



Gorgan University of Agricultural
Sciences and Natural Resources

Journal of Utilization and Cultivation of Aquatics

Vol. 10(3), 2021

<http://japu.gau.ac.ir>

DOI: 10.22069/japu.2021.19297.1595

Effects of various carbon to nitrogen ratios with dietary protein on immunity of juvenile common carp (*Cyprinus carpio*) in the biofloc system

M. Aalimahmoudi¹ and H. Mohammadiazarm^{*2}

¹Ph.D. Graduate, Dept. of Fisheries, Faculty of Marine Natural Resources,

Khorramshahr University of Marine Science and Technology, Khorramshahr, Khuzestan, Iran,

²Associate Prof., Dept. of Fisheries, Faculty of Marine Natural Resources, Khorramshahr University of Marine Science and Technology, Khorramshahr, Khuzestan, Iran

Received: 07.07.2021; Accepted: 06.29.2021

Abstract

The aim of this study was to investigate the effect of different carbon to nitrogen ratios and its method for rearing common carp (*Cyprinus carpio*) in the biofloc system through immunological parameters. A total of 750 fish species with a mean weight of 17 ± 0.5 g were selected and randomly divided into 30 fiberglass tanks with a volume of approximately 250 liters of water. The treatments included three levels of carbon to nitrogen with different levels of 15, 20 and 25 with three levels of dietary protein including 25%, 30% and 35% by three replications during the 56-day period of trial. Also, a control group was fed with 35% dietary protein in usual system with water exchange. Based on the results, the amount of total protein, albumin, and globulin showed significantly a numerical increase with increasing the percentage of dietary protein in biofloc treatments compared to the control treatment ($P < 0.05$). Also, the lowest serum total protein and albumin were observed in the control treatment. Furthermore, the lowest serum bactericidal activity, lysozyme, and total complement (ACH50) were in control treatment that significantly different from the biofloc treatment with 30% protein and the ratio of C/N 15 ($P < 0.05$). As a result, using the optimal ratio of carbon to nitrogen 15 with 30% protein due to the activity of lysozyme and complement is a good strategy for the production of common carp juveniles at the early stage in this system.

Keywords: Biofloc, Blood serum, Common carp, Heterotrophic bacteria, Immunity system

*Corresponding author: azarmhamid@gmail.com



Gorgan University of Agricultural
Sciences and Natural Resources

Journal of Utilization and Cultivation of Aquatics

Vol. 10(3), 2021

<http://japu.gau.ac.ir>

DOI: 10.22069/japu.2021.18907.1579

Evaluation of catch and stocks of common kilka *Clupeonella cultriventris caspia* in the Iranian coastal of the Caspian Sea (2018-19)

A.A. Janbaz^{*1}, H. Fazli², M.A. Afraei Bandpei³, F. Bagherzadeh Afroozi⁴, Gh.R. Razeghian⁴ and K. Khedmati⁵

¹M.Sc., Agricultural Research Education and Extension Organization, Iranian Fisheries Science Research Institute, Caspian Sea Ecology Research Center, Sari, Iran,

²Associate Prof., Agricultural Research Education and Extension Organization, Iranian Fisheries Science Research Institute, Caspian Sea Ecology Research Center, Sari, Iran,

³Assistant Prof., Agricultural Research Education and Extension Organization, Iranian Fisheries Science Research Institute, Caspian Sea Ecology Research Center, Sari, Iran,

⁴Expert, Agricultural Research Education and Extension Organization, Iranian Fisheries Science Research Institute, Caspian Sea Ecology Research Center, Sari, Iran,

⁵M.Sc., Agricultural Research Education and Extension Organization, Iranian Fisheries Science Research Institute, Inland Waters Aquaculture Research, Anzali, Iran

Received: 02.24.2021; Accepted: 08.25.2021

Abstract

The main objectives of the present study were to estimate of catch age structure, biomass and maximum sustainable yield of common kilka in Iranian waters of the Caspian Sea. The result shown that catch of kilka in Iranian coastal in 2018 decreased from 26153 ton to 24586 ton in 2019. The mean length was 104.3 ± 10.6 at the same time and the minimum and maximum fork lengths were 52.5 and 137.5 mm and always fishes with 3 and 4 year olds had the highest frequency 78.1% and 80.6%, respectively. The biomass of common kilka was estimated 76922.9 and 74342.7 ton, respectively. In these years, the three years old fish had the highest amount of reserves (respectively 24677.6 and 24254.8 ton) and the lowest reserves for 6-year-old fish, respectively. The breeders biomass of this species is 39557.4 and 36939.4 tons, respectively and the ratio of biomass of broodstocks to the whole was 51.4% and 49.6%, respectively. Acceptable Biological Catch was estimated 19500 tons, with a very cautious approach. The fishing mortality was more than reference points of common kilka at $F_{0.1}$ and $F_{40\%}$ (0.92 and 0.80), in fact overfishing has occurred. Proper exploiting leads to continuous harvest and long-term stability of storage.

Keywords: Acceptable Biological Catch, Biomass, Caspian Sea, Kilka fishes

*Corresponding author: aliasgharjanbaz@yahoo.com



Gorgan University of Agricultural
Sciences and Natural Resources

Journal of Utilization and Cultivation of Aquatics

Vol. 10(3), 2021

<http://japu.gau.ac.ir>

DOI: 10.22069/japu.2021.19358.1598

Medicinal plants: A promising source in the prevention and treatment of aquatic animal diseases

A. Zamani* and M. Khajavi

Dept. of Fisheries Sciences and Engineering, Faculty of Natural Resources and Environmental,
Malayer University, Hamedan, Iran

Received: 07.30.2021; Accepted: 09.07.2021

Abstract

In recent decades, the growth of the aquaculture industry and the use of intensive culture methods has increased the susceptibility to pathogens in aquatic animals. Therefore, many researchers have focused on the stimulation of the immune system against pathogens. The use of common methods in the control of aquatic diseases has limitations due to the some side effects. Antibiotics cause the increase of bacterial resistance, accumulation in muscle, environmental damage and other methods, such as vaccines, are costly. Medicinal plants, as a safe and inexpensive source, can be a suitable alternative to antibiotics, chemicals and vaccines with minimal side effects. So far, more than 250 medical plant species from 75 families and 32 orders have been reported mainly belonging to Lamiales, Fabals, Asterales, Malpighiales, Euphorbiaceae and Phyllanthaceae. There are the various biological activities in herbs due to the presence of bioactive compounds such as alkaloids, flavonoids, pigments, phenols, terpenoids, lectin, steroids and essential oils. The evaluation of these bioactive compounds have shown that they can be improved the immune system and antimicrobial defense in aquatic animals. A better understanding of the bioactive compounds function can be lead to the effective application of medicinal plants in aquaculture, as they can be used specifically for each fish species. The aim of the present work is to investigate the role of medicinal plants in stimulation of immune system and to study the properties of the antibacterial, antiviral, antifungal and antiparasitic effects in aquaculture.

Keywords: Antibiotic, Aquaculture, Bioactive compounds, Medicinal plants

*Corresponding author: a.zamani@malayeru.ac.ir



Gorgan University of Agricultural
Sciences and Natural Resources

Journal of Utilization and Cultivation of Aquatics

Vol. 10(3), 2021

<http://japu.gau.ac.ir>

DOI: 10.22069/japu.2021.19111.1587

Evaluation of antioxidant properties of aqueous extract of brown *Sargassum vulgare* macroalgae collected from Qeshm coast

M. Ahadifar^{*1}, S.M. Ojagh², S.H. Hoseinifar², M. Kordjazi³,
M.A. Khanlar⁴ and A.R. Alishahi⁵

¹M.Sc. Student, Dept. of Fisheries, Gorgan University of Agricultural Sciences and Natural Resources,
Gorgan, Iran,

²Associate Prof., Dept. of Fisheries, Gorgan University of Agricultural Sciences and Natural Resources,
Gorgan, Iran,

³Assistant Prof., Dept. of Processing of Fishery Products, Gorgan University of Agricultural Sciences and
Natural Resources, Gorgan, Iran,

⁴Ph.D. Graduate, Dept. of Fisheries, Gorgan University of Agricultural Sciences and Natural Resources,
Gorgan, Iran,

⁵Assistant Prof., Dept. of Fisheries, Gorgan University of Agricultural Sciences and Natural Resources,
Gorgan, Iran

Received: 04.29.2021; Accepted: 06.09.2021

Abstract

Antioxidant are the main agents of neutralizing free radicals, which are active and harmful substances for humans. The aim of this study was to investigate the antioxidant properties of aqueous extract of *Sargassum vulgare* brown algae collected from the shores of Qeshm on a laboratory scale. After collecting the algae from the shores of Qeshm and washing with fresh water, extraction of *Sargassum vulgare* algae was performed then the desired extract was obtained in dry freeze dryer as a powder. The parameters of total Phenol, total antioxidant properties, free radical scavenging activity of DPPH, superoxide free radical, iron ion chelating ability and hydroxyl radical were investigated in this study. According to the results the content of total phenol, total antioxidant activity, DPPH free radical, superoxide free radical percentage, iron ion chelating ability and hydroxyl radical in their highest concentrations equivalent to 16.22 mg of gallic acid per 100g of extract 521.70 mg of ascorbic acid per gram of extract, 24.08%, 14.08% and 33.65% were calculated, respectively. Due to the high ability of *Sargassum vulgare* brown algae extract in antioxidant activities this algae extract can be introduced as a rich source of natural antioxidant compounds in food, pharmaceutical cosmetic and health industries.

Keywords: Antioxidant, Aqueous extract, Brown macroalgae, Free Radicals

*Corresponding author: mitraahadifar@gmail.com



Gorgan University of Agricultural
Sciences and Natural Resources

Journal of Utilization and Cultivation of Aquatics

Vol. 10(3), 2021

<http://japu.gau.ac.ir>

DOI: 10.22069/japu.2021.19310.1596

Health assessment of Zarrin Gol River, Kaboudwal and Shirabad Streams in Golestan province using biological indices

M. Molaei¹, R. Patimar^{*2}, M. Gholizadeh³, H. Mostafavi⁴ and H. Jafaryan²

¹Ph.D. Student, Dept. of Fisheries, University of Gonbade Kavos, Golestan Province, Iran,

²Associate Prof., Dept. of Fisheries, University of Gonbade Kavos, Golestan Province, Iran,

³Assistant Prof., Dept. of Fisheries, University of Gonbade Kavos, Golestan Province, Iran,

⁴Assistant Prof., Dept. of Bio-Diversity and Ecosystem Management, Environmental Sciences Research Institute, Shahid Beheshti University, Tehran, Iran

Received: 07.13.2021; Accepted: 08.28.2021

Abstract

Human activities degraded river ecosystems and disturbed the effectiveness and sustainable river services (including drinking water, water treatment, energy, organic matter uptake, food cycle, recreation and habitat for plants and animals). To deal with the destructive effects of human activities, assessing and determining the health of the river is one of the basic criteria considered by water management organizations. The health assessment of Kaboudal and Shirabad and Zarrin Gol streams conducted based on biological indicators of benthic invertebrate population in Golestan province. Based on the existing barriers and the possibility of access to the river, 5 stations in Kaboudwal, 3 stations in Shirabad and 10 stations in Zarrin Gol stream were determined. Macroinvertebrates collected using a surber sampler in a seasonal period over one year. Afterward, alpha, beta and multivariate biodiversity indices of water qualitative health assessment were studied. The results showed that the effluent of fish farms had a significant effect on river water quality so that the frequency of pollution-sensitive families in the stations after fish farms decreased and increased the frequency of resistant families. The streams of Golestan province generally experience moderate ecological conditions and move towards poor conditions, which with the increasing trend of destruction of ecosystems along the creek and the impact of agricultural and aquacultural activities, it seems that we will have these conditions in the future.

Keywords: Biological indicator, Health assessment, Kaboudwal Stream, Shirabad stream, Zarrin Gol stream

*Corresponding author: rpatimar@yahoo.com



Gorgan University of Agricultural
Sciences and Natural Resources

Journal of Utilization and Cultivation of Aquatics

Vol. 10(3), 2021

<http://japu.gau.ac.ir>

DOI: 10.22069/japu.2021.18708.1566

Comparison of UV absorption potential and phycobiliproteins amount extracted with the help of solvent and ultrasound from (*Spirulina platensis*) microalgae

L. Aslani¹, B. Shabanpour^{*2}, P. Pourashouri³, V. Payamnoor⁴ and A. Adeli³

¹M.Sc. Student, Dept. of Seafood Science and Technology, Faculty of Fisheries and Environmental Science, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran,

²Professor, Dept. of Seafood Science and Technology, Faculty of Fisheries and Environmental Science, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran,

³Associate Prof., Dept. of Seafood Science and Technology, Faculty of Fisheries and Environmental Science, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran,

⁴Associate Prof., Dept. of Forestry and Forest Ecology, Faculty of Forest Science, Gorgan University of Agriculture Sciences and Natural Resources, Gorgan, Iran

Received: 12.30.2020; Accepted: 05.03.2021

Abstract

microalgae produce a wide range of protective compounds and pigments (mycosporid-like amino acids, Scytonemines, phycobiliproteins, and carotenoids) against ultraviolet (UV) radiation, which specially reduce the risk of skin cancer and aging. To compare the effect of solvents on UV protection factor (SPF) as well as the extracted amounts of carbohydrates, proteins and phycobiliproteins of *Spirulina platensis* different solvents including aqueous, ethanolic, methanolic, aqueous/ethanolic and aqueous /methanol were used. The yield of lyophilized extracts was compared. The results showed that ethanolic extract had a higher protective factor than other extracts (SPF=11.94 ± 0.00) also, this extract showed a higher amount of carbohydrates (2.39 ± 0.002 mg/ml) than other extracts. Aqueous extract had the highest amount of phycobiliproteins and extraction efficiency between other lyophilized extracts (90.05%). In conclusion, due to the significant amount of SPF of ethanolic extract, the usage of this extract in sunscreen formulations as a natural UV filter could be suggested.

Keywords: Phycobiliproteins, SPF, *Spirulina*, Solvent, Sunscreen

*Corresponding author: b_shabanpour@yahoo.com



Gorgan University of Agricultural
Sciences and Natural Resources

Journal of Utilization and Cultivation of Aquatics

Vol. 10(3), 2021

<http://japu.gau.ac.ir>

DOI: 10.22069/japu.2021.18796.1574

Study on hematological and biochemical indices of common carp (*Cyprinus carpio*) in exposure to different concentrations of polystyrene nanoplastic

A.R. Mehri¹, S.A.A. Hedayati^{*2}, H. Mohammadi Azarm³, A. Jafar Nodeh⁴
And S. Abarghoui⁵

¹M.Sc. Student, Dept. of Fisheries and Aquatic Ecology, Faculty of Fisheries and Environmental Sciences, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran,

²Associate Prof., Dept. of Fisheries and Aquatic Ecology, Faculty of Fisheries and Environmental Sciences, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran,

³Associate Prof., Dept. of Fisheries, Faculty of Natural Resources and Marine Sciences, Khorramshahr University of Marine Sciences and Technology, Khorramshahr, Iran,

⁴Ph.D. of Fisheries, Dept. of Aquaculture, Faculty of Fisheries and Environmental Sciences, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran,

⁵Ph.D. Student, Dept. of Aquaculture, Faculty of Fisheries and Environmental Sciences, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran

Received: 01.23.2021; Accepted: 04.28.2021

Abstract

Small plastic particles are known as emerging pollutants and this has led to the development of studies in this field. Today, many studies have examined the effects of microplastics on living organisms and aquatic organisms, but fewer studies have been conducted on the effects of nanoplastic on organisms; However, there is still no comprehensive information on the effects of these substances on living organisms and humans. The aim of this study was to investigate the hematological and biochemical responses of common carp in exposure to polystyrene nanoplastic. 84 common carp with an average weight of 30 ± 5.1 were distributed in 4 food treatments (control with basic food and without nanoplastic, treatments containing 0.1, 0.5 and 1 ml of nanoplastic sprayed emulsion styrene on diet for 28 days. At the end of the experimental period, serum samples were collected to investigate some biochemical and hematological indices. Different concentrations of nano polystyrene plastic despite the increasing trend, red blood cell count, hemoglobin, hematocrit, MCV, MCH, MCHC, lymphocyte count, neutrophil, monocyte, basophil and eosinophil and serum biochemical indices, such as albumin, albumin. Serum had no significant effect ($P > 0.05$), but the level of white blood cells and glucose at a concentration of 1 ml (highest concentration) was significantly higher than the control group ($P < 0.05$). Finally, higher concentrations of polystyrene nanoplastic are likely to increase stress and inflammatory responses in common carp.

Keywords: Blood and Biochemical indicators, Common carp, Polystyrene nanoplastic

*Corresponding author: hedayati@gau.ac.ir