Effect of Caspian Sea Water Soluble–Fraction of Crude oil on liver antioxidant Enzymes activity as biomarker of oil pollution in Persian sturgeon (*Acipenser persicus*) juveniles

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Abstract

This study evaluate the effects of water soluble fraction of Caspian Sea crude oil on Super oxide dismutase and Catalase enzymes concentration in juvenile Persian sturgeon (*Acipenser persicus*) average weighting 3.14±0.18 g. Firstly, the LC_{50} 96h value of water soluble fraction of crude oil was calculated (31.94 mg/L) and then the control group and 3 treatments were choose in lower concentrations ($0.25LC_{50}$, $0.50LC_{50}$,0.75LC50) than the LC_{50} 96h. Each experimental group had 3 replicates. Experiments period was 96h and in each 24h the liver were sampled and enzymes concentrations were calculated. During the experimental period physical and chemical factors of water were measured. As the result, the Super oxide dismutase enzyme concentration in third day showed significant difference between all treatments with control ($p<0.05$). Even if the $0.75LC_{50}$ treatment showed significant increase in enzyme concentration ($p<0.05$). On the other hand the concentration of Catalase enzyme in different treatments had not different signification during first and second days of experiment ($p>0.05$), and only the $0.75LC_{50}$ treatment showed significant increase in enzyme concentration in third day ($p<0.05$). In forth day only the $0.75LC_{50}$ and the $0.50LC_{50}$ treatments showed significant differences with other treatments ($p<0.05$). The results showed that the Super oxide dismutase and Catalase enzymes are acceptable biomarkers for oil pollution in Persian sturgeon juveniles, even if because of the delay in increasing of Catalase, the liver Super oxide dismutase is the better biomarker for this pollution in this fish.

Key word: Persian Sturgeon (*Acipenser persicus*), Crude oil, Catalase, Super oxide dismutase, Biomarker.

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Bacterial Study of *Streptococcosis* in Infected fish and Antibiotic Resistance in *Rainbow trout* (*Oncorhynchus mykiss*) farms in Guilan Province

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Abstract

Streptococcosis is one of *the* most causes of mortality in rainbow trout farms in Guilan province. This study was conducted in 7 cultivated rainbow trout farms in Guilan province in 2013-2014. The aim of this study was to investigate the incidence of streptococcosis and its antibiotic resistance in Guilan province. The infected fish (168 with an average weight of 25-50 g) with clinical signs such as blurry, exophthalmic eyes and bleeding in the eyes, skin, and fins fish were sampled. Samples were taken from the liver, kidney, spleen and some parts of the brain and transferred to the Blood Agar and TSA Agar. The disease was observed in all seasons. The incidence of *Streptococcosis* in this study was 39.29%. The streptococcal bacteria were isolated *S. iniae* (33.3%), *S. agalactia* (39.4%) and E. faecalis (27.3%) respectively and antibiotic resistance of bacteria in *rainbow trout* showed the highest resistance to Bacitracin and lincomycin. (92% -100%).

Keywords: *Streptococcosis, Rainbow trout* , bacteria.

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Nutritional characteristics of silver pomfret fish (*Pampus argenteus*) in the Northwest Persian Gulf

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Abstract

This project accomplished with aim of new studies on the type and nutritional content density, coefficient of empty stomach and detection it's favorite food in different months of year on silver Pomfret fish. For this reason 1095 fish of this kind captured from station: Musa estuary, Bahrekan, Boshehr and Dayyer in the north-east of Persian gulf in year (2012-13), and their sampling of stomach and intestine is performed in there. Thus, the detection nutritional resources in samples includes 18 kind of food with plant source and 12 kind with animal source, that observed greatest food preference from plant sources *Diploneis* sp., *Nitzschia* sp., *Rhizosolenia* sp., & *Ceratium* sp. (totally with preference 50.37 %) and from animal sources *Copepoda*, *Cladocera* & *Ostracoda* (totally with preference 24.72 %) and also *Peridinium* sp. & *Prorocentrum* sp. are from plant resources (respectively 2.4 % and 3.51%) that observed accidently in their nutritional diet. Most nutrition compression occurred in the year between October and February that have mainly plant source, and amount of food with plant source decreases and increases animal source in the year between April to May ($P<0.01$). On the base of coefficient of filled stomach and intensive of fish, the lowest coefficient is related to May until September with average 37.05 percent and highest amount observed with a mutation in April with 79.8 percent at two years.

Keywords: Nutrition, Silver Pomfret (*pampus argenteus*), Persian Gulf.

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Multi-species culture of Black carp (*Mylopharyngodon piceus*) with Chinese carp fish in Iran

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Abstract

The BLACK CARP *Mylopharyngodon piceus* were transferred in 1992 from China. The aim of this research were to increase diversity of black carp in polyculture system of warm-water fish (Chinese carp) in ponds. In this research, stocking amount of this species was determined. The fish stocking Black carp was introduced (with an average weight of 23 gr) to treatments 1 and 2 with number 250 and 500 pieces per hectare respectively was carried out in May. stocking density 3000 per hectare with Silver carp, Common carp, Grass carp and Big head were introduced 140, 42, 42, 25 pieces respectively. Black carp also introduced 180 pieces 90 pieces up to 50 % survival, respectively. The maximum average weight has belong to black carp treatments 1 and 2 with 407±15 gr and 234±12 gr as well as the maximum weight of this fish was 780 gr. There was no statistically significant difference biomass between treatments 1 and 2 ($p > 0.05$). The result showed suitable density of Black carp was 250 pieces per hectare.

Keywords: Aquaculture, Warmwater fish, Diversity, Black carp (*Mylopharyngodon piceus*).

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Comparison the injection effects of Ovaprim, HCG and Barbus fish pituitary extract on spermatogical parameters in Goldfish (*Carrassius auratus gibelio*)

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Abstract

In this study the effects of HCG, Ovaprim and Barbus fish pituitary extract on spermatological parameters (motility duration, percentage of motile spermatozoa, spermatocrit, sperm density, milt volume, pH) and sperm quality were compared in male goldfishs *(Carassius auratus gibelo*). Fish were injected with Ovaprim hormone, HCG and pituitary extract in 2µg kg−1, 1500 IU/Kg−1, 3mg/Kg−1 respectively. There were significant difference between pH of seminal plasma of different treatments ($P<0.05$) as the highest value of pH observed in treatments Ovaprim and HCG (7.77±0.365, 7.76±0.245) respectively. There were a highly significant differences for percentage of motile spermatozoa among treatments ($P<0.05$.) as the highest value percentage of motile spermatozoa observed in treatments HCG and Ovaprim (96.60±4.68, 93.48 ±9.48) respectively, but there was no significant difference ($P>0.05$) for motility duration among treatments. There was a significant difference of spermatocrit among treatments ($P<0.05$), as the highest value of spermatocrit observed in treatment of Ovaprim (48.45±11.80). Likewise there were significant difference of sperm density among treatments ($P<0.05$) as the highest value of sperm density observed in treatment of Ovaprim (137×10^9 spermatozoa/ml semen). There was a significant difference about milt volume among treatments ($P<0.05$) as the highest value of milt volume observed in treatments pituitary extract and Ovaprim (0.590±0.321, 0.470±0.163) respectively. The present study demonstrated that hormonal Ovaprim and HCG. More effective on spermatological parameters compared with pituitary extract treatment groups.

Keywords: Goldfish; Ovaprim; HCG; Pituitary extract; Spermatological parameters.

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Effect of the wastewater farm rainbow trout (*Oncorhynchus mykiss*) on benthic invertebrates Esfidan River (North Khorasan)

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Abstract

Entering waste of fish makes the changes in balance of ecosystems the streams and rivers in abundance are benthic macroinvertebrates. In this research, to determine the effect river water of rainbow trout farms by the abundance of benthic macro-invertebrates in the River Esfidan (North Khorasan province), the study of these the river were during summer in four study sites. During study of large benthic invertebrates, 12 orders and 24 families were identified. The more of benthic fauna of the river Esfidan aquatic insect larvae were found. The great abundance of benthic invertebrates at all stations 6601±4266.68 Specimens per square meter were counted. Studies show that between sampling stations indices EPT, EPT/CHIR, Shannon and Hilsenhoff are significant differences ($p<0.05$). The results of Hilsenhoff biological indicator of water river and quality changes in range from appropriate to very poor that showing of effect the fish farm on the water quality of river.

Key words: Trout farms, benthic macro-invertebrates, Bio-indicators, Esfidan River.

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Effect of light intensity on hatching rate, survival and growth in rainbow trout (*Oncorhynchus mykiss*) alevin

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Abstract

Most fishes require a minimum threshold light intensity to be able to develop and grow. A 90-day experiment was carried out to investigate the effects of light intensity on egg hatching, survival rate and growth in rainbow trout (*Oncorhynchus mykiss*) alevin. Four light intensities, of 50, 200, 1000 and 2000 lux were tested in triplicates. On days 10, 20, 55 and 90, larvae were collected to assay growth parameters. The results showed that light intensity significantly affected ($p<0.05$) the egg hatching, survival rate and growth of rainbow trout. The highest hatching rates were found in samples treated with the 50 lux and 200 lux light intensity, while there were no significant differences between 50 and 200 lux ($p>0.05$). From the eleventh day after hatching until the twentieth, the lowest percentage of abnormality was observed in 200 lux. Twenty-one to fifty-five days after hatching, optimum feed conversion ratio (FCR) and specific growth rate (SGR) were obtained in the 1000 lux treatment. At the end of the experiment, fish reared at 1000 and 2000 lux, their weight was higher than those reared at 50 lux and 200 lux ($p<0.05$). SGR was the highest at 2000 lux compared to other treatments ($p<0.05$). In conclusion light intensity fluctuation from 200 to 1000 lux could improve growth of *O. mykiss* which could be used as a pattern of regulation of light intensity in the commercial culture.

Keywords: Light, Condition factor, Egg, Rainbow trout.

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Comparison of the Antimicrobial Activity of ethanol Extract of Celery (*Kelussia odoratissima)* with common antibiotics used in farms Rainbow trout

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Abstract

Plants can be used as a suitable replacement for synthetic drugs such as antibiotics due to fewer side effects. Celery (*Kelussia odoratissima*) is a native plant of Iran along with anti-bacterial effects. This study aimed to compare the efficacy of anti-bacterial antibiotics with Ethanol extract of celery against four strains of *Streptococcus iniae* isolated from rainbow trout. In this regard, five treatments with different concentrations of 6.25, 12.5, 25, 50 and 100 µg/µl of extracts was developed. Then, Well Diffusion and Discs on Mueller Hinton methods were used to determine the antibacterial activity. Collected data were statistically analyzed using one-way ANOVA and the significant level of p< 0/05. The results showed that ethanol extract of celery in concentrations of 6.25 and 12.5 µg/µl had no effect on the studied bacteria. Also, there is no bacteria inhibition zone in bacteria concentration of 25µg/µl in 3, 4 bacterial isolates addition to 6/25 and 12/5 µg/µl. The most bacteria inhibition zone diameters were respectively recorded 19.33, 19.33, 18.67 and 15.33 mm that showed the difference between different concentrations (p<0.05).

Keywords: Antibiogram, *Streptococcus iniae*, Antibiotic, Rainbow trout, *Kelussia odoratissima*.

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The Impact of Bluga (*Huso huso*) cages on water abiotic factors in the southern part of Caspian Sea (Jafroud region)

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Abstract

According to the climatic, ecological and hydrological conditions in the Caspian Sea and according to the Caspian Sea is an enclosed inland body of water and habitats for many valuable aquatic species and endangered sturgeons, it is necessary that comprehensive studies are conducted before any development on fish culture in the sea. This project was financially supported by the Fisheries Organization of Guilan Province and was conducted in the International Sturgeon Research Institute in order to investigate abiotic factors for sturgeon cage culture in Jafroud region of Anzali Port (depth of 50 m) for one year. Physico-chemical factors were investigated monthly. The investigations were carried out in four stations in cage and one station outside the cage (20 m in the opposite direction of water flow in the west). The abiotic conditions for fish cage culture including physico-chemical factors (temperature, dissolved oxygen concentration, pH, salinity as well as nitrite, nitrate, orthophosphate, electric conductivity and total Suspended Solids (TSS) were measured monthly. Physico-chemical factors in rearing cage significantly did not affected ($p<0.05$) growth rate of *Huso huso*. Also results obtained from this study revealed that there were no significant differences between parameters inside and outside of the cage ($p<0.05$). However, significant effects of variations in TSS, Total Organic Matter (TOM) and grain sediments factors levels were observed in inside and outside of the cage ($p<0.01$).The results of abiotic factors found around the stations are in the range of the allowable concentrations of theses parameters for culture. Considering to the environmental findings, the results of this study provides the useful information for fish culture to manage well based on the water quality and hydrological foreseen. The results from this study can enable managers to obtain necessary data to evaluate the rearing capacity of fish in marine cage to issue the permits for sturgeon culturists.

Keywords: cage culture, *Huso huso*, abiotic factors, Caspian Sea.

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Assessing Different Methods of DNA Extraction from The golden Rainbow trout farmed (Golden Rainbow Trout: *Oncorhynchus mykiss*) in order to study the molecular

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Abstract

DNA extraction is a routine step in many biological studies and variety of methods have been established to isolate DNA molecules from biological materials. most methods share three aims: 1- the comprehensive lysis of cells and extraction of intracellular nucleic acids into aqueous solution, 2- the removal of non-nucleic acid organic and inorganic molecules from resultant aqueous extracts and 3- the minimization of nucleic acid losses throughout this purification process. Rainbow trout fish, including salmonid species have been domesticated and today the most important cold-water fish species in the country. To accomplish this study 4 Extraction 1. Extraction Kit Company Gena All 2- Trizol Reagent 3- traditional method of heating and Proteinase K 4- phenol chloroform were studied and It was found that the The best extraction method in terms of quality and the quantity of DNA extracted by 1 percent agarose gel and Nanodrop and Also in terms of the effectiveness of PCR for DNA extraction kit method is the enterprise Gene All Country South Korea.

Keywords: Golden rainbow trout farmed, DNA extraction, Company extraction kit Gene All, PCR.

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