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Purification of lipase from the foregut of Rainbow trout (*Oncorhynchus mykiss*)

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ABSTRACT

Aquatics have been considered as resource for extract of enzymes such as lipase in past years. Viscera of rainbow trout are a very good resource for the isolation of enzyme. In this study, lipase enzyme was purified from the foregut of rainbow trout. For purification, was used the acetone to defat, ammonium sulphate for precipitation, ultrafiltration to concentration and chromatography of gel filtration in order to isolation. Enzyme activity with Nitrophenyl palmitate as substrate and protein of this enzyme by Lowry method were assessed in the different steps of purification. In this study, parameters such as purification efficiency and the purified was examined. The results showed that in the last step of purification, enzyme activity and enzyme protein were 6.171 U/ml and 0.53 mg/ml, respectively, purification efficiency was 7.53% and the purified was 5.49. The molecular weight of lipase was determined by SDS-PAGE 32 KDa. Based on this research it can be concluded that the lipase in the intestines of rainbow trout has been useful as an additive in the future can be considered related industries and in Biotechnology Research.

Keywords: chromatography, enzyme activity, fish waste, lipase.

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Antioxidant responses, lipid peroxidation and blood aminotransferase activity in *Liza persicus* in the northern Persians Gulf (case study: the Boushehr Province)

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ABSTRACT

Xenobiotics change the physiological homeostasis including balance between enzymes and lipid peroxidation in fishes. The present study investigated changes of some physiological responses such as blood aminotransferase enzyme, glutathione-s-transferase (GST), glutathione reductase (GR) and lipid peroxidation (LPO) in *Liza persicus* in northern Persian Gulf (Boushehr province) as biomarkers in biomonitoring programs. Six stations (Haleh, Nakhle Taghi, Kangan, Gofreh, Solhabad, Shogab) and a reference site (Bonod) were selected in the Boushehr province. The fish samples had an average length of 16.21 ± 1.51 cm [mean \pm SD] and weight of 44.53 ± 11.79 g. PAHs concentration of coastal sediment were measured using GC-MS and the biomarker were measured using biochemical and spectrophotometric method. There was a significant difference between Nakhle Taghi station (The nearest station to petrochemical complex) and the control site (Bonod). There was no significance difference in blood alanine aminotransferase (ALT) between the stations. There was a significant difference in GST among Haleh, Nakhle Taghi, Solhabad, Shogab and the control site (Bonod). However, there was a significant difference in glutathione reductase activity between the Gofreh station and the Bonod station. This study indicated that xenobiotics biomarkers in the stations with a high level of pollution had significant difference with the control site (Bonod). In conclusion, *Liza persicus* and the studied biomarkers are potentially suitable for future biomonitoring programs.

Keywords: biomarker, blood aminotransferase, lipid peroxidation, *Liza persicus*, Persian Gulf.

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Effect of different levels of dietary Bakers Yeast (*Saccharomyces cerevisiae*) On Growth performance and feed utilization in Rainbow Trout (*Oncorhynchus mykiss*) alevin

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ABSTRACT

The aim of present study was to evaluate the effect of different levels of yeast probiotic on growth, feed utilization and survival of rainbow trout (*Oncorhynchus mykiss*) alevins. This experiment conducted in a completely randomized design with four treatments which had triplicates. Four levels of yeast (0, 3%, 6% and 9% of ration) were added to the basic diet. Fish alevins were fed by experimental diets 4 times a day at 5 to 6% of body weight for 30 days. Rainbow trout larvae (average individual weight, 176 mg) were randomly distributed with density of 4 fish/l into twelve 10 liter fiberglass tanks. The results indicated that the *Saccharomyces cerevisiae* could not influence growth and feeding parameters in rainbow trout alevin. The final body weight and specific growth rate (SGR) in experimental treatments had not significant difference in comparison with control treatment ($P \geq 0.05$). The bakers yeast had not significant positive effects on food conversion efficiency (FCE), thermal growth coefficient (TGC) and feed conversion ratio (FCR). This study showed that *S. cerevisiae* had not high efficiency in feeding parameters and growth performance of rainbow trout alevin.

Keywords: alevin, feeding, growth, yeast, rainbow trout.

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Extraction of omega-3 fatty acids from *cultriventr* *Clupeonella* and purification of EPA and DHA by molecular distillation method

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ABSTRACT

The present study was designed to investigate the feasibility of extracting omega-3 fatty acids from *cultriventr Clupeonella*. Molecular Distiller was designed and built in order to study the effective parameters on the purity of extracted omega-3 fatty acid. Effects of feed methylation, feed temperature, distillation chamber pressure and feed flow rate on product purity were investigated. *Clupeonella* oil was methylated before feeding and feed from (1-5) ml/min; 170-250 °C; 40-0.01 mmHg to the system.

It was determined that distillation efficiency was lower without methylation separation. The best product was obtained with such process at 230 °C. Separation would not be possible effective at vacuum pressure over than 0.1 mmHg.

Keywords: ω3; purification; molecular distillation; methylation; *cultriventr Clupeonella*

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Species composition of bycatch trawl commercial trawler from fishing grounds in Hormozgan province

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ABSTRACT

This study was conducted for estimation of bycatch shrimp trawl from fishing grounds of Hormozgan province. Sampling operation was carried by commercial trawler around Hormoz and Qeshm Island during fishing season in October and November 2012. Towing duration was between 1 to 3.5h (2 ± 0.08 h). Contribution of bycatch and target species was 86.26% (18918.80 kg) and 13.74% (3014.22kg) respectively. By-catch-to-shrimp ratio was estimated 6.27. Small discard species, large discard species, commercial species and target species were constituted 68.02%, 3.35%, 14.7%, 13.74% of total catch respectively. In this study, species composition included 103 species belonging to 64 families that include 77 teleost species from 47 families, 13 species elasmobranchia from 9 families, 3 species invertebrate from 3 families, 4 species Penaeid shrimps and sea turtle, sea snake and sea star. The results of this research indicate fishing pressure on commercial and non-commercial species in this region. The little long term information exists for Bycatch species shrimp trawl that used for conventional population models. The results of this study can be used for assessment damages shrimp trawl fisheries on the resources of the Persian Gulf and the ecological risk assessment models.

Keywords: bycatch, Hormozgan, Persian Gulf, shrimp, trawl.

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Comparative effect of filling media on canned Mullet (*Liza klunzingeri*) quality parameters

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ABSTRACT

This study was conducted to evaluate the effect of filling media on chemical and sensory quality of canned mullet. For this purpose Mullet fish preparation with, steam precooking method at temperature 100°C for 10 minutes and were canned in the oil, oil (garlic), tomato sauce and brine, cans autoclaved for 65 minutes at a temperature of 121°C. Cans produced after spending 15 days inside the warehouse for quarantine purpose were tested for organoleptic evaluation and chemical experiments. Results showed in total, canned Mullet fish in oil with the overall acceptability 4.71±0.48, flavor 4.57±0.53, colour 4±0.57, odour 4.28±0.75 and texture 4.42±0.53 had the highest utility although there was no significant difference in oil (garlic) and tomato sauce filling media ($P \geq 0.05$). The results of chemical tests showed changes of chemical factors were 18.42-20.09% for protein, 4.84-6.53% for fat, 68.60-71.15% for moisture and 5.94-6.69 for pH. The results showed that the highest amount of protein in the canned fish in brine, oil, oil(garlic) and highest amount of fat in the canned fish in oil and oil (garlic) ($P < 0.05$). Results of organoleptic evaluation with a range between 1-5, showed canned produced with oil, oil (garlic), tomato sauce and brine, respectively, were most favorable.

Keywords: can, chemical composition, *Liza klunzingeri*, organoleptic evaluation.

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New method (biotechic) for artificial breeding of *Barbus sharpeyi*

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ABSTRACT

Barbus sharpeyi in family Cyprinidae is an endemic fish of the province Khuzestan of Iran. These fish are produced by artificial breeding using carp pituitary extract (CPE). According to the problem of artificial breeding about this fish in Iran, the objective of this study was to obtain the effectiveness new method (LHRH-a2 hormone Combined with carp pituitary extract (3 injections) on reproduction index in *Barbus sharpeyi*. The results showed that the LHRH-a2 hormone combined with carp pituitary extract in three injection (specially treat2) lead to high spawning success (62% average) and weight of stripped egg mass/ weight of stripped egg mass (8.49% average) and fertilization success (76.57% average). Therefore, it can be concluded that like many other cyprinids, LHRH-a2 hormone combined with carp pituitary extract (3 injection) can be effectiveness for spawning induction in *Barbus sharpeyi*.

Keywords: *Barbus sharpey*, biotechnic artificial breeding, carp pituitary extract, induce spawning, LHRH-a2 hormone, reproduction index.

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Diet and feeding indices of big mouth Botak fish (*Cyprinion macrostomum* Heckel, 1843) in the Sezar River (Lorestan province)

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ABSTRACT

This study was conducted for identifying the feeding indices of Botak fish (*Cyprinion macrostomum*) in the Sezar River. Monthly sampling was done from July to December 2011, using pursing net with different mesh size and gill net with 50 mm mesh size. In total 68 specimens of *C. macrostomum* were examined. The results of feeding indices showed that the mean of RLG was 5.33 ± 0.07 . Also, the mean of GI, K, IF and CV were 0.13 ± 0.002 , 1.41 ± 0.01 , 340.96 ± 20.77 and 5.47, respectively. Based on the results, *Navicula*, *Cymbella*, *Diatoma* and *Nitzschia* as main, *Microspora*, *Coconeis*, *Oscillatoria*, *Pediastrum*, *Rhoicosphenia*, *Mougeotia*, *Tribonema*, *Synedra*, *Cosmarium*, and *Spirogyra* as subsidiary and *Ulothrix*, *Gyrosigma*, *Closterium Scenedesmus*, *Pinnularia*, *Gomphonema*, *Cymatopleura*, *Diploneis Oedogonium*, and *Melosira* as an accidental food items were detected. Diet analysis showed that *Cyprinion macrostomum* is a priphyton feeder with a RLG of five processing an appropriate condition factor and feeding condition in the Sezar River.

Keywords: Botak, *Cyprinion macrostomum*, feeding indices, Lorestan Province, Sezar River.

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Effect of discontinuous administration of prebiotic mannan oligosaccharide and β -1,3-glucan on growth performance and some immunity response of rainbow trout (*Oncorhynchus mykiss*)

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ABSTRACT

Effect of dietary prebiotic mannan oligosaccharide and β -1,3 glucan on growth performance, body composition and immunity response of rainbow trout (*Oncorhynchus mykiss*) were investigated for a six week culture period. Four feeding strategies were set, including feeding prebiotic-free diet continuously (control), feeding dietary prebiotic continuously (T1), feeding dietary alternately (one week prebiotic+one week control diet) (T2) and 2 Day prebiotic+5 Day control diet (T3). The experiment carried out in 500 liters Plastic tanks. 32 juveniles rainbow trout with initially average weight 19.6 ± 0.06 were stocked in tanks and fed up a day. The results showed no significance difference was observed on growth performance and feeding indexes ($P > 0.05$). There was significant differences in composition carcass ($P < 0.05$). The highest protein content was observed in the control treatment and maximum fat was observed in treatment 2. There were significant differences in the serum lysozyme activity ($P < 0.05$). Continuous administration of prebiotic mannan oligosaccharide and β -1,3-glucan showed significantly higher serum lysozyme activity (53.89) than those in the control group (16.88). The result indicated that continuously applying mannan oligosaccharide and β -1,3-glucan into the diet compare to discontinuous administration caused improved growth performance and immunity response for rainbow trout.

Keywords: body composition, growth, immunity response, mannan oligosaccharide and β -1,3glucan, rainbow

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Growth rate, nutritional indices and stress response in Pacu, *Piaractus brachypomus*, to produce edible fish

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ABSTRACT

Yearly, million pieces of Pacu, *Piaractus brachypomus* is imported to Iran as an ornamental fish. The genera of this fish are reared as edible fish in some countries like Latin America countries. The main aim of this research is study of growth, survival, nutritional indices and stress response of *P. brachymous* in rearing conditions in a recirculation system. An experiment carried out in 3 recirculation treatments with 3 replications in 250-liter tanks with a volume of 200 liters water. An extra 100-liter tank prepared as biological filter. Tanks were stocked in 3 densities 50, 75 and 100 fingerling.m³ with an average weight as 3.52±0.11 for duration of 3 months. Water replacement was 10% per day. Survival was determined with counting of dead fish daily and growth with monthly biometry. Blood was collected to determine cortisol and glucose as stress response indices. The results showed that intensity of 100 pis./m³ has a negative effect on some of the growth indices: average of body weight, absolute growth rate, and daily gained weight (P<0.05), but no effect on Specific Growth Rate (SGR), Relative Growth Rate (RGR) and Condition Factor (CF) (P>0.05). In addition, the intensity 100 pi/m³ has negative effect on nutritional indices; FCR, protein production value, fat production value (P<0.05). This stocking increased cortisol and glucose values in the fish (P<0.05). It is concluded that since the intensity 100 pi/ m³ decreased the gain weight and increased stress responses in Pacu fish, it is suggested that 75 pi/m³ is the best intensity to produce edible fish with the defined experiment.

Keywords: growth indices, intensity, recirculation system, *Piaractus brachypomus*, stress response.

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The effects of *Spirulina platensis* levels in diet on growth indices and chemical body composition of Kutum fry (*Rutilus frisii kutum*)

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ABSTRACT

The aim of this study was to evaluate the spirulina powder in the diet of the southern Caspian kutum and compare with basal diet (lack of spirulina). The experiment was conducted for 90 days under controlled conditions. In this experiment, five commercial diets containing 0 (basal diet), 0.5%, 1%, 2% and 5% spirulina powder was considered and fed to Triplicate groups of fish. Four-hundred and fifty fish with initial average weight of 0.475 ± 0.081 g were randomly distributed between 15 glass aquarium tank of 50 liters capacity which was filled with 40 liters of fresh filtered ground water. The fishes were fed at satiation at three times (8, 12 and 18). With increasing spirulina powder to 5% level all growth factors and fed efficiency were not improvement and was significant with other treatments ($P < 0.05$). The use of spirulina powder has position effect in the survival rate of kutum fry up to 2% level after that (5%) has been decreased. The chemical body composition has no differences in treatments ($P > 0.05$). In general, considering the growth factors, feed efficiency, the treatment 1 (commercial basal diet) is more reliable in the diet of southern Caspian kutum.

Keywords: carcass component, growth factors, Kutum, *Rutilus frisii kutum*, Spirulina algae.

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Hematological and serum biochemical profile of rainbow trout (*Oncorhynchus mykiss*) fed immunogen

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ABSTRACT

Current use of prebiotic as indigestible feed additive improves health statuses of host, instead of drug and chemical material in aquaculture. The aim of this experiment was to investigate the effect of $2\text{g}\cdot\text{kg}^{-1}$ prebiotic immunogene on hematological, biochemical and some serum enzymes parameter of rainbow trout after 7 weeks feeding. Hundred and twenty rainbow trout (81.65 ± 1.49 g) After checking the health status and acclimatized to laboratory condition for 10 days, they were equally stocked in six fiberglass tanks (1000 L) assigned to two levels (0 and 2 g kg^{-1}) of Immunogen (commercial prebiotic, ICC Co; USA) with three replicates. During the experimental trial (7 weeks) fish were hand-fed (2% of BW) twice daily (09:00 and 17:00). At the end of trial the blood was collected using a hypodermic syringe from the caudal blood vessels and was used to evaluate the hematological and biochemical parameter. The results of this experiment indicated that some hematological parameter such as RBC, Hb, MCH, MCV and MCHC were not affected by immunogen ($p>0.05$), but the Hct and WBC were increased in rainbow trout immunogen ($P<0.05$). Considering serum biochemical parameter it was observed that in the group fed with prebiotic immunogen increased the level of glucose ($P<0.05$), Although the level of triglyceride and serum total protein were not affected, but the level of serum cholesterol was increased in group fed with prebiotic immunogen ($P>0.05$). The results indicated that administration of immunogen no effect on ALT, AST, LDH and ALP levels. These results indicate that fish blood parameters and serum biochemical profiles could be affected by immunogen, which should be taken into account in future studies.

Keywords: hematological parameters, immunogen, prebiotic, rainbow trout, serum biochemical profile.

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