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Technical efficiency and factors effecting using DEA approach (Case study: Beach sein cooperative companies in Golestan Province)

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ABSTRACT

Considering the efficiency studies play a role in making available the revise in relative importance, policy reforms and resource management, this study has been accomplished in fish beach seine Cooperative Companies located in Golestan Province and used DEA approach to measure the technical efficiency (TE) and factor effects. The survey data were gathered from 20 farms, which selected via census and questionnaires in 2009-2010. Results showed that the mean TE of sample was 79.2 percent which revealed that the present technology can improve the technical efficiency by 20.8 percent. Furthermore, the regression analysis revealed the energy, capital, age, educational level, experience and proficiency of manager had positive effect on technical efficiency, but not significant and interpretable. Finally, Rotilus frisii kutum and Liza auratus and L. salince were important effective factors on technical efficiency of fish beach seine Cooperative Companies. On this basis, and given the severity of the impact of relevant factors may be appropriate policy solutions to improve the current performance Planners and policy makers in this field proposed.

Keywords: Beach sein cooperative company, data envelopment analysis (DEA), Golestan Province, technical efficiency.

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Analysis of diallel cross for some reproductive traits in ornamental fish (*Puntius tetrazona*)

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ABSTRACT

The best method of fish breeding is the isolation of pure lines having high-producing hybrids. The decline in heterosis (DIH) resulted from inbreeding, maternal effects, general combining ability (GCA) and specific combining ability (SCA) on reproductive traits (e.g., egg production, number of hatched egg, and hatchability of pure lines and crosses) of Tiger, Green, and Albino Barbie hybrids were cross-checked using a full diallel cross design. The results showed that the rate of heterosis was negative for all traits and heterozygous offspring were not superior to their counterparts in pure lines. The highest DIH was observed in egg production while the least DIH was seen in hatchability. When the Albino line was used as maternal line, the performance of hybrids was higher than other crossing programs because of highly positive maternal effects in Albino line. Analysis of GCA represents the additive genetic superiority for egg production in Tiger line rather than other genetic lines and this breed line possess high capacity for transferring the breeding values of spawning power to their offspring. In addition, the highest rate of SCA for egg production, number of hatched egg, and hatchability was attributed to the crosses of male Tiger × female Green, male Tiger × female Albino, and male Albino × female Green, respectively.

Keywords: diallel cross, genetic combining ability, heterosis, ornamental fish, specific combining ability.

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The environmental factors influencing the phenotypic plasticity of *Barbus lacerata* (Heckel, 1843) in the Zarrineh River, the Urmia Lake basin

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ABSTRACT

The body shape of fishes is influenced by environmental parameters and the habitat condition. The present study investigated morphological characteristics phenotypic plasticity of *Barbus lacerata* in the Zarrineh River and the role of environmental factors influencing the phenotypic plasticity. Three hundred specimens were caught using electric fishing, anaesthetized with clove powder, fixed in 10% formalin and transferred to the laboratory. The left side of the specimens was photographed using a digital camera with a resolution of 6 megapixels. Twelve landmarks were put of the pictures using the software TPSDig2. The Procrustes superimposition was used to transform landmark data and subjected to Canonical Variate Analysis (CVA) using PAST software. Thin-plate spline was used to detect morphometric changes inferred form translation of the landmarks. Based on the movement of landmarks, a significant difference was found between the morph of the specimens from the up- and downstream of River. The morphological differences recognized in body height and caudal peduncle height. Two-block PLS and correlation matrix showed that the velocity of water flow and river discharge are the main factors causing morphological changes. This research recommends the further study on other environmental factors affecting the morphology.

Keywords: *Barbus lacerta*, environmental factors, geometric morphometric, Kura barbel, morphological changes, Zarrineh River.

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Effects of different concentrations of vitamin C and hardness at brood-stock tank water on reproductive indices of freshwater prawn (*Macrobrachium rosenbergii*) in recirculation system

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ABSTRACT

Optimum concentration of vitamin C and hardness at giant freshwater prawn brood-stock tank water has great important on their reproductive quality in recirculation system. The main objective of the present study is investigation on effects of different concentrations of these factors on reproductive parameters of the giant freshwater prawn female brood-stock. For this purpose, at the first experiment, treatments with different concentrations of vitamin C including 0 (Control treatment), 2, 5, 8 and 10 ppm and for the second experiment treatments with different concentrations of hardness including 205 (Control treatment), 250, 300, 350 and 400 ppm were prepared at the brood-stock tanks and their influences were evaluated on reproductive indices of freshwater prawn after 3 reproductive cycle. According to the results, optimum concentration of water hardness and vitamin C were assessed 250 and 5 ppm respectively in the brood-stock tanks. Also the results indicated that the studied factors showed significant differences (P<0.05) in egg dry weight, fertilized eggs percentage, hatched eggs percentage and ESI (Egg-clutch Somatic Index) parameters among the treatments but did not differ significantly in total and relative fecundity parameters (P>0.05). It is concluded that studied elements have not any influences in oogenesis process and show their effects during vitellogenesis and embryogenesis periods.

Keywords: hardness, *Macrobrachium rosenbergii*, recirculation system, reproductive indices, vitamin C.

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Anderogenic changes of some immunity parameters in *Oncorhynchus mykiss*

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ABSTRACT

The purpose of this study is determining of some immunity and blood serum parameters in brood stock and grower fish before and after of stripping to evaluate the effect of breeding physiological changes on immunity and serum indexes. In this study 15 male trout fish (*Oncorhynchus mykiss*) including 5 in the stage of grower, 5 before stripping and 5 after stripping randomly were considered. Blood samples of brood stock and grower fish after anesthesia by *Dianthus caryophyllus* extract were collected from a commercial farm in Haraz and sent to the laboratory. Laboratory results showed that there is a significant difference in glucose concentration of grower fish before and after stripping ($P<0.05$). However, average total protein in all kind of fish approximately was unchanged($P>0.05$).Also, comparison of average osmolality in all fish showed that negligible difference is 5%.Kortizol hormone concentration after stripping compare with other fish showed a significant difference($P<0.05$). The number of white blood cell in brood stock before and after stripping decreased drastically compare with grower Fish. Blood hemoglobin before stripping increased considerably in 2 spices of fish. Although the percentage of blood hematocrit decreased significantly before stripping, the reduction of this factor after stripping was approximately unchanged. Besides, MCV index in grower fish before and after stripping was more than brood stock. Finally, it can be concluded that at the moment of reproducing, the secretion of endocrine hormones in male rainbow trout completely affect fish physiology. In this study, we exanimated the measurement of mentioned indicators for managing more resistant or less sensitive and metabolism can be better.

Keywords: blood serum parameters, breeding, immunity indexes, Iran, rainbow trout.

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Optimization of microwave and ultrasound-assisted extraction of antioxidant extract from Green marine algae (*Chaetomorpha sp*) using response surface methodology (RSM)

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ABSTRACT

Chaetomorpha sp is one of the Persian Gulf green algae which can be a marine source of natural antioxidants such as polyphenols. Industrial and economic development of these materials is influenced by effective extraction and application methods. Microwave-assisted extraction (MAE) and ultrasound-assisted extraction (UAE) are novel techniques which have a potential to apply in laboratory with advantages like reduction in extraction time and target compounds deterioration and enhancement in efficiency. In this study, in MAE a central composite design with six replication in central point and 20 experimental runs and a Box-behnken design with six replications at central point and 17 runs were used in order to optimization of antioxidant components extraction from *C.sp*. Total phenol content, ferric reducing power, DPPH radical scavenging activity and total antioxidant capacity assays were used to evaluate antioxidant activity of the extracts. The results revealed that the highest antioxidant activity in optimum condition in MAE were in following initial factors: power (300 W), time (8 min) and solvent concentration (25%) and in UAE were: time (8 min), temperature (30˚C) and TPC was 1.096 and 1.091 mg tannic acid equivalent/g algae in MAE and UAE, respectively. Moreover, the actual experimental values were adjacent to the corresponding predicted values which demonstrated fitness of the employed models and suitability of RSM in extraction parameters optimization. Furthermore, result revealed the green algae has antioxidant activity and can be used as a resource of natural phenols in food and pharmaceutical industries.

Keywords: green algae (*Chaetomorpha.sp*), microwave-assisted extraction, phenolic compounds, response surface methodology, uultrasound-assisted extraction.

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Evaluation chitosan nono particles and nano-encapsulated thyme effect on microbial spoilage of Rainbow trout (*Oncorhynchus mykiss*) fillet inoculated with *Listeria monocytogenes*

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ABSTRACT

Seafood is valuable protein sources for human being and acts important role in a healthy diet. Due to probability of fish contamination, from catch time to consume time with different microorganisms, there's different technics to prevent fish spoilage. The present study purposed to investigate the effect of encapsulated thyme (*Zataria multiflora Boiss*) extract and chitosan to inhibit *L. monocytogenes* growth in filleted rainbow trout meat during refrigerated storage.The filleted samples were inoculated by 1×10^3cfu/g of *L. monocytogenes*. Then samples exposed to 0.8% and 1.2% thyme extract and 0.15 % and 0.25% v/w% chitosan nano particles and control group in five tratments. All treatments were kept for 16 days at refrigerator temperature. Every 4 days amount of Total viable count (TVC), Psychro trophic count (PTC) and *Listeria monocytogenes* counts measured. Least TVC, PTC and EBC in final experiment day observed in 0.25% chitosan treatment ($P<0.05$). Result indicated by passing time the efficiency of preservatives against L. monocytogenes will be decrease and use of chitosan will cause better inhibition of *L. monocytogenes* in refrigeration condition.Use of chitosan and thyme extract can significantly prevent the growth of Listeria monocytogenes also chitosan is more effective in *Listeria monocytogenes* prohibition.

Keywords: chitosan, *Listeria monocytogenes*, nanocapsul, rainbow trout, thyme extract.

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Determination of Silver carp (*Hypophthalmichthys molitrix*) cracker formulation and its quality changes during three months storage at room temperature

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ABSTRACT

The aim of this study was to determine the formulation of silver carp fish cracker and checking qualitative changes of cracker in the four time intervals (0, 30, 60 and 90 days), during storage at room temperature. Treatments consisted of dried cracker (drying time 2 hours) and cracker were fried (drying time 1 hour) and the final treatment was drought cracker that fried at the end of each period. The amount of protein, carbohydrate, ash and moisture for dried cracker is more than the other two treatments ($P<0.05$). Maximum fat was observed in fried cracker ($P<0.05$). All three treatments showed increasing pH ($P<0.05$). There was no significant changes of TBA dried cracker in during storage ($P>0.05$), But there was significant difference in the other two treatments ($P<0.05$). In measuring free fatty acids most changes and fluctuations observed in dried cracker. However, There was no significant difference between the levels of free fatty acids on day 0 and day 90 in all three treatments ($P>0.05$). Total viabl count was zero, at all sampling times. Results for color properties showed the lightness of final treatment was more than the other two treatments ($P<0.05$) and the end of period all three treatments brightness reduced ($P<0.05$). Sensory evaluation revealed the most popular final treatment compared to the other two treatments. Overall, the results showed that there was no bacterial load in all three treatments, but the sensory properties such as taste, smell, texture, color and overall acceptability were better in final treatment.

Keywords: fish cracker, formulation, preservation, shelf life, silver carp.

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Phylogeny of a pearl wing oyster species; *Pteria loveni* (Bivalvia: Pteriidae) from subtidalzone of Chabahar bay based on *COI* gene sequence

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ABSTRACT

Bivalves are the second largest class of moluscs that have been abundantly successful in different habitats of marine and fresh water, from the cold circumpolar seas to tropical waters and from shallow shores to abyssal depths. Molecular phylogenetic comparative studies can help in tracing the historical evolution of the gene alive and evaluate them. In this research species of pearl wing oyster were collected to document gene sequence from Chabahar bay subtidal zone in 2013. The nucleotide sequence of *COI* determined. Species sequence in this study compared with the sequence of 18 species from GenBank belonging to the two genera of the family Pteriidae. Phylogenetic relationships analyzed by Maximum Liklihood. The result shows monophyly between the two genera and closest species to Iranian sample is *Pteria loveni* that supported with almost moderate bootstrap (71%). This is the first report of *Pteria loveni* species from south coast of Iran.

Keywords: bivalve, Chabahar, COI, pearl wing oyster, phylogeny, subtidal zone.

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Effect of feed frequency on growth performances, feed utilization and biochemical composition of sterlet sturgeon, *Acipenser ruthenus*

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ABSTRACT

The effect of feeding frequency on growth performance, feed consumption and body biochemical composition of *Acipenser ruthenus* juveniles was investigated. The trial was performed using 150 fish with a mean initial weight of 50±1 g randomly introduced in fifteen tanks. Fishes were fed at a feeding frequency of twice daily (T1), three times a day (T2), four times a day (T3), five times a day (T4) and six times a day (T5) at the rate of 3 percentage of wet body weight for 60 days. There was a significant difference ($P< 0.05$) in fish growth performance between the feeding frequencies except condition factor. The best growth rate was observed in the treatment where fish were fed five times a day. Food conversion ratio, feed efficiency ratio, net protein utilization and net lipid utilization were significantly affected by different feeding frequencies. Increased feeding frequency showed an improvement in nutritional indicators. A statistical comparison of the biochemical composition revealed a significant difference ($P<0.05$) in crude protein and lipid among treatments, but none specifically ($P>0.05$), in ash content. Based on the results of this study, five meals per day (T4) is recommended for juvenile sterlet sturgeon feeding.

Keywords: *Acipenser ruthenus*, body biochemical composition, feed conversion, feeding frequency, growth.

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In vitro effects of steroid hormones on inducing GVBD in caspian salmon (*Salmo trutta caspius*) oocytes

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ABSTRACT

This study was inducted to elucidate the effect of different steroid hormones on simultaneous maturation of oocytes in Caspian salmon. Oocytes were incubated with 1, 10, 100 and 1000 ng/ml of testosterone, progesterone and 17 β stradiol, *in vitro*, for 40 hrs. GVBD was considered as hormones effectiveness. 17β estradiol was effective just in 1000 ng/ml and testosterone had no positive effect on maturatin procces. In this study progesterone was the most effective hormone in maturation.

Keywords: Caspian Sea, *in vitro*, salmom, steroid hormones.

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Probiotic effects of *Pediococcus acidilactici* to enhance growth indices, gastric enzymes activity and chemical analyzed of whole body (% dry matter basis) in Green Terror fish (*Aequidens rivulatus*)

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ABSTRACT

In an eight-week time period, the implications of *Pediococcus acidilactici*, as a probiotic, were examined on growth index and the activity of gastric enzymes of *Aequidens rivulatus* (green terror) (0.388±0.0021) in a completely randomized system. The fishes were input into nine oval-shaped ponds of 120 liters capacity with the density of about 60 pieces per pond, and fed twice a day. This study include three treatments as 1) control treatment 2) the feed including fish oil and nutrient treatment 3) feed including fish oil complemented with *P.acidilactici* bacteria. In treatment number three, final weight (3.22 gr), SGR (3.65%/day), FCR (1.45), FER (0.87), PER (0.38) had an improved condition compared with other treatments ($P<0.05$). Dry matter value (30.81), fat (33.73) and body energy (6217.20) were also improved at the end of the latter treatment (0.05). Moreover, in this case the level of gastric enzymes vis. trypsin (1/82 U/mg protein), amylase (3.04 U/mg protein) and lipase (1.24 U/ mg protein) showed significant difference from other treatments ($P<0.05$). There was no significant differences between protein and ash levels in all cases ($P>0.05$). Given what is concluded, *P.acidilactici* has a positive effect on growth index and the activity of gastric enzymes of green terror fish and this bacteria could be used in culturing ornamental fishes as a probiotic in order to improve growth indices and feed digestion.

Keywords: *Aequidens rivulatus* (green terror), body decomposition, gastric enzymes, growth index, *P.acidilactici*, probiotic.

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