulsions technique. Nanoemulsion is at least two insoluble liquids in each other that dispersed into droplets, which is heterogeneous emulsion appears to be transparent or semi-transparent. One of the most essential features of nanoemulsions is that they connect the structure of water and thereby limit the access to water of microorganisms. Nanoemulsions are known as antimicrobial preservatives thus many researchers have reported that nanoemulsions have an adverse effect on bacteria, fungi and viruses. The antimicrobial impacts of nanoemulsions have been attributed to their structure itself and the nano-sized droplets. Nanoemulsions selectively disrupt the membrane of prokaryotic cells but do not harm eukaryotic cells, thus allowing the potential usability of nanoemulsions in food safety. In addition, nanoemulsions are used as delivery systems for bioactive lipids, drugs, flavours, antioxidants and antimicrobial agents. Consequently, this review focus on the impact of nanoemulsions on seafood quality and safety.

Keywords: Nanoemulsion, food safety, antimicrobial effect, preservation
POSTER PRESENTATION

Isolation and Culture of Some Freshwater Microalgae in Ankara

Müjgan Kazanç¹, İlkay Açıkl göz Erkaya², Didem Aydın¹

¹Department of Biology, Faculty of Science, Erciyes University, Kayseri
²Department of Environmental Engineering, Faculty of Engineering and Architecture, Ahi Evran University, Kırşehir, Turkey

Corresponding author e-mail: ilkayacakgoz@gmail.com

Abstract

Microalgae are primary producers in food chain and great of importance in biotechnological studies due to the chemical reactive and food substances they contain. In order to use microalgae in biotechnological studies, they should be collected in their natural environment, identified and investigated in terms isolation and cultivation under laboratory conditions. It is significant to provide appropriate conditions to cultivate microalgae after pure isolation. The most influential factors in microalgae production are light, temperature, nutrients and pH. The present study aimed to isolate the microalgae collected from different freshwaters in the laboratory, to maintain cultural viability under optimum conditions, and to use them in further biotechnological studies. The samples were collected from ponds and freshwater pools located within the borders of Ankara and were firstly examined under the microscope. Micromanipulation and dilution methods were applied in species isolation. Species identification was performed under light microscope according to their morphological features. Isolated algae were grown in BG-11 and Allen Medium under 16:8 L/D illumination with about 6000 µmol cm⁻² s⁻¹, at a temperature of 22 ± 2°C and at 6.8-7 pH. As a result of isolation studies, species of Geitlerinema splendidum (Greville ex Gomont) Anagnostidis, Oscillatoria tenuis C.Agardh ex Gomont were isolated from Cyanobacteria; Chlorella vulgaris Beyerinck, Kirchneriella aperta Teiling, Monoraphidium contortum (Thuret) Komářková-Legnerová, Scenedesmus arcuatus (Lemmermann) Lemmermann, Ulothrix sp. were isolated from Chlorophyta.

Keywords: Microalgae, isolation, culture, media, culture condition
POSTER PRESENTATION

The Properties of Fishing Boats Used in Karakaya Dam Lake

Mürşide Dartay*, Erdal Duman

Fırat University, Fisheries Faculty, Elazığ, Turkey.

Corresponding author e-mail: mdartay@firat.edu.tr

Abstract

In this study, the structure of fishing boats was conducted to determine in the Karakaya Dam Lake fishery cooperatives. There is 79 registered fishing boats in the study area. All of these boats is made from sheet iron. It was determined that 97.46% of the boats were 7.0-7.7 m long and 2-2.5 m wide. At least 5.3 - 6.2 m long boats used (2.53%) and the length of the boat is used 4th and 8th region in Karakaya Dam Lake. The engine horse power used to 8-11 HP (69 units) beet engine and 12-28 HP (10 unit) lombardin brand engine. At high engine power 28 HP (2.18%), was determined to 8th region Cooperative. The tonage of this boats of was determined 1.0-2.5 ton. It is important to reveal the boat profile and inventory of the region in order to establish a data base for the fisheries studies used in Karakaya Dam Reservoir.

Keywords: Fishing Cooperative, Fishing boat, Karakaya Dam Lake
POSTER PRESENTATION

Taxonomic Statue of Ponticola iranicus Based on COI Cytochrome Gene

Nasrin Nikmehr*, Soheil Eagderi, Hadi Poorbagher

Department of Fisheries, Faculty of Natural Resources, University of Tehran, Karaj, Iran

Corresponding author e-mail: nasrin_nikmenhr@yahoo.com

Abstract

The family Gobiidae possesses 42 species in the Iranian inland waters comprising about 10% of its freshwater fish fauna. This family has x genus in Iran that the genus Ponticola is most diverse one. Morphological variation of the members of the genus Ponticola, make it difficult their identification. Recently a new species i.e. Po. Iranicus (Vasil'eva et al., 2015) based on the morphological characters from the Bijar, Gisum and Totakabon rivers, Caspian Sea basin of Iran. Therefore this study aimed to verify the validity of this species based on COI gene and its phylogenetic position. For this purpose, 7 specimens per river were collected different rivers of the Caspian Sea basin. Then their DNA were extracted by phenol-chloroform method, and the cytochrome COI gene was amplified during the PCR process and sequenced after purification. The results showed that Po. Iranicus is a valid species, as a sister species of the Po. Syrman with about 3.0% K2P genetic distance.

Keywords: Taxonomy, morphological variation, genetic variation, Iran.
POSTER PRESENTATION

Investigation of Biochemical Response in Gill Tissue of Crayfish (Astacus leptodactylus) Exposed to Remazol Brilland Blue R textile dye

Önder Aksu, Tufan Karakoç

Munzur University, Fisheries Faculty, 62000. Tunceli, Turkey
Corresponding author e-mail: onderaksu@munzur.edu.tr

Abstract

In this study, it was aimed to investigate biochemical response of freshwater crayfish (Astacus leptodactylus Eschscholtz, 1823) when they were exposed to Remazol Brilland Blue R being textile stain at various concentrations. The study groups were constituted as the control group (0 mg/l) and exposed groups to the sublethal dose of Remazol Brillant Blue R 3 (0.5 mg/l, 1 mg/l and 2 mg/l). Crayfish in each aquarium were removed from the aquarium after 24 hours and 48 hours. Reduced glutathione (GSH), superoxide dismutase (SOD), catalase (CAT) and malondialdehyde (MDA) levels in gills of crayfish were assessed for determination of biochemical response. SOD activity was investigated and there was no statistically significant difference between 24 hour and 48 hour samples (p>0.05). It was determined that there was no statistically significant difference among the doses administered in the 24 hour sample (p>0.05) while there was the statistically significant difference among the dose groups in the 48 hour sample (p<0.05). CAT activity showed statistically significant difference (p<0.05) both between 24 and 48 hour samples, except for 1 mg/l. All doses gave a significant difference between themselves when 24 and 48 hour experimental groups were compared within groups (p<0.05). GSH and MDA results were not statistically significant (p>0.05).

Keywords: Remazol Brilland Blue R, Astacus leptodactylus, enzyme activity, SOD, CAT, GSH, MDA.
The Effect of Olive Oil Obtained by Different Methods on FCR and NBT values of Rainbow Trouts (Oncorhynchus mykiss)

Önder Aksu1, Başar Altinterim2, Mustafa Dörücü3

1Munzur University Fisheries Faculty, Tunceli, Turkey, onderaksu@munzur.edu.tr
2İnönü University Fisheries Faculty, Malatya, Turkey, basaraltinterim@gmail.com
3Fırat University Fisheries Faculty, Elazığ, Turkey, mdorucu@firat.edu.tr

Abstract

Rainbow trout (O. mykiss) (n: 30) with an average live weight of 25.88±1.41 g was used in the study. The riviera and extra virgin olive oil used in the experiment were obtained from a market. Olive fruit (Olea europaea L.) was kept in sunflower oil (1/10) for 15 days to obtain macerated oil. The oils were added to the trout feeds at 2%. During the entire study the fish were fed for two days with a commercial trout diet for 21 days, morning and evening. Feeding was applied on an average of 2% of live weight of fish daily. Feed evaluation ratio (FCR) was determined at the end of the study. Blood collection was done without feeding from fish and the fishes were anesthetized (Benzocaine 30 mg / L) before the blood collection. Experiments were conducted in accordance with ethical rules (Inonu University, Faculty of Medicine, Experimental Animal Ethics Committee, Protocol No: 2017 / A-24). Blood samples were taken from the tail veins of the infected fish by injector and transferred to tubes containing EDTA. On the same day of EDTA blood samples, nitroblue tetrazolium (NBT) activity (total oxidative radical production of neutrophils) was determined spectrophotometrically. As a result of this study, it was determined that the maximum weight increase was in the extra virgin olive oil (131%), this group was determined as weight gain of fish fed with riviera olive oil added group (119%), macerated olive oil added group (104%) and control group at least weight gain (109%). In addition, FCR values were found to be 0.77 in control group, 0.85 in macerated oil-added feed group, 0.94 in extra virgin olive oil feed group and 1.07 in riviera olive oil group. The highest NBT value was obtained in extra virgin olive oil group (0.488±0.017) and followed by riviera olive oil added group (0.465±0.017), control group (0.353±0.062) and macerated oil groups (0.306±0.022), respectively.

Keywords: Macerated oil, riviera olive, extra virgin olive, Oncorhynchus mykiss, FCR, NBT.
POSTER PRESENTATION

Evaluation of the Potential of Bacterial Flora in Semen of Brook Trout (*Salvelinus fontinalis*)

Özlem Ertekin¹, Filiz Kutluayr², Mehmet Kocabas³, Nadir Başçınar⁴

¹Munzur University, Engineering Faculty, Department of Food Engineering, 62000, Tunceli, Turkey.
²Munzur University, Fisheries Faculty, 62000, Tunceli, Turkey.
³Karadeniz Technical University Faculty of Forestry, Department of Wildlife Ecology & Management 61080, Trabzon, Turkey.
⁴Department of Fisheries Technology Engineering, Faculty of Marine Sciences, Karadeniz Technical University, Trabzon, Turkey

Corresponding author e-mail: oertekin@munzur.edu.tr

Abstract

Experiments were designed to evaluate bacterial flora in semen culture of brook trout (*Salvelinus fontinalis*). Herein, semen samples were collected from fish and standard microbiology techniques were processed for bacterial flora. The samples were serially diluted in physiological saline (NaCl: 0.85%). Aliquots of 0.1 mL of each dilution were spread-plated onto Plate Count Agar (PCA) (Total Bacteria Count), Rose Bengal Agar (RBC) (Yeast-Mold Count), VRBD (*Enterobacteriaceae* count) and Mannitol Salt Agar (MSA) (*Micrococcus/Staphylococcus* count). *Micrococcus/Staphylococcus* group bacteria (11.11%) were counted from brook trout (*S. fontinalis*) semen. Total bacteria count varied between $10^3$-$10^5$ cfu ml$^{-1}$ in semen.

Keywords: Bacterial count, brook trout, *Salvelinus fontinalis*, semen.
POSTER PRESENTATION

Plant Species Used in the Treatment of Fish Diseases

Özlem Gündoğdu¹, Sertan Aytaç¹, Emre Yavuzer¹

¹Department of Food Processing Technology, Kaman Technical and Vocational School, Ahi Evran University, Kırşehir, Turkey

Corresponding author e-mail: ogundogdu@ahievran.edu.tr

Abstract

Medicinal and aromatic plants are used as herbal medicines in the prevention and treatment of various diseases. These plants exhibit biological activity because they contain a large number of bioactive components such as terpenic compounds, tocopherols, flavonoids, phenolic acids, essential oils. Plant and plant extracts such as thyme, garlic, rosemary, nettle, sage, sumac, marjoram, which are medicinal and aromatic plants, are used in the treatment of various diseases in traditional folk medicine. In studies conducted with laboratory animals, it has been reported that such plants have positive effects such as antimicrobial, antioxidant, antiviral, anticancer and antiinflammatory. These plants are also used in the treatment of farm animals. Fish is the most important living thing in the fishery sector due to its rich nutrient content. Plant and plant extracts are used as an alternative to chemical drugs in order to prevent sectoral losses in fish diseases that develop due to various reasons. The use of extracts derived from medicinal and aromatic plants has become widespread in the fight against these diseases. Plants and their extracts such as green tea, sage tea, daisy, Red Clover fenugreek, ginger, mint, sumac, cinnamon and nettle are used for strengthening the immune system, increasing growth performance and extending the shelf life of aquaculture products. This study was carried out in order to provide information about herbal therapies as alternatives to synthetic drugs in the prevention and treatment of fish diseases and to spread them in fish breeding.

Keywords: Medical-aromatic plants, fish diseases, preventive treatment.
POSTER PRESENTATION

Phylogeny of the Genus *Garra* in Iran using Caudal Fin Skeleton

Paria Jalili, Soheil Eagderi

Department of Fisheries, Faculty of Natural Resources, University of Tehran, Karaj, Iran.

Corresponding author e-mail: pariya.jalili@yahoo.com

Abstract

Among cyprinid family, little information is available about the phylogenetic relationships of the members of genus *Garra* in Iran. The structure of caudal skeleton as a valuable source in taxonomic studies of fishes can help to determine their systematic position. Hence, this study was conducted to compare the osteological features of caudal fin skeleton and reconstructing phylogenetic tree of the Iranian members of genus *Garra*. For this purpose, five specimens of every selected (except Iran blind carp with two specimens from each morphotype) taxon were cleared and stained to examine the osteological characteristics of their caudal fin skeleton. Also, Kura barbel (*Barbus cyri*) and Barzam (*Capoeta trutta*) were designed as outgroup. The results showed that members of *Garra* constitute a monophyletic group. The results revealed that the caudal skeleton features cannot discriminate the members of genus *Garra* at the level of species because of small number of extractable characters and their states.

Keywords: Phylogeny, Osteology, Iran blind carp, *Garra*. 
POSTER PRESENTATION

Body Shape Comparison of Three-spined Stickleback (Gasterosteus aculeatus) in Iran

Paria Jalili, Soheil Eagderi

Department of Fisheries, Faculty of Natural Resources, University of Tehran, Karaj, Iran.

Corresponding author e-mail: pariya.jalili@yahoo.com

Abstract

The body shape of three populations of three-spined Stickleback (Gasterosteus aculeatus) from Iran was compared using geometric morphometric method. A total of 90 specimens were sampled from three stations of Caspian Sea basin including the Babolroud River (central part of the Caspian Sea basin), the Gomishan wetland (east part of Caspian Sea basin) and Gisum River (west part of Caspian Sea basin). The left side of specimens was photographed using digital camera and 23 landmarks points were digitized on two-dimensional images using TpsDig2. The obtained data after generalised procrustes analysis (GPA) were analyzed using CVA and PCA. The results displayed significant difference of body shape between Babolroud River population and two Gomishan and Gisum populations ($P<0.001$) that were related to body and head depth, caudal peduncle length and depth.

Keywords: Caspian Sea basin, stickleback, landmark, phenotypic plasticity.
POSTER PRESENTATION

The Status of Coral Reefs in the Larak Island, Persian Gulf During 2012 to Present

Pegah Javid¹, Maryam Soyouf Jahromi², Mohammad Sharif Ranjbar¹*

¹Department of Marine Biology, Faculty of Marine Science and Technology, Hormozgan University, Bandar Abbas, Iran
²Department of Atmosphere and Oceanography, Faculty of Marine Science and Technology, Hormozgan University, Bandar Abbas, Iran

Corresponding author e-mail: Sharif.ranjbar@hormozgan.ac.ir

Abstract

Coral reefs are one of the most important marine ecosystems around the world. This ecosystem is the breeding and living ground for vast of animals including sea turtles, fish, and even dolphins. There is a disaster which is raising more and more by natural effects and more importantly by human origin. Global warming and consequently raising heat endangers the life of living organisms especially immobile ones. Coral reefs belong to the sessile animals that cannot move, migrate or defend themselves as strongly as advanced organisms. Different stressors such as thermal shock result in bleaching coral reefs so that the symbiont algae (zooxanthellae) does not return to the colony which ends to corals’ death. Coral Reefs of the Persian Gulf are not the exception and they have been bleached severely during last few years. Typically, water temperature rises from March to middle of August and decreases again toward December. The most severe bleaching happened in August 2015 in Northern Larak Island while the water temperature was 32.60°C. However, the water temperature was high even in January, February and March to 22.84°C. The highest temperature during August 2017 (32.81°C) was another bleaching peak for North and Eastern Larak Island corals. During this catastrophe in 2017, more than 90% of genus Acropora and more than 80% of genus Porites were bleached. There was a recovery status in 2018 but dead corals never recovered. Although there are resistant corals in the coral reef ecosystem, heat is a certain stress which can ruin the ecosystem.

Keywords: Coral bleaching, Larak Island, Heat shock
Morphologically Different Species of *Diplostomum* spp. in Farm-raised Common carp From Khuzestan, Iran

Rahim Peyghan *, Zahra Tulaby Dezfuly, Maryam Shokoohmand

Department of Aquatic Animal Health and Diseases, Faculty of Veterinary medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran.

Corresponding author e-mail: peyghan2014@gmail.com

Abstract

Diplostomiasis is one of main diseases in carp farms of Khuzestan province. Diplostomum species are the parasites responsible for diplostomiasis or eye fluke in fish. In previous studies we showed that Diplostomiasis in our fish had resulted in visual impairment even blindness, exophthalmia, local hemorrhage, lens cataract, reduced fish growth and deformities of the vertebral column. The parasite has become an organism of concern because it has been found in a large number of freshwater fish species as a host and predatory birds as a carrier. Common carp (*Cyprinus carpio*) is one of the widely distributed fish species in south-west part of Iran (Khuzestan). Over the years it has become one of the most important cultivable fish species in Iran especially in Khuzestan. Since some of the physiological activities of the fish such as feeding, swimming, mating etc are vision dependent, it is important that fish has clear vision ability to enable it to compete well in the system. It could also expose the fish to predation and therefore increase mortality. The objective of this study is to report the occurrence of different Diplostomum species in farm-raised carp in Khuzestan. About twenty fish in the summer of 2016 were referred to veterinary hospital, Aquatic animal department because of Anorexia, decline in growth and mortality. The fish eyes were abnormal with obvious sign of cloudy lens or cataract. The eye lens and other external and internal organs of the body were examined for the presence of parasites. The result shows that 100% of the fish and their both eyes had infested with metacercaria of Diplostomum. Morphologically, there were two different forms of the parasite. The metacercariae count in each eye lens was on 15±6. The intensity of infection in left and right eyes was not significantly different. The parasites were elliptical in shape with two different morphologies that has discussed in the paper. The parasite in the first morphology was 135-160 µm diameters. The second morphology was bigger with 146-261 µm diameters. In conclusion, we think this two morphology show two species of Diplostomum. However for definite identification we need to do PCR test for further investigations.

**Keyword:** Diplostomum, Cyprinids, Khuzestan, Metacercaria.
Effect of Aflatoxin Toxicity on Gill Structure of Pacific White Shrimp

Sara Jamshidizadeh\textsuperscript{a}, Narges Amrollahi Biuki\textsuperscript{b*}, Morteza Yousefzadi\textsuperscript{c}, Ali Aramideh\textsuperscript{d}

\textsuperscript{a,b,c}Department of marine biology, Faculty of marine science and technology, University of Hormozgan, Bandar Abbas, Iran
\textsuperscript{d}Research Institute of Medicinal Plants, Phytochemistry department, Shahid Beheshti University, Tehran, Iran

Corresponding author e-mail: amrollahi@hormozgan.ac.ir

Abstract

Over the past decades, shrimp farming has become a significant industry around the world. However, there are potential threats that can seriously affect the proper harvesting of aquatic organisms in this industry, such as contaminated shrimp meal with fungus, which is often caused by the Aspergillus species. These fungi produce a variety of mycotoxins, including aflatoxin. In this study, the histopathologic response of \textit{Litopenaeus vannamei} in exposure to aflatoxin toxicity were studied in two groups included control and treatment. For this purpose 200 samples of live shrimp were collected from a shrimp breeding center located on the south of Tiab, in Hormozgan province. Next, aflatoxin-contaminated diets with different concentrations of 0.18, 0.9, 1.8, 7.11, 9.77 and 16.05 ppb of aflatoxin were prepared and shrimps in 6 experimental groups with 3 replicates in each group were fed for 28 days. At the end of experimental period, shrimp sampling was done. Results of this study showed that gill tissue in control samples are normal but in contrast, various histopathological alternations in the gill tissue of treated shrimps, was showed. The types of histopathological changes, which depend on the concentration of aflatoxin in diets, included: disruption of the pillar cells and collapsing of lamellae, detached cuticle, club-shaped distal tips of gill lamellae, vacuolisation, malformation at tip of the gills, slight lamellae distortion, hyperplasia and necrosis.

Keywords: Aflatoxin, Aspergillus, gill, \textit{Litopenaeus vannamei}
Use of Nettle (Urtica dioica L.) to Extend Shelf Life of Fish Products

Sertan Aytaç, Özlem Gündoğdu, Emre Yavuzer
Department of Food Processing Technology, Kaman Technical and Vocational School, Ahi Evran University, Kırşehir, Turkey

Corresponding author e-mail: saytac@ahievran.edu.tr

Abstract

Nettle is from Urticaceae family and is widely available in our country. Nettle root, stem, leaves, flowers and seeds are used as herbal medicine in traditional folk medicine. Nettle generally has antimicrobial, anti-inflammatory, antiallergic, antifungal and antiviral effects because it contains a large number of biologically active compounds. Studies conducted on the laboratory animals show that there are positive effects of the nettle on the immune system and it is used as herbal medicines in the prevention and treatment of fish diseases. Various herbs and extracts are also used to prolong shelf life in addition to the disease treatment. Demand for the ready-made food sector has increased in our country and worldwide. White meat and fish are the most important food groups in this sector. Due to unsaturated fatty acid and protein contents, fish meat is easily degradable products. Physical damages that may occur during processing and storage accelerate the process of chemical and microbiological deterioration. In the storage process, oxidation rates and microorganism development are inhibited by the treatments and coatings made with plant extracts. The nettle extract, which is used to extend shelf life, can be used as an alternative to artificial preservatives. When literature information is examined, studies on plant extracts in the fishery processing sector are limited. In this study, a literature search has been conducted on the usability of nettles to extend the shelf life of fish products.

Key words: Nettle, fish and fish products, shelf life
POSTER PRESENTATION

Evaluation of the Quality Management Systems Used in Trout Culture in Turkey in Terms of Fish Health

Sibel Özesen Çolak¹, İdil Ezgi Can Oma²

¹Department of Aquaculture and Fish Diseases, Faculty of Aquatic Sciences, Istanbul University, Istanbul, Turkey
²Department of Aquaculture and Diseases, Institute of Sciences, Istanbul University, Istanbul, Turkey

Corresponding author e-mail: hsoc@istanbul.edu.tr

Abstract

The rapidly increasing market share of aquaculture and the serious competition in the market have necessitated food safety management systems in order to use existing resources in a more effective manner. To ensure fish welfare, and to reduce the rate of mortality to the lowest possible level, it is important to have a successful aquaculture management in place that not only promotes sustainability but leads to effective use of available resources. Implementation of quality management systems in aquaculture, assessment of the impact on fish health management, and productivity is very important. This study is based on trout, which is most cultured fish species in Turkey. Although, there are many quality management systems for trout culture globally, the state subsidy certificate valid for aquaculture is the Good Agricultural Practices (ITU) in Turkey. Certificates with international validity in trout farming are the Global Aquaculture Alliance’s (GAA) Best Aquaculture Practices (BAP), Global Gap (GGAP) approved by the Global Food Safety Initiative (GFSI), and ASC (Aquaculture Stewardship Council). The relationship between fish health, and the practices in these certification systems has been investigated. As a result, a more detailed examination of the impacts of quality management systems on the fish health, which fish farmers have started to implement to increase their market share, will not only contribute to the fish health management of these systems but also carry the fisheries sector forward.

Keywords: Aquaculture, trout, farm, quality management system, fish health
POSTER PRESENTATION

Effects of Dietary Lactobacillus Probiotic along with Exposure to Silver Nanoparticles on Growth Performances of Common Carp (Cyprinus carpio)

Tahereh Bagheri, Zahra AminiKhoei

Offshore Fisheries Research Center, Iranian Fisheries Science Research Institute, Agricultural Research Education and Extension Organization, Chabahar, Iran.

Corresponding author e-mail: Bagheri1360@gmail.com

Abstract

This study was to investigate the growth and carcass composition of common carp (Cyprinus carpio) exposed to iron nanoparticles and probiotic LctoBacillus. 250 fry carp for 42 days in three treatments of without probiotics and prebiotics level A ($10^6$) and Level B ($10^7$) were divided. Then each group exposed to 50% of nano-iron LC$_0$ for 10 days. Protein was determined with total nitrogen in Kjeldahl method, crude fat by fat dissolving in the ether and determine where to soxhlet, ash by putting the sample in electric oven and humidity was measured by drying the samples. Protein, weight gain and FCR of fish carcasses showed that probiotic and iron reduced protein and FCR and within the influence of reduction of iron is far more than probiotics, although the rate of increase in body weight of probiotics gain to reduce the body weight and carcass, whereas the addition of iron lead to neutralize the reduction effects of probiotics and even lead to increased these indices. Probiotics had some undesirable effects of iron on the growth of common carp neutralize and had a positive synergistic effect.

Keywords: Fish, growth, resistance improvement, probiotics
Microsatellite Variation and Population Structure in the Caucasian Brown Frog from Eastern Anatolia Region

Tuğba Ergül Kalaycı¹, Nurhayat Özdemir¹, Gökhan Kalaycı²

¹Department of Biology, Faculty of Art and Science, Recep Tayyip Erdoğan University, Rize, Turkey
²Faculty of Fisheries and Aquatic Science, Recep Tayyip Erdoğan University, Rize, Turkey

Abstract

Brown frogs are comprised by four cold adapted species (*Rana macrocnemis*, *Rana camerani*, *Rana holtzi* and *Rana tavasensis*) in Anatolia. Recent taxonomic studies decreased the number of species of this group inhabited in Turkey. The two of them (*R. macrocnemis* and *R. tavasensis*-endemic to Akdağ;Denizli and its close vicinity) distributed in Anatolia according to current researchs. Although existing systematic studies made by different molecular markers, there is no population genetic study revealed by microsatellites. It is possible to estimate genetic differentiation among adjacent populations by combining several microsatellite markers. We studied genetic structure of *R. macrocnemis* from Eastern Anatolia region. We genotyped 26 individuals at six microsatellite loci: BFG095, BFG134, BFG143, Radal G-11, Radal E-8, Radal F-5. Alleles were scored using GeneMarker software (Soft Genetics LLC). We tested for the presence of null alleles, with MICRO-CHECKER. Estimates of allelic diversity, number of alleles, their frequency and private alleles (unique allele) made using GENALEX 6.1. Significant deviation from Hardy-Weinberg equilibrium (HWE) expected and observed heterozygosity (HO and HE) was obtained using program with ARLEQUIN. The allelic richness per locus ranged from 2 (BFG134) to 9.15 (Radal F-5). The average of number of alleles in the pooled population was determined as a 7.3. The average expected and observed heterozygosity were found as a 0.679 and 0.517, respectively. Most loci showed significant deviations from HWE.

Keywords: Microsatellite, Anatolian mountain frogs, Eastern Anatolia, Turkey
POSTER PRESENTATION

The Damages of Prohibited Amateur Fishing Device (Parashut) on Aquatic and Terrestrial Organisms
Tuncay Ateşşahin

Fırat University, Fisheries Faculty, Elazığ- Turkey

Corresponding author e-mail: tatessahin@firat.edu.tr

Abstract

In this study, the damages on the aquatic organisms of amateur fishing device, which is commonly used by amateur fishermen in inland water, have been examined. According to interactive data collected, it was found that this fishing method gives to damage not only aquatic organisms but also terrestrial organisms. It is legally forbidden to sell, transport and use in the water courses with the Turkish fisheries communiqué. This study has been carried out in order to take attention the damages of this fishing device used in the aquatic environments even though it was forbidden. It has been determined that this fishing device is harmful to aquatic organisms such as trout, freshwater mullet, mackerel, freshwater crayfish and also others organisms such as snakes and birds. Very strict precautions for the production, sales and uses of this fishing device, which causes ghost fishing, should be taken. In order to develop sustainable fisheries, awareness of all fisheries stakeholders is needed. It should be emphasized that this fishing device is the cause of the ghost fishing in the aquatic and terrestrial environment, so it should never be used.

Keywords: Parashut, ghost fishing, amateur fishing, aquatic damage.
Application of Decision Support Tools to Promote the Implementation of the Maritime Spatial Planning process: Lessons Learned from the COFASP-ECOAST Case Study in Northeastern Mediterranean Waters

Vassiliki Vassilopoulou, Eleni Gadolou

Institute of Marine Biological Resources and Inland Waters, Hellenic Centre for Marine Research, Greece

Corresponding author e-mail: elenigadolou@hcmr.gr

Abstract

In the last decades, maritime economic development has caused growing conflicts between uses, particularly in coastal areas, competing for the limited sea space. The latter is particularly evident in Mediterranean coastal regions, and as a result the Protocol on Integrated Coastal Zone Management (ICZM) has entered into force in 2011; the ICZM Protocol is a major innovation, however its implementation in various national contexts remains a challenge. Furthermore, in Mediterranean EU countries the Marine Spatial Planning (MSP) Directive has been adopted in 2014 to promote sustainable use of maritime and coastal resources and sustainable growth of maritime and coastal economies. A key aim of both structures is the sustainable use of maritime space following an Ecosystem-Based Approach according to which the alignment of marine and terrestrial planning is needed taking into account sea, coastal and land interactions. In this context, the ICZM-MSP process requires among others, integrated assessment of conflicts and synergies of marine uses, and of the cumulative effects of human activities on the ecosystem, which have been the main focus of the present study. The objective has been to assess mainly the impact of fisheries and aquaculture on coastal ecosystems of the central Ionian Sea, as well as explore the spatial interactions between these activities which are of key socio-economic importance in the area. The overall aim was to identify and map potential spatial conflicts between the two uses along with “hotspots” of cumulative impact in order to contribute to the planning process in the study area.

Keywords: COFASP-ECOAST, ICZM-MSP process, ICZM-MSP process.
POSTER PRESENTATION

The Applications of Organic Acids on Seafood Biopreservation

Yılmaz Uçar¹,², Fatih Özoğul¹, Mustafa Durmuş¹, Ali Rıza Köşker¹, Esmeray Küley Boğa¹, Yeşim Özoğul¹

¹Cukurova University, Faculty of Fisheries, Department of Seafood Processing Technology, Adana, Turkey
²Ordu University, Faculty of Marine Science, Ordu, Turkey
Corresponding author e-mail: fozogul@cu.edu.tr

Abstract

Acids are generally divided into two groups that are inorganic and organic acids. While acids without carbon element in their structure are classified inorganic acids, another included carbon element are classified organic acids. Organic acids including acetic, propionic and lactic acid are important for the biological protection of food in terms of bacterial inhibition and stabilization of sensory characteristics (flavour, colour, juiciness). These acids inhibit the growth of undesirable microorganisms by lowering the pH in foods. Lactic acid starter bacterial cultures fall within five genera that are Lactococcus, Streptococcus (one species), Pediococcus, Leuconostoc, Lactobacillus and Bifidobacterium. These organisms produce an extensive amount of lactic acid and they may also produce acetic acid by carbohydrate fermentation, which it can be used for metabolism in some cases. Propionibacterium species can produce propionic and acetic acid from carbohydrates (or lactate). The usage of organic acids as bio-preservatives was also effective in reduction of enzymes activity of microorganism. Lactic acid starter culture used in food fermentation convert different carbohydrates to lactic, acetic and propionic acids and various other by-products. These by-products do not only constitute the desired flavour but also texture of the food. Many of them especially weak organic acids provide stabilization by preventing the development of unwanted microorganisms. Organic acids produced by starter culture bacteria compose an important barrier to control microbial degradation in fermented seafood and to improve safety of seafood. Many researchers have showed that organic acids such as acetic propionic, benzoic, sorbic, lactic and lauric could be added to edible films to lessen bacteria in solution, on culture media, or on a variety of seafood. These organic acids are more effective for decreasing the levels of food-borne pathogens when immobilized into an edible film. Some of the organic acids such as acetic, lactic and citric have been used to control microbial growth, improve sensory attributes and extend the shelf life of various food. Organic acids and their salts are generally considered as safe (GRAS) and have been approved by most member of European Union. Consequently, bio-preservation refers to prolong the shelf-life and enhance safety of seafood using the natural microflora and their antibacterial compounds. Thus organic acids have a major potential as bio-preservation to extend the shelf-life and improve the quality and safety of seafood products.

Keywords: Organic acids, seafood, bio-preservation, packaging, microorganism.
POSTER PRESENTATION

The effect of curcumin on oxytetracycline-induced spermatological parameters in rainbow Trout

Zafer Doğu ¹, Erdinç Şahinöz ¹, Faruk Aral²

¹Department of Fisheries and Aquaculture, Bozova Vocational High School, Harran University, Şanlıurfa, Turkey
²Faculty of Art and Science, Niğde Ömer Halisdemir University, Niğde, Turkey

Corresponding author e-mail: zaferdogu@harran.edu.tr

Abstract

The aim of this study was to determine the effects of Curcumin on oxytetracycline (OTC)-induced some spermatological parameters in rainbow trout. The experimental fish analysed in this study were divided into 3 different experimental groups. Group 1 was the control group, and groups 2 and 3 received Curcumin and OTC, respectively, for 14 days. Group 2 received OTC for 14 days after Curcumin pre-treatment for 14 days, while group 3 received OTC for 14 days before lycopene posttreatment for 14 days. Results showed that spermatozoa motility rate, duration of motility (P<0.001) and pH (P<0.05) in sperm increased and volume was decreased when compared to control. Curcumin ameliorated oxytetracyclin-induced toxicosis in the sperm volume. It can be concluded that curcumin could not be able to antagonize oxytetracyclin toxicosis on sperm quality.

Keywords: Curcumin, oxytetracycline, sperm, rainbow trout