TURKISH-JAPANESE MARINE FORUM-III

International Workshop

26 November 2015 - Çanakkale TURKEY

RECENT DEVELOPMENTS IN MARINE & ENVIRONMENTAL SCIENCES SUSTAINABLE UTILIZATION OF WATER RESOURCES

PORT OF ÇANAKKALE (KEPEZ) LİMANI

Tokyo University of Marine Science and Technology

Preface

Dear Colleagues,

I would like to welcome you all to Turkish-Japanese Marine Forum-III: Focus on Recent Developments in Marine and Environmental Sciences, Sustainable Utilization of Water Resources. It is organized by Faculty of Marine Sciences and Technology, Çanakkale Onsekiz Mart University (COMU), in collaboration with the Tokyo University of Marine Sciences and Technology (TUMSAT).

The workshops are dedicated to the dissemination of knowledge concerning the marine and environmental sciences. The aim of this workshop is to bring together scientists, engineers, farmers, managers, equipment and systems manufacturers, consultants and other professionals.

We are grateful to our sponsor of Port of Çanakkale for supporting this conference. We also thank the committee members, speakers and poster presenters for enriching the program.

We are glad you were able to come and hope you have an enjoyable and productive time.

On behalf of the Organization Committee
Professor Dr. Sebahattin ERGUN
Dean of Faculty of Marine Sciences and Technology

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Asst. Prof. Dr. Pınar ÇELİK
Asst. Prof. Dr. Çiğdem YIĞIN

PROGRAM

13:30-14:00 **Opening Remarks**

Session I

14:00- 14:10 **Mr. Ali AKTOPRAK and Mr. Evren BECEREN** (Port Management, Port of Canakkale) **CANAKKALE-TURKEY**
Port Operations and Waste Reception Services in the Strait of Canakkale

14:10- 14:20 **Assoc. Prof. Dr. Makiko ENOKI** **TUMSAT – JAPAN**
Polysaccharides of Sea Algae and their Utilization

14:20- 14:40 **Dz. Bin. Tamer ALPUL (Coast Guard Commander)** **CANAKKALE - TURKEY**
Coast Guard Security and Safety Operations in the Strait of Canakkale

14:40- 14:50 ***Coffee Breaks***

Session II

14:50- 15:00 **Cpt. Rıdvan GEZGİN (Director of VTS Control Center)** **CANAKKALE - TURKEY**
Turkish Straits Vessel Traffic Services and Physical Conditions of Canakkale Strait

15:00- 15:10 **Cpt. Murat ÖNGÜR** **CANAKKALE - TURKEY**
Vessel Traffic Services of Turkish Straits

15:10- 15:20 **Assist. Prof. Dr. Takeshi TERAHARA** **TUMSAT – JAPAN**
Microbial Ecology in the Aquatic Environment

15:20- 15:30 **Prof. Dr. Murat YİĞİT** **COMU - TURKEY**
The Increasing Economic Power of Turkey in Europe: Marine Aquaculture Industry

15:30- 15:40 **Assoc. Prof. Dr. Makiko ENOKI** **TUMSAT – JAPAN**
Development and Application of Bioflocculant for Water Remediation

15:40- 15:50 ***Coffee Breaks***

Session III

15:50- 16:00 **Mr. Seydi Ali DOYUK (Director of Fisheries)** **CANAKKALE - TURKEY**
Potentials and Activities of Fisheries and Aquaculture in Canakkale

16:00- 16:10 **Assist. Prof. Dr. Takeshi TERAHARA** **TUMSAT – JAPAN**
Isolation and Characterization of Bacteria from Marine Samples

16:10- 16:20 **Dive Master Cetin KEDIOGLU** **COMU – TURKEY**
Peace Message to the World from Lundy and Halep Wrecks of World War -1

16:20- 16:30 **Prof. Dr. Sebahattin ERGÜN and Mr. Sevdan YILMAZ** **COMU – TURKEY**
Using Natural Feed Additives in Fish Feeds for Saving Water Resources Towards a Sustainable Marine Ecosystem

16:20- 16:30 **Miss Shigeoka YU (MSc fellow)** **TUMSAT – JAPAN**
Marine Research Studies at COMU and Experiences in Turkey

16:30- 16:45 ***Coffee Breaks***

Session IV

16:45- 16:55 **Mr. Hakan SÖNMEZ (Aquaculture Industry Representative - Sönmez Fishing Co.) ANTALYA – TURKEY**
Aquaculture Industrial Challenges, Experiences from Past - Expectations for Future

16:55- 17:20 **Wrap Up and Discussions**

17:20- **POSTER SESSION and PRESENTATIONS**

Port Operations and Waste Reception Services in the Strait of Canakkale

Evren BECEREN[1*], Ali AKTOPRAK[1], Arzu TORÖZ[2]

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Abstract

Has been established in 2005, Port of Canakkale is acting in port operations for handling of almost all type of cargoes such as bulk, general cargo, liquid, chemical, container, Ro-Ro and also with cruise operations. In compliance with ISPS (Internatıonal Ship and Port Facility Security) Code and having operating permits with the relevant legislations, following type of vessels can be accommodated in Port of Canakkale:

- Ferries, Passenger High-Speed Crafts, Cruise Ships
- General Cargo Vessels - Bulk Carriers - Crude Oil/Product Tankers
- Chemical Tankers - Ro-Ro Vessels - Container Ships and
- LPG Carriers in Gas-Free condition in order to supply ammonia (NH_3) for cargo tank cooling operations.

Located in the Strait of Canakkale and completely built on the customs area; with its characteristic as being a sea-border, Canakkale (Kepez) Port is the gate of tourism and trade opening to world for Canakkale city. Port also provides the opportunity of direct connection to Bursa – Izmir highway with its 2 km private motorway.

With its draft of pier starts from 8.5 m. and reaches up to 28 m. and its pier having 214 m. length overall; port is capable to dock panamax vessels (50,000 to 80,000 DWT). Moreover, having the storage requirements with 55,000 m² open-bounded area and 3,000 m² covered warehouse, almost all type of cargoes can be handled and stored at Canakkale (Kepez) Port.

Beside the port operations, Port Of Canakkale is “the leading company” in Turkey for reception of ship generated wastes in MARPOL 73/78 Annex I, IV and V.

As a member of EUROSHORE, the association of port (waste) reception facilities in Europe and beyond, Port of Canakkale is proud of having the largest Waste Reception Facility of Turkey with the tank storage capacity of 20,000 m^3 and the largest barge fleet consist of 5 barges, with the capacity of 8,136 DWT.

Keywords: Port of Canakkale, Canakkale, Kepez Port, Strait of Canakkale, Waste, EUROSHORE

Polysaccharide of Sea Algae and their Utilization

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Abstract

Sea algae are rich in adhesive polysaccharide namely polyelectrolyte, which are specific to algae and does not exist in land plant. Most of them has gelling property, and thus they have been utilized as important material. Alginic acid is one of the algal polyelectrolyte which has been used in many filed including flocculant for cleaning water. However it is very expensive so that it is hardly used as a flocculant in spite of the environmentally friendly property. In order to reduce the cost for manufacturing of such bioflocculant, algal bioflocculant was prepared from brown algae without separation and purification steps. This bioflocculant showed better flocculation ability than those of purified alginic acid. Some of brown algae are also rich in fucoidan which seems to have flocculation function too. Algal flocculant was found to be obtained by washing with acidic medium and soaking in alkaline solution. The optimum preparation condition varied with species depending on their components.

Keywords: brown algae, alginic acid, fucoidan, bioflocculant, egg-box structure, solid-liquid separation

Vessel Traffic Services of Turkish Straits

Captain Murat ÖNGÜR

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Abstract

Inroduction of Turkish Straits with Special Reference to Çanakkale Strait.

Importance and Requirements of VTS for Turkish Straits.

Procedures of Operations.

Statistics of Vessel Traffics for the Strait of Çanakkale.

Keywords: VTS, Vessel Traffic Service, Canakkale Strait

Microbial Ecology in the Aquatic Environment

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Abstract

Deep-sea water (DSW), which is generally defined as the seawater below 200 m depth, has some unique characteristics, such as low temperature, stable quality, very low concentration of microorganisms, and a high concentration of minerals. However, less attention was paid to DSW in terms of microbiology. There is no report on the horizontal variation of bacterial community structures in DSW pumped from various geographical locations throughout Japan. On the other hand, molecular biological techniques are useful to investigate the microbial diversity because of viable but non-culturable (VBNC) bacteria. (Amann et al., Microbiol. Rev., 1995) In this study, the bacterial community structures of DSW and surface seawater (SSW) samples were investigated by molecular biological techniques. DSW and SSW samples were collected from eight selected pumping stations from Hokkaido through Okinawa Prefecture, Japan. DGGE analyses revealed that bacterial community structures of DSW differed from those of SSW. There is the possibility that high concentrations of inorganic nutrients have important effects on the bacterial community structures of DSW. In addition, pyrosequencing analysis revealed that bacterial community structures of DSW were diverse, and specific phyla, such as Firmicutes and Planctomycetes, were characterized by a higher proportion of the bacterial community structure in DSW than in SSW. (Terahara et al., Gene, 2015)

Keywords: Bacterial community structures, Deep-sea water (DSW), Denaturing gradient gel electrophoresis (DGGE), pyrosequencing analysis

The Increasing Economic Power of Turkey in Europe:

Marine Aquaculture Industry

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Abstract

The Mediterranean aquaculture industry is mainly dominated by sea bream and sea bass production of about 194.000 tons (marine, fresh water and diadromous fishes), and Turkey together with Greece are the main producers. In contrast to the Turkish and Greek aquaculture production, the production of the other Mediterranean countries such as Spain, Italy or Portugal has been remaining stable, while aquaculture production in France showed a serious decline during the last ten years. Environmental legislations may differ among countries and those supporting the nature with innovative technologies and environmental friendly culture methods are accepted as the pioneers for the sustainable future of the aquaculture industry. In 2006, the Turkish Ministry of Environment and Forestry has developed and ruled the new Environmental Law which excludes cage farms from environmentally sensitive areas, enclosed bays or near shore areas. The criteria for sensitive areas where cage aquaculture farms are not allowed have been determined as minimum 30 m of water depth, 0.6 miles distance from coastline and a current speed of 0.1 m/sec. With the begin of the new law, fish farmers had to challenge strong conditions such as new investment costs, administrative regulations, procedures for environmental impact assessments, or new skill and management. However, within a short time frame, it became clear that the new environmental setup was a great success, since the production of Turkish aquaculture has increased significantly over the years with the new culture methods using offshore technologies. As the Aquaculture industry looks to feed the world with its 9 billion people in 2050 in a sustainable way, fish farmers worldwide need the support of knowledge and knowhow of innovative farming methods and technologies. Within the targets of Turkey for 2023, Turkish aquaculture industry has the potential of supplying high quality food for the increasing human population in the world.

Keywords: Mediterranean aquaculture, aquaculture regulations, cage aquaculture

Development and Application of Bioflocculant for Water Remediation

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Abstract

Water shortage is now one of the most serious worldwide problems. In this study, simple preparation method was investigated by using many kinds of plant aimed at the situation that people could prepare them easily and elsewhere. Some of the land plants and most of veritable and flutes showed flocculation property with simple treatment because of pectin which widely dispersed in the plants. Improvement of flocculation ability of pectin was also examined by using L-lysine and papain. Interestingly, papain, proteinase, was revealed to catalyze dehydration condensation between amino group of L-lysine and carboxyl group of pectin. Though some of the enzymes such as proteinase and lipase are known to catalyze reverse reaction, those reaction has been believed to be limited in amino acids and esters, respectively. The L-lysine modified pectin showed significantly improved flocculation ability. According to the results of the structural analysis, it is concluded that this improvement was caused by inducing positive charge derived from lysine.

Keywords: bioflocculant, pectin, modification, lysine, basic amino acid

Potential and Production Activities of Fishing in Çanakkale

Seydi Ali DOYUK

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Abstract

Aquaculture market has a strategic value in terms of both its contribution to employment and the added value that it brings. Çanakkale has a significant aquaculture potential since this province has the longest coastline in Turkey, following the Muğla province. Dardanelles (Çanakkale) Strait that connects the Sea of Marmara to Aegean Sea, has relatively less salty surface water of Black Sea and more salty deep water of Mediterranean Sea which offer a suitable environment for various species of aquaculture along with its unique hydrographical structure; thus it is the migratory route for many species as well. In this province having 671 km-long coast line, there are 5962 fishers having the License of Aquaculture as Real Entity while there are 880 licensed fisher vessels. Considering other fishers who arrive this province with the purpose of fishing in addition to existing fishers and vessels, it can be seen that the unit fishing effort of this province has a prominent place in fishing fleet of Turkey.

In Çanakkale province, a total of 8.034 tonnes of aquaculture was produced and 76.928.604 TL production value was obtained in 2014.

On the basis of this potential on aquaculture, this province has Aquaculture Operation and Assessment Facilities having EU confirmation number. There are 99 facilities in Turkey that export to EU member states. There are 11 facilities that export to EU in Çanakkale province.

In our day when we are going through the Process of Adaptation to European Union, the western-centered characteristics of Turkey and the responsibility of its leading role in aquaculture sector stipulate an indispensability to move this sector forward by means of efforts to be endeavored.

Routine audit, control and monitoring activities should be conducted in order to ensure the satisfactory use of aquaculture potentials and sustainable production of fishery and aquaculture.

Keywords: Aquaculture, Market, Çanakkale

Isolation and Characterization of Bacteria from Marine Samples

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Abstract

Hexavalent-chromium (Cr(VI)) is highly toxic. Cr(VI) pollution is occurred from industrial waste. Bioremediation technologies have strong potential use in terms of less costly and more environmentally friendly technology. Bacterial Cr(VI) reduction has been reported; however, there are few studies on Cr(VI) reduction using actinomycetes. In this study, Cr(VI)-reducing actinomycetes were screened from estuarine and marine samples on the basis of Cr(VI)-resistant and Cr(VI)-reducing ability. Sediments were collected from Tokyo Bay, Japan using an Ekman-Birge bottom sampler. Morphologically different colonies that showed *Streptomyces*-like growth were isolated and then tested for their resistance to Cr(VI). One Cr(VI)-reducing strain isolated from the estuarine sediment of Tokyo Bay was found. This strain was able to remove 60 mg/l of Cr(VI) within 1 week and was identified as *Streptomyces thermocarboxydus* on the basis of 16S rRNA gene analysis. The comparative evaluation with the type strain *S. thermocarboxydus* NBRC 16323 showed that our isolated strain had higher ability to grow at 27°C and reduce Cr(VI) at a NaCl concentration of 6.0% at 27°C compared with the type strain NBRC 16323. These results indicate that our isolated strain have a potential ability to remove Cr(VI) from contaminated, highly saline sources without heating. (Terahara et al., Appl. Biochem. Biotechnol., 2015)

Keywords: Actinomycetes, Hexavalent chromium, NaCl tolerance, *Streptomyces*

Peace Message to the Word from the 1st. Word Wrecks Lundy and Halep

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Abstract

Çanakkale Wars was a battle took place in the First World War. Gallipoli War, First World War, known as the bloodiest chapter in its history. In the countless Turkish victories it was the brightest page in the history, full of glory and honor. UK's first operation in 3 November 1914 on the Ottoman Empire has been started with the bombing of the Strait by the British battle ships. Depending on the position of the Gallipoli Peninsula, the war on land and sea were severe. Allies of the Ottoman had some plans on the capital, Istanbul, which included to seize the control of the Strait and in this way to make a healthy trade with Russia. Also the aim was to win the war by leaving the Ottoman Empire, the ally of Germany, outside of the fight. During the war, Mustafa Kemal Ataturk ordered to reveal everything to the military to defeat the enemy in the fronts of Anafartalar, Conkbayiri, Kilitbahir and Arıburnu and said "I am ordering you to die not to attack". As a result, the enemy and the Allies who had failed all the attacks were forced to retreat and evictions from the Peninsula have ended on 9 January 1916. Through the research carried out by the Chief of General Staff of Military History Research Office of Strategic Studies (ATASE), Gallipoli War has resulted; with 55 thousand 801 Martyrs , 20 thousand of disease resulting losses, 10 thousand to be captured and the enemy forces were determined to give close to 60 thousand dead in the fronts. “Gallipoli Campaign, the Nation's heroic epic, reaching the right to live with dignity changed the fate of history where it was written”. Us, to commemorate our martyrs and we realized this saga by diving to Aleppo Ferry Lundy and hope to continue forever with the provisions of the peace in the world. LUNDY British minesweeper Lundy which served during the Battle of Gallipoli in order to help other battleships was built in 1908. Capable of 10 knots, 188 gross tons in weight and 33.5 x 6.8 meters in size, Lundy was estimated to sink by a coup received by the stern on 16 August 1915 at the Gallipoli Peninsula, between the bays of Büyük Kemikli and Küçük Kemikli. Today the top of it at 18 meters and the bottom of it at 30 meters depth, it lies on the sand floor standing on the ports side being in one piece. Halep Vapuru, The 110 meters length, 1881 made ship connected to the city lines was named as “Company-i Auspicious” in those days.

Keywords: Çanakkale, Çanakkale Wars, Peace, Diving, Lundy, Halep

Using Natural Feed Additives in Fish Feeds for Saving Water Resources towards a Sustainable Marine Ecosystem

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Abstract

Various antibiotics, vaccines and chemotherapeutics are used in aquaculture. Most of treatment chemicals are not environmentally and even prohibited for aquaculture use or banned in many countries. Especially, antibiotics used as growth promoters and treatment of pathogenic infections in fish or shellfish farms. Fish are given antibiotics as a component of their food, and occasionally in baths and injections. The unconsumed food, and fish faeces, containing antibiotics reach the sediment at the bottom of the raising pens; antibiotics are leached from the food and faeces and diffuse into the sediment and they can be washed by currents to distant sites. Once in the environment, these antibiotics can be ingested by wild fish and other organisms including shellfish. These residual antibiotics will remain in the sediment, exerting selective pressure, thereby altering the composition of the microflora of the sediment and selecting for antibiotic-resistant bacteria. There are a number of important studies that indicate that the bacterial flora in the environment surrounding aquaculture sites contain an increased number of antibiotic-resistant bacteria and that these bacteria harbour new and previously uncharacterized resistance determinants. Herbal bio-medicinal products, probiotics and/or organic acids in aquaculture are used for the improvement of fish welfare in terms of growth promotion, improvement of immune functions, as well as anti-stress, antibacterial, antifungal, antiviral and anti-parasitic effects, suggesting that they may be an alternative to antibiotics and/or other chemicals in fish and shellfish culture. The objective of the present study was to review the possible utilization and effects of medicinal herbs, probiotics and organic acids in aquaculture.

Keywords: Chemical Contaminants, Antibiotics Aquaculture, Medicinal Herbs, Probiotics, Organic Acids

Marine Research Studies at COMU and Experiences in Turkey

Yu SHIGEOKA

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Abstract

It had been passed about 3 months since I came in Turkey. I came from TUMSAT as Mevlana exchange program student. My study theme is “Concentration of radioactive material of the seaweed stock in Fukushima coast area” at TUMSAT. It is different from Marine research studies at COMU. There are a lot of things I don’t know, but it is interesting for me to learn something new. I participated in 2 laboratory, mainly. The first was laboratory of Feed and Food analysis. We did the amino acid analysis of feed of fish using HPLC and the fatty acid analysis of fish using Gas chromatography. The second was laboratory of ecotoxicology. I could join many experiments in this laboratory. We did protein analysis of rainbow trout using Microplate Spectrophotometer, and exposure experiments of crab and *Daphnia pulex* by Aluminum oxide, Copper oxide and Zinc oxide. These are not only things, I could have many experiences. I’d like to thank everyone for your help and support.

Keywords Mevlana, TUMSAT, Tokyo University Marine Science and Technology, COMU

Catch Efficiency, Bycatch and Discard Rates of the Encircling Nets, used in Bluefish (*Pomatomus saltatrix*, Linnaeus 1766) and Atlantic Bonito (*Sarda sarda*, Bloch 1973) Fishery in Çanakkale Region

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Abstract

The aim of this study is to determine catch efficiency, bycatch and discard rates of the encircling nets which were used for *Pomatomus saltatrix* and *Sarda sarda* fishery in Çanakkale coasts. The study was conducted in shallow waters of Dardanelles and Gallipoli Peninsula (0-20 m) between September 2006 and October 2009. Eight different mesh sizes for encircling nets (40, 44, 46, 50, 56, 60, 64 and 72 mm were used. The highest catch rates were obtained with encircling net which has 50 mm mesh size. The most abundant fish species captured by encircling nets were *Boops boops* (32%), *Sarpa salpa* (16.3%) and *Sardinella aurita* (12.8%). The catch efficiency of the target species *Pomatomus saltatrix* and *Sarda sarda* were observed 10.6% and 8.3%, respectively. The catch efficiency per unit operation were calculated 71.9 n/op. and 12.3 kg/op. The amount of discard species of the encircling nets composed of the 9% of the total catch. This study shows that the encircling nets were useful and productive fishing gears for shallow water fishery with a high catching efficiency.

Keywords: Canakkale, catch efficiency, by catch, discard, encircling nets

Age and Growth of Young of the Year *Symphodus melanocercus* from Gökçeada Island Coasts

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Abstract

Age and growth of juvenile *Symphodus melanocercus*, were studied from microincrements in sagittal otoliths. Fish collection was carried out from shallow waters (0-20 m) of Gökçeada Island by using beach seine between June 2013 and May 2014. A total of 58 young of the year (YOY) *Symphodus melanocercus*, ranging from 20 to 78 mm in total length (TL) were aged and estimated to be between 44 and 166 days. Length-age regression analysis resulted in growth rates of 0.567 mmday^{-1}. The hatching period of the YOY *Symphodus melanocercus* was estimated to occur between March and June with relatively higher frequency in April.

Financial support: This study was funded by the Scientific and Technological Research Council of Turkey (TÜBİTAK, project number: 112Y062).

Keywords: Age, otolith microincrement, growth, hatching frequency, *Symphodus melanocercus*

Modification with Tryptophan on Surface of Fish Bones Particles by Chemical Reaction

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Abstract

Nowadays, the waste products are emerging in many different areas such as increasing population, technological developments and uncontrolled industrialization. It is know that many different methods are used for eliminating wastes but most of these methods are both expensive and insufficient. In the recent years, many studies focus on recycling of wastes as usable materials. Therefore, many researchers are carried out different works to be converted the wastes. Many natural and waste materials have some features such as being transformable and applicable thanks to their chemical properties. In this study, the fish bones as waste in fish production have been investigated to be converted functional material with chemical modification. On surfaces of homogenized bone particles were made modifications with esterification reactions. The modification process is carried out using the hydroxyl groups of hydroxyapatite which is the main structure of the bone. Fish bones were obtained from Tons of Çanakkale Factory and used tuna. The bones were cleaned with heat in a basic medium. The cleaned bone was homogenized and brought into powder using mortar and a coffee grinder. Bone meal was obtained as white and was used on chemical reaction. As modification chemical, tryptophan was selected and modified on the bone particle surface by esterification method. The results showed that surface modification was performed successfully. Tryptophan bonded on the surface of bone was calculated as 108 µmol/g. The point of zero charge (PZC) of bone apatite and modified bone was investigated and determined as 7.25 and 7.34 respectively. SEM-EDS spectrums showed that nitrogen element of tryptophan on the surface of modified bone could be observed in EDS spectrum clearly.

The authors acknowledge TUBİTAK and this study was supported by TUBITAK Project No: 213M200.

Keywords: Fish Bone, Tryptophan, Surface Modification

Obtainment of Gelatin from Waste Fish Skin

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Abstract

It is known that gelatin is used for just biological gum in the first ages but nowadays it turns into a industrial material which is used in many industrial areas. These areas are such as cosmetic, photography, medicine, pharmacy, food industry and etc. Gelatin is used widely in food industry that is because its own unique functional specialties which make it used as multifunctional food additive. Human and animal organisms contain approximately 60% collagen, and it is a kind of protein. Gelatin is obtained with the partial hydrolysis of collagen which is contained in connective tissues or bones of bovine and porcine. Gelatin is produced about 360 thousand tons in year and the most part of raw material sources are bovine and porcine. That limited raw material source is a reason to find new one. Gelatin from fish is a possible alternative to bovine gelatin. One of the most important advantage is it doesn't have risk for bovine spongiform encephalopathy. It is not only acceptable for Christian people but also Muslim or Jewish people and that makes it important alternative. Fish waste is an important byproduct of fish processing industry and it can be used as gelatin source instead of causing pollution. Most part of the fish waste is not used for anything or just used for cod oil and fish food but their economic values are too low. Gelatin has been obtained from fish waste products with acid extraction since 1960. Aquaculture industry increases rapidly all over the world because world population increases day by day and that makes increase in demand for fresh fish. Aquaculture is an effective method to deal with growing demand. It is known that aquaculture is firstly tried in Asia about two thousand years ago and spread to Europe in the following years. In Turkey it is started in 1970s and now it is a growing industry. According to the reports 235 thousand tons of fish is cultured in 2014 in Turkey. Trout (*Salmo trutta*) is the most cultured species. In this study, gelatin is obtained from trout skin with using acidic and basic wash to remove agents such as other proteins, fat or etc. and extraction in distilled water. The results show us it is an effective method and yield is about 14%.

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Keywords: Fish Skin, Gelatin, *Salmo trutta*

Nanotechnology as a Novel Tool in Fisheries and Aquaculture Industry

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Abstract

Nanotechnology involves the application of materials at the nanoscale to produce new products or processes, and with many potential benefits to society. Nanotechnology has a wide usage potential in fisheries and aquaculture and its applications include; I) antifouling in fishing and aquaculture nets, antibacterial substances for aquaculture tanks and new packaging materials for seafood products; II) nanofiltration of water purification; III) protection of food products against microbial contamination; IV) nanopolymers and coatings to strengthen food packaging in order to protect delicate fish fillets; V) and also nanotechnology could be used to improve the delivery of micronutrients or unstable ingredients in aquafeeds. Nanotechnological applications will help to meet the global challenges associated with aquatic organism production, including environmental sustainability, human health, disease control and food security. This aspect of aquaculture and fisheries is still in insufficient and require attention of the scientific collaboration for its widespread use to harness its potential benefit.

Keywords: Nanotechnology, fisheries, aquaculture, utility

An Alternative Species for the Mediterranean Aquaculture Industry: Production opportunities of *Sarpa salpa* under Controlled Conditions

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Abstract

Turkish aquaculture has an important advantage of production area in the southern European seas with a long coast line and suitable water conditions. Turkish aquaculture industry is in a rapid growth period and has reached a production of about 220.000 tons in 2012 and ranked as the biggest producer among European countries (FAO, 2015). Considering the increase of human population in the world, the need for protein remain as one of the world's problems to be solved whereas the aquaculture industry is looking for the supply of the food requirements of the food industry by high quality fish protein. However the Mediterranean aquaculture industry is limited to certain fish species, such as sea bream, sea bass or sea trout. The introduction of new fish species may increase the market variation and benefits for the fish farmers as well as increasing the food supply for human consumption. In the present study, a new candidate fish, the *Sarpa salpa* has been evaluated and the production potential has been investigated under controlled conditions.

Keywords: Mediterranean Aquaculture, Alternative Species, *Sarpa salpa*, Fish Growth.

Investigation of Growth and Survival of Larval European Lobster (*Homarus gammarus* (Linneaus, 1758))

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Abstract

Present study which is the first research on larval stages of European lobster in Turkey was carried out between January 2015 and May 2015 in Research Center of Marine Sciences and Technology of Faculty of Marine Sciences and Technology at Çanakkale Onsekiz Mart University. The brood stocks of lobster were caught in January 2015 and placed into the tanks that have 500 L volume. They have fed fresh fish and mussel until the hatching time. The hatching times were in 28th and 90th days for both brood stocks, respectively. Both larvae were survived until post larval stage. Larvae of the first brood stock reached 10.857 mm TL and 0.025 g W in approximately 30 days. Larvae of the second brood stock reached 11.36 mm TL and 0,031 g W in approximately 28 days. The results of this study indicate statistically significant differences ($P < 0.05$) in total length and weight compared to the initial measurements were observed among larvae for both brood stocks of European lobster. In addition, it was determined that larvae of the second brood stock showed more growth because of the high temperature.

Keywords: Lobster, *Homarus gammarus*, Larva, Survival, Growth

GIS for Environmental Sustainability

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Abstract

Sustainability is a difficult and long-term goal of achieving ecologically sustainable resources. Sustainable development is the method for reaching the sustainability. Sustainable development can be defined as meeting the needs of this generation while protecting the environment to ensure the needs of future generation. Increasing human population and its requirements on the global resources lead to a need for sustainable practices. Applying these practices needs cooperation and partnership between different establishments. GIS contribute to habits of cooperation for multidisciplinary data collection and analysis at all scales. There are various metrics to measure and monitor at all scales and there is a need to integrate information from different systems. GIS is a powerful technology that integrates all types of data and enables to have knowledge easily accessible. Also, GIS allows sharing ideas on how to protect the environment and meet the resource needs to ensure the survival of the future generations. GIS is a vital tool to sustainable development of resources and GIS is useful for helping decision makers to ensure the environmental sustainability.

Keywords: GIS, Geographic Information System, Sustainability

Spatial Distribution and GIS Modelling of Juvenile Garfish (*Belone belone*, Linnaeus, 1761) with Regard to Habitat in the Shallow Waters of Gökçeada Island (Northern Aegean Sea, Turkey)

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Abstract

The main purpose of this study was to determine the abundance, density, spatial distribution, habitat preferences and modelling of juvenile garfish *Belone belone* (Linnaeus, 1761) species spatial distribution in Gökçeada Island's shallow waters using Geographic Information System (GIS). Fish samples were collected by beach seine and beam trawl surveys between June 2013 and May 2014. Sediment samples were collected by van Veen grab and composition of sediment was determined by grain size distribution analysis for understanding the habitat preferences of garfish. The spatial distribution of juvenile garfish species regarding to the habitat structure was estimated and modelled using geostatistical tools and GIS. It was observed that juvenile garfish species prefer the sandy areas in Gökçeada Island's shallow waters.

Keywords: *Belone belone*, Distribution, GIS, Gökçeada, Habitat, Juvenile, Modelling

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First Record of the Forkbeard (*Phycis phycis* Linnaeus, 1766) for Gallipolu Peninsula (Northern Aegean Sea, Turkey)

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Abstract

This study presents the first record of *Phycis phycis* for the Gallipoli Peninsula. A single specimen of *P. phycis* was caught on 07 February 2015 in the Güneyli Bight (lat 40º 30′ 45″ N, long 26º 40′ 38″ E), Gallipoli Peninsula (Northern Aegean Sea, Turkey) at a depth of less than 30 m. It measured 27.5 cm and weighted 198.00 g.

Key words: *Phycis phycis*, Record, Gallipoli Peninsula, Northern Aegean Sea

Ceratothoa oestroides (Risso, 1826) (Isopoda: Cymothoidae) on Bogue *Boops boops* (Linnaeus, 1758) from Dardanelles, Turkey

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Abstract

Ceratothoa oestroides is the most common parasitic species of Cymethoidae family. Bogue samples obtained by the fishermen which were caught in the Dardenelles, This ectoparasit was detected in buccal cavity of Bogue (*Boops boops*). Totally, 7 adult *Ceratothoa oestroides* were dissected on the fish. However after examining these adult parasites, we were detected 25 eggs and 256 larvae of this species. Milodinco (2003) was reported that *Ceratothoa oestroides* spend whole life cycle on the fish. This study support the knowledge of the life cycle of this parasite.

Key words: *Ceratothoa oestroides*, ectoparasite, Dardanelles, *Boops boops*

Ornamental Fish in Aquaponics Systems

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Abstract

The integrated fish and plant culture have several advantages such as shared production costs, reduced water usage, fish waste nutrient removal by plants, and increased profit potential by producing two cash crops. Moreover, the flexibility of the preference for target species is also very advantageous. For instance, *Oreochromis* spp. are the mostly cultured fish species recently in aquaponics system however several fish species such as *Cyprinus carpio*, *Hypophthalmichthys molitrix* and *Ctenopharyngodon idella* were also successfully reared in this system. Today, different aquaponics production methods are being developed and potential of different species are also tested to get more efficient results. However, although the ornamental fish trade has a high economic value with its thousands of variety of species, its potential for aquaponics systems has not yet been discussed in detail. There are plenty of species which can do well in crowding or adverse culture conditions and therefore the potential of those species for aquaponics are needed to be enlightened. In this study, the potential of ornamental fishes in aquaponics systems has been discussed.

Keywords: Ornamental fish, Aquaponics

Economic Evaluation of Trawl Vessels Operating in the Black Sea

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Abstract

In the present study, trawl vessels operating in the central part of the Black Sea area were evaluated in terms of economic benefits in the fishing season. Each of the vessels (vessel A and B) with similar construction year, length and gross register tonnage (GRT) were equipped with twin diesel engines, with the only difference of 46 HP more for vessel B, which consequently had a more daily fuel consumption of 0.17 tons compared to that of vessel A. Gross proceeds, annual expenses and net incomes of two trawl vessels (vessels A and B) were recorded as 269.395,78 $, 297.156,65 $; 203.833 $, 250.869 $ and 65.562,80 $, 46.287,70 $, respectively. The estimated profit ratio of the vessels were found as 0.24 for vessel A and 0.12 for vessel B. The results of the present study demonstrated that both vessels recorded a lucrative fishing operation in the season. However, considering the two-fold higher investment capital profit ratio of vessel A over the vessel B could be due to the less fuel expenses for a similar amount of harvest.

Keywords: Economic analyses, trawl vessels, profitability, Black Sea

Mediterranean Aquaculture - Today and Future Challenges

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Abstract

Turkey and Greece are the main two leading countries in the Mediterranean aquaculture industry with a production of 194.000 tons (marine, fresh water and diadromous fishes) and seabass and seabream are the main species in the production. Aquaculture production of the other main producers in the Mediterranean (Spain, Italy or Portugal) has been stable, while the production in France showed a serious decline during the last ten years. Since the world aquaculture industry looks to feed the world with its 9 billion people in 2050 in a sustainable way, new environmental regulations are needed to be amended for the control of fish farms towards a sustainable aquaculture in the future.

Keywords: Mediterranean aquaculture, seabream, seabass, production

WORKSHOP FINAL DECLARATION

The main aim of our organization is to increase the economic benefits of the Fisheries and Aquaculture industry and improve the competitive capacity of Turkey with its borders to three different seas, by means of studies for the rational utilization of natural water resources. The training and education of graduates at advanced level and international standards has a great importance for reaching this target.

Serving as a pioneer for the training of Fisheries and Aquaculture Engineers at international standards, dealing with problems and solutions related to Marine Science and Technology, producing innovative technologies, conducting research and development for the improvement of culture conditions and increasing the diversity of species in the aquaculture industry with the aim of increasing economic impacts on the country's economic development is in the focus of our faculty, which pays a great importance for sharing new information and knowledge with stakeholders, i.e., academic and industrial based.

For this reason, the bilateral agreement between our faculty and Tokyo University of Marine Science and Technology (TUMSAT) in terms of student and academic staff exchange is an important collaboration for sharing the most recent developments in the world that can benefit both Turkish and Japanese fisheries industries and also serve as a strong link of cultural exchange between both nations. From this point of view, the workshop on "Recent Developments in Marine and Environmental Science" has been successfully completed with the valuable attendance of Japanese scientists from TUMSAT and recent developments have been shared with stakeholders involved in marine and environmental science.

The workshop, held with the main topic of "Water is Life, Tomorrow Can be Late" hosted over 100 audiences with 5 presentations from Japanese scientists and a total of 13 oral presentations and over 20 poster presentations.

During the workshop, recent developments and information have been shared in an interactive study ambience. The success of Turkish aquaculture industry in Europe has been outlined and the environmental concern caused by the increased aquaculture production has been underlined with the hopes of minimizing environmental impacts and its importance for the sustainability of the fisheries and aquaculture industry, and further importance of the utilization of water resources in food production for the increasing human population in the world.

We would like to express our thanks to the valuable support and attendance of speakers and audiences who have contributed the workshop, which could only be a success with their valuable attendance. COMU, Faculty of Marine Science and Technology, as also in the past, will continue its duties for serving the marine environment with environment based scientific studies and support the marine industry with sustainable and innovative knowledge. The valuable attendance and contribution of the audiences is much appreciates and acknowledged.

Workshop Scientific Committee