

Effect of three levels of Olive tree extract on growth, survival and activity of antioxidant enzymes in grass carp (*Ctenopharyngodon idella*)

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Abstract

The present study was performed to determine the effect of olive leaf extract on growth and antioxidant enzymes activity of Grass carp (*Ctenopharyngodon idella*). For this purpose, four diets containing different levels of olive leaf extract with different concentrations (1, 2 and 3%) in the form of T₂, T₃ and T₄, respectively and control diet (without extract T₁ prepared as diets of Grass carp. Results showed that daily growth rate, specific growth rate, condition factor, final weight, final length, weight gain and feed conversion rate were significantly higher in fish fed diets containing olive leaf extract compared to control (P<0.05). The highest feed conversion ratio was observed in control treatment. The lowest levels of superoxide dismutase and glutathione peroxidase were observed in fish fed the control diet (p<0.05). Fish fed the T₃ diet had the highest levels of malondialdehyde and the least amount of catalase (p <0.05). The results suggested that the use of different levels of olive tree leaf extract in Grass carp diet significantly affecting on growth indices and liver antioxidant enzymes activities.

Key words: Olive Tree Extract, Oxidation, Growth Indices, Grass carp, Antioxidant.

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The effect of pH and temperature on growth, the antioxidants, phenols and flavonoids in *Scenedesmus* sp. microalgae

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Abstract

Microalgae are one of the rich sources of natural antioxidants in various applications in the food and pharmaceutical industries. In this study, the effects of temperature stress (23°C, 28°C, 33°C) and pH (5, 7, 8, 9) on antioxidant activity, phenolic and flavonoids content and on the amount of colorants in the microalgae *Scenedesmus* sp. were studied. Environmental conditions for all treatments were 12:12 light: dark, continuous aeration, and a 16-day period. The results showed that the best conditions for antioxidant activity and flavonoid production occurred at high pH (8 and 9) and low temperature (23°C). Concerning phenolic content, the results indicated that temperature (23°C) plays significantly an effective role than pH in increasing the phenolic content of the algae (7.53 ± 0.06 mg GAE /g DW), and pH caused a significant decrease ($p < 0.05$) in phenolic content compared to control. Although pH and temperature did not affect the amount of chlorophyll α , but in general, the results indicate that pH and temperature can affect the antioxidants content of the *Scenedesmus* sp. microalgae.

Key words: Flavonoids, Microalgae, FRAP, phenolic compounds.

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Effects of four kinds of tree leaf as different feeds on growth indices of *Daphnia magna*

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Abstract

A completely randomized experimental design was conducted to determine the effect of tree leaves as *Daphnia* feed with six food beds on survival, reproduction and development of *Daphnia magna* (in main section, Observation of the first reproduction), during a 3-month culture in an enclosed unit in vitro in triplicates. The treatments were included: Pure water (treatment 1); Food without leaves (treatment 2); Plane: *Platanus orientalis* (treatment 3); white poplar: *Populus alba* (treatment 4); Oak: *Quercus castaneifolia* (treatment 5) and mixed of Plane, Mulberry: *Morus alba* and food (treatment 6). Each experimental unit was consisted of a trough (30 cm length, 25 cm width and 10 cm depth (about 12 L)), and an aeration pipe. The experiment was run in February 2014. The *Daphnia* were fed dry powdered leaves or food with the rate of 12gr/unit. The EC, pH, TDS and salinity, measured at 16, 29, 39 and 93 days after initiation of the experiment. Twenty pieces of *Daphnia magna* were introduced randomly to each experimental. The number of *Daphnia* were visually counted in 1 liter of each unit. Water temperature (in the first part) and pH ranged (during the experimental period) between 10-14°C and 7/80-8/34, respectively. The survival, reproduction and development were significantly different ($p < 0/01$) among treatment. This rate in treatment (6) with plane, mulberry and food was higher compared to the other treatments. The results of this study indicated that *daphnia magna* fed mixed plane, mulberry and food (treatment 6) have better condition for reproduction than plane leaf (treatment 3) and food without leaves (treatment 2). Results showed that the mulberry and plane leaves contain some substances stimulate the maturation and reproduction of *Daphnia*.

Keywords: *Daphnia magna*, food bed, plane leaf, white poplar leaf, oak leaf and Mulberry. leaf.

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Effect of temperature, pH and citrus essential oil on reduction of *Listeria monocytogenes* in cold and hot -smoked silver carp

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Abstract

The aim of this study was to investigate the effects of temperature, pH and orange essential oil on reducing the growth rate of *L. monocytogenes*. The variables included 45 ° C (for 144 hours), 50 ° C (for 72 hours), 55 ° C (for 6 hours), 4 pH levels (4, 5, 6) and essential oil citrus (*Citrus aurantium* L.) in 0.2, 0.4 and 0.6% levels on the growth rate of *L. monocytogenes* in cold smoked silver carp fillet. The results showed that the number of bacteria increased with increasing pH at the studied temperatures ($P < 0.05$), But correlation analysis showed no correlation between *L. monocytogenes* and pH. An increase in temperature significantly reduced the number of bacteria in cold and hot smoked silver carp fillets, so that the lowest bacterial count in both cold and hot smoked fillets recorded at temperature of 55 ° C. The correlation between number of bacteria and temperature also confirmed these results. The effect of citrus essential oil on the number of bacteria showed that at a constant pH and temperature, with an increase in the percentage of essential oil, the number of *L. monocytogenes* decreased. This, especially in the treatment of 0.6% of orange essential oil was evident. At the same temperature and pH, hot smoking compared to cold smoking was more effective in reducing the number of *L. monocytogenes*, however the number of bacteria in both methods of smoke at different temperatures and pH was not higher than the 10^7 Log cfu/ g standard. It could be argued that smoke is a reliable way to increase the shelf-life of silver carp fillet, and the best temperature and time period to smoke was recorded at 55 ° C and 6 hours, respectively and at pH = 4, within the essential oil level of 0.6%.

Keywords: *Citrus aurantium* essential oil, pH, temperature, *Listeria monocytogenes*, Cold and hot smoked fillets.

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Study of CNT@Fe₃O₄ effects on *Aeromonas hydrophila* and *Yersinia ruckeri* bacteria isolated from fish

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Abstract

The use of nanomaterials has made it possible to run processes with less pollution than conventional methods. Among these nanoparticles, nanocarbon tubes (CNTs), which have antibacterial properties, can be mentioned. Also, among the important bacterial pathogens in the fish breeding industry, the two *aeromonas hydrophila* bacteria are one of the causative agents of septicemia and hemorrhagic sepsis and *Yersinia rockair* are the causative agent of oral antibiotic antibiotic bacteria. The aim of this study was to investigate the effect of magnetized tubes nanocarbon (CNT@Fe₃O₄) on two *Aeromonas hydrophila* bacteria and *Yersinia rockair*. To conduct research, nanomaterials were prepared by hydrothermal method, and their antibacterial effect in vitro was determined on the bacteria studied. Nano-carbon nanotubes synthesized by spectroscopic and microscopic techniques including X-ray diffraction spectrum, shaking sample magnetometer and vegetative electron microscopy were investigated. Ultimately, the results of the MBC (Minimum Concentration Test) showed that the opacity of OD for the *aeromonas hydrophila* bacteria was 1.42 in the control group. However, in treatments containing carbon nanotubes at concentrations of 8, 16, 32 and 64 mg, these values were equal to 0.17, 0.14, 0.08 and 0 respectively. The OD of turbidity created for *Yersinia rockair* bacteria in the control group was 0.94. However, in treatments with carbon nanotubes at concentrations of 8, 16, 32 and 64 mg, these values were equal to 0.245, 0.194, 0.11 and 0.09 respectively. The results of the minimum germination test for both bacteria showed the same results. Finally, after summarizing and comparing the results of the research with other studies, it can be concluded that the use of magnetic nanocarbon in the filtration system of aquatic reservoirs could have a potential impact on the reduction of barbatoic content.

Key words: Nanocarbon Magnetic Tubes, CNT@Fe₃O₄, *Aeromonas Hydrophyla*, *Yersinia rockair*.

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In vitro evaluation of the anti-bacterial and anti-oxidant properties of Coelomocytes and its extracts (organic phase and aquatic phase) isolated from Echinometra matheai

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Abstract

In this study, anti-bacterial and antioxidant activities of coelomocytes and aqueous and organic extracts of Sea urchin were investigated. The live samples of sea urchin were collected from Persian Gulf and their coelomocytes and extracts were isolated. Antibacterial effects of coelomocytes and its extracts were assessed on *Staphylococcus aureus*, *Bacillus cereus*, *Escherichia coli* and *Pseudomonas aeruginosa*. The results of this study showed that coelomocytes and extracts had strong antibacterial effects. The most powerful antibacterial effect was related to the aqueous phase. Also, antioxidant activity (DPPH and ABTS free radical as well as reducing power assay) showed that aquatic phase had highest DPPH scavenging activity (at a concentration of 1/25 mg/ml) and organic extract had the highest effect on ABTS scavenging (at a concentration of 5 mg/ml). Reducing power assay indicated that extracts showed the lowest activity and there was no significant effect in any concentrations ($\alpha \geq 0$). MIC and MBC of the bioactive compounds in this study were equal to each other. MIC and MBC for the coelomocytes, aqueous and organic extracts on experimental bacteria (*Staphylococcus aureus*, *Bacillus cereus*, *Escherichia coli* and *Pseudomonas aeruginosa*) was obtained in 5 >, 2.5, 2.5, 5 and 2.5, 0.019, 0.019, 0.019 and 5 >, 0.625, 0.625 & 2.5 ug/ml, respectively. Generally, according to the antibacterial and antioxidant results of the study, the extracts from sea urchin can be used as packaging, antimicrobial and antioxidant agent.

Keywords: Sea urchin, Coelomocyte, Extract, Antibacterial activity, Antioxidant activity.

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Production and evaluation of smart biodegradable film based on carrageenan for fish fillet packaging

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Abstract

In the present study, a polymer was produced with the aim of food packing (especially meat) to inform the consumers from corruption stages of food corruption based on color of food pack and in addition to be biodegradable. For this purpose, the biodegradable films based on carrageenan in combination with red cabbage extract (*Brassica oleaceae*) prepared, after producing the films, their functional properties, including tensile strength and strength, solubility, water vapor permeability, microstructures were investigated using the FTIR test. Then, the relationship between the stages of corruption in Rainbow trout filets (*Oncorhynchus mykiss*) and the color changes of packed film investigated for 48 hours at room temperature (in order to expedite corruption) condition. The PH, TVB-N and colorimetric performed in every 6 hrs intervals. The changes in color of the polymer determined at each stage of maintenance. According to the tests, the results indicated that carrageenan film containing cabbage extract, at first is colorless then after packaging the food, its color change which is in accordance with the corruption stage in fish packed. The TVB-N and pH changes extended and the color of the smoky film became dark. These symptoms could be used as a corruption index to inform the consumer about the quality and freshness of the packed fish. Therefore, according to the results of this study, the carrageenan film containing cabbage extract can be used as an indicator of fish corruption and other meat food.

Key words: Carrageenan, Biodegradable, Packaging, Rainbow trout, Spoilage.

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Proximate composition and amino acid contents of two sea cucumbers, *Holothuria leucospilota* and *Stihcopus herrmanni*

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Abstract

The aim of this study was to investigate the sea cucumber powder as producing edible capsule for human consumption. For achieving to this propose, two sea cucumber species (*Holothuria leucospilota*, *Stihcopus herrmanni*) were collected from 5 meters deep of sea water around Qusem Inland. The samples were transported, under low temperature, using ice powder, to Persian Gulf and Oman Sea Institute. The Weight and length of specimens were determined immediately in the biotechnology Lab. After that, the samples gutted and cooked in boiling water for 10- 15 minutes then dried in the Oven at 40°C for 3 days. Within second time, the dried samples were put in boiling water for 10-15 minutes, and dried at 45°C for 7 days. The dried samples were powdered using blender. Sea cucumber powder was capsulated using 500mg capsule. Results of this study indicated that powder yield of the two species of sea cucumbers were varied from 9-10.5 percent of the wet weight. The Protein rates in both dried samples of *Holothuria loeucospilota*, *Stihcopus herrmanni* were between 30- 32 percent, however the fat content was very low. Eight and four amino acids detected in *S. herrmanni* and *H. loeucospilota*, respectively. Aspartic acid had the highest rates in both species. The least rates of Lysine and Arginine amino acids recorded in *S. herrmanni* and *Holothuria loeucospilata*, respectively.

Key words: Sea cucumber, *Echinoidea*, Amino acid, Oman Sea.

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