



Gorgan University of Agricultural  
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## **Improvement of rainbow trout (*Oncorhynchus mykiss*) roe quality using chitosan and garlic and lemon extract**

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### **Abstract**

The effect of 1% salt, garlic and lemon extract 1.5% and chitosan solution 1% on the quality of rainbow trout roe (*Oncorhynchus mykiss*) during six months storage at -18°C were investigated. Chemical analysis including measurement of the amount of pH, thiobabitoric acid, protein, total fat and sensory evaluation in 180 days (0, 60, 120 and 180) were performed. Lipid oxidation in samples treated by extract and chitosan postponed. The amount of fat and protein in all treatments significantly decreased during the cold storage. pH in chitosan and extract treatments showed significantly difference as companed with the other treatments. The results showed that the use of garlic and lemon extract and chitosan could delay lipid oxidation in the frozen roe and thereby increasing its shelf life.

**Keywords:** Rainbow trout roe, Garlic and lemon extract, Chitosan

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## **The suevey of results of cross breeding in rainbow trout and golden trout**

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### **Abstract**

The golden trout have undergone genetic alterations in the must fish farm for lack of separate breeding and Non-normative fertilization between them and rainbow trout (*oncorhynchus mykiss*). Thus, the preparation of pure strain is very useful and effective in research centers and commercial scale, according to the marketability of golden trout and their importance in all-female and all-male fish production. Then we can expect to distribute in fish farm across the province and the country and it s reliable Results of the project applications. Therefore in this study, golen trout and rainbow trout broodstocks were fertilized and were evaluated the eyed percentage, hatch rate, fry and survival percentage to weight of 10g.

**Keywords:** Golden trout, Rainbow trout, Pure line

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## **The effects of sublethal concentrations of cadmium on liver and gill of *Cyprinus carpio***

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### **Abstract**

The effect of sub lethal toxicity of cadmium ions on the liver and gill of *Cyprinus carpio* was investigated under laboratory conditions. After exposure of *Cyprinus carpio* in the vicinity of (0/1LC<sub>50</sub>) Cadmium sampling days 1, 3, 7 and 14 of the second arc of gills and liver were, and the histopathological lesions were examined. After reviewing the intensity and timing complications, it seems that in the early hours of exposure to inflammatory damage caused and more destructive damage occurred. Common carp liver is able to control some inflammatory damages so that (Hypertrophy of hepatocytes and nuclear hypertrophy) on the third day this damage can be minimized, on contrarily, inflammatory damage in the gills became more intense with increasing time of exposure. Destructive Injury in any modifying process was not found in the liver and gills with increasing exposure time increased the severity of injuries.

**Keywords:** *Cyprinus carpio*, Histopathological, Cadmium, Gill, Liver

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## **Effect of bionanocomposite film activated with pure and Nanoliposome Oregano essential oil on quality and shelf-life of Rainbow trout fillet (*Oncorhynchus mykiss*)**

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### **Abstract**

Fish shelf life is limited due to its sensitivity to spoilage. One of the methods considered in this regard is the use of edible films and coatings as a carrier for antimicrobial and anti-oxidant additives natural. In this study, nanocomposite films from myofibrillar protein-nanofibrillated cellulose activated with pure and nanoliposome essential oils (2%) as a preservative agent on the fillet of rainbow trout were used. Nanoliposome of the oil used to improve the efficacy and sustainability of essential oil in the natural environment. The results of microbiological tests showed that active films significantly reduced the growth of spoilage bacteria. The results of sensory evaluation were in accordance with the microbiological analysis. In fact, amount of sensory attributes of active treat were bigger than blank due to preventing of the growth of bacteria by presence of films containing oregano essential oil. Treatment contained Nanoliposom essential oil, especially in the early days (up to 8) in all analyses was better than pure essential oil. These results shown that Nanoliposoms mainly until about a week after storage, enhanced the effectiveness and sustainability of essential oils.

**Keywords:** Myofibrillar Protein, Film, Oregano essential oil, Nanoliposome, Rainbow trout

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## **The effects of broccoli powder (*Brassica oleracea* var. *Gemmifera* L.) on some indices of mucus on common carp (*Cyprinus carpio*)**

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### **Abstract**

The broccoli plants (*Brassica oleracea* var. *gemmifera* L.) is full of organic matter, mineral matter and vitamin. The present research was investigated to study the effect of different levels (0, 0.2, 0.5 and 1% respectively) of broccoli on total protein, evaluation of antibacterial properties and Alkaline phosphatase (ALP) in the mucosa of common carp (*Cyprinus carpio*). The number of 300 fishes (25 fish per tank with an average body weight of  $2.11 \pm 0.24$  g) fed for 8 weeks. In the end, the results showed that total protein of the mucus in the treatment with 1% broccoli observed significant difference with the other treatments and control group ( $P < 0.05$ ). Also, amount of Alkaline phosphatase in the mucosa of treatment 1% observed a significant difference than other treatments and control group ( $P < 0.05$ ). In addition, to determine the antibacterial activity of mucus, a bacterial challenge was performed between the mucus and 4 bacterial species: *Micrococcus luteus*, *Streptococcus faecium*, *Serratia marcescens*, *Escherichia coli*. The results showed that treatment with 1%, the largest the diameter of inhibition zone around the disc formed per 4 bacterial challenge than other treatments and the control group but not significant ( $P > 0.05$ ). In the end, it can be concluded based on the results that it seems amount of 1% of broccoli in the diet of common carp may boost the immune system.

**Keywords:** Broccoli, Mucus, Common carp

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## **Comparative effects of three anesthetics: MS222, Clove oil and 2-Phenoxy ethanol on some hemato-immunological parameters of grass carp (*Ctenopharyngodon idella*)**

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### **Abstract**

Different kinds of anesthetics decrease fish stress by affecting on fishes audaciousness and physiological side effects of stress in fish. In this study the effects of anaesthesia with MS222, Clove oil (*Eugenia caryophyllata*) and 2-Phenoxy ethanol on some haematological and immunological parameters of grass carp (*Ctenopharyngodon idella*) were investigated. Firstly the effective dose of each anaesthetics were calculated in grass carp. Secendly the effective dose of MS22, 2-Phenoxy ethanol and Clove oil were determined as: 100, 200 and 100 mg/l, respectively. Fish were anaesthetized with the effective dose of each anaesthetic then blood samples were taken at 1, 12, 24 and 72 hours after anaesthesia. Haematologcal parameters (Packed cell Volume, Hemoglobin, Red blood cell count, White blood cell count, differentiated count, MCV, MCH, MCHC), immunological indices (Serum Lysozyme activity, Serum bactericidal activity, serum total protein and Serum immunoglobulin) were compared among groups. Results showed that most of haematological parameters didn't change in anaesthetic treatments ( $P>0.05$ ). Leukocyte differentiated count showed significant differences among groups ( $P<0.05$ ). Neutrophils ratio increased in Clove oil and Phenoxyethanol treatments at 12 and 24 hours after anaesthesia ( $P<0.05$ ), whereas lymphocytes ratio decreased in this groups. Serum lysozyme activity increased in Clove oil and Phenoxy ethanol treatments at 12 hours after anaesthesia ( $P<0.05$ ). According the results of this study it can be concluded that MS222 induced minimum interaction with haematological and immunological parameters of grass carp.

**Keywords:** Grass carp (*Ctenopharyngodon idella*), MS222, Clove oil, 2-phenoxyethanol, immunological and haematological parameters.

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## **Optimization of antioxidant compounds extraction from brown algae *Sargassum angustifolium* in heating reflux methods using Taguchi design**

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### **Abstract**

Reflux extraction was applied for extraction of algal extracts from brown algal species (*Sargassum angustifolium*). Extraction condition consists of three solvents (ethanol, ethanol/water; 50:50 and water), three extraction times (90, 180, 270min). All the experimental parameters were applied at three levels according to Taguchi's statistical design. Total phenol contents, DPPH scavenging activity of the extracts were determined. According to results, the best condition for extraction of antioxidant compounds from *S.angustifolium* was aqueous extract, and 270 minute extraction time. The TPC and IC<sub>50</sub> in the optimized treatment are 392 GAE (mg/gr dry matter) and 0.008 mg, respectively. Results showed that this alga was suitable for the extraction of antioxidant compounds.

**Keywords:** Sargassum, Natural antioxidant, Persian Gulf

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