

UTILIZATION OF CHLORELLA VULGARIS IN FISH FEEDING IN FISHERY INDUSTRY

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Annotation

The increase in Chlorella production significantly enhances the economic indicators of fish farming, improves the quality of fish products, reduces fish diseases, and provides the opportunity to enhance the natural ecological environment in fish farming ponds.

Keywords

Fishing, zooplankton, phytoplankton, Chlorella vulgaris.

In our Republic, the main objects of fish farming are natural and artificial water reservoirs, ponds, and fisheries, and one of the most effective methods of feeding fish with natural food is the use of *Chlorella vulgaris* strain market suspension. Various types of *Chlorella* with different productivity are used in fish farming today.

The implications of utilizing algae in aquaculture involve specifically increasing the green algae as a food source for the fish, a process that triggers photosynthesis, generating oxygen (O₂) in volumes up to 200 times its original content. This influx of oxygen helps break down organic matter in the water aerobically, facilitating its conversion into mineral substances. Consequently, the overall sanitary conditions of fishponds improve significantly.

In aquaculture, 70-80% of the expenditure is allocated to proper nutrition. To foster the development of this sector, a refined nutritional and stable food base is essential. Over the past decade, enhancements have been made in the form of supplements, vitamins, and biological additives among other aquatic plants. Microscopic green algae, such as *Chlorella*, are introduced to the diets of livestock.

The preparation of *Chlorella* suspension utilizes strains of *Chlorella vulgaris*. They stand out with their inherent characteristics, namely independent mobility and equal distribution in the cultural environment. They do not have excessive demands on the nutritional environment and carbonate anhydrite gas, making them instrumental in the innovative biotechnology of microalgae aquaculture and

Chlorella cultivation in laboratory conditions. The introduction of Chlorella suspension into the livestock feed industry has been successfully conducted in the scientific research institutes of developed countries. The significance of Chlorella suspension lies in the biological activity of the strains it employs. It results in increased weight, enhanced immunity, improved safety of livestock, and a lasting positive effect on animals. The administration of Chlorella suspension is determined based on the feed duration, specific species, and age group.

The introduction of green algae into fishponds through specialized cultivation enhances photosynthesis, significantly increasing oxygen (O₂) levels. This promotes the aerobic breakdown of organic matter into mineral substances, thereby enhancing the sanitary conditions of fishponds. Its application aligns with the goal of promoting complete digestion, increasing additional kilograms, boosting milk production, increasing egg production, and improving the weight retention of livestock. Utilizing Chlorella suspension allows the reduction of veterinary costs and provides the opportunity to obtain high-quality aquaculture products, including antibiotics for animal treatment.

Among the numerous species within the Chlorella genus, *Chlorella vulgaris* stands out as the most prominent for mass production. The use of *Chlorella vulgaris* is especially notable due to its high efficiency in increasing the population. *Chlorella vulgaris* strains have proven crucial in aquaculture, particularly in producing antibiotics in water. This practice significantly reduces the risk of bacterial and fungal infections in farmed fish, enhancing their health and growth. *Chlorella vulgaris* is primarily utilized as the main food source for the silver carp (*Hypophthalmichthys molitrix*).

The representatives of *Chlorella vulgaris* strain play a vital role in supplying fish farming enterprises. Their blue-green algae are essential in the cultivation of pond fish. The regular introduction of Chlorella suspension into fish ponds leads to an increase in the quantity of aquatic organisms' food, improving the hydrochemical balance, especially the oxygen regime. This practice significantly enhances the productivity of intensive fish farming ponds (including grass carp, carp, and crucian carp) by 35-40%.

The use of Chlorella in feeding pond fish is implemented to impact the ecological balance of water reservoirs. By influencing the diversity of phytoplankton organisms, it contributes significantly to establishing the natural food base of fishponds. Recognizing the importance of various plankton organisms in terms of nutrition, it is essential to ensure the prevalence of the most valuable representatives of green algae in terms of food in the aquatic environment.

To promote the widespread development of green-algae in the pond, algalization is carried out using planktonic strains of *Chlorella*. Algalization, employing *Chlorella* suspension in fish ponds, significantly enhances the availability of their food supply.

Organic and mineral nutrients were introduced into controlled ponds in fish farming enterprises, and experimental trials were additionally subjected to algalization. *Chlorella vulgaris* strains were utilized for experimentation. The background composition of the water predominantly consisted of diatoms and blue-green algae, which turned mainly green after algalization. The development of zooplankton organisms in the experimental ponds was notably intensive under observation. When compared with other water basins in the experimental pond, the zooplankton density was the highest (1363 mg/l), providing the opportunity to obtain the standard sample of carp fish before the specified time.

In the experimental pond of the “*Abdushukurov Yusufjon kelajagi*” fish farming enterprise in the Beshriq district of Fergana region, during the monitoring period of mussel transplantation, there was a 24% increase in weight as compared to the control pond.

The use of *Chlorella* allows obtaining the standard stocking material for carp. In the experimental pond of the fish farming enterprise, *Chlorella* suspension was introduced, and by the beginning of August, the targeted weight of the fish (425 g) was achieved, reaching a yield of 1 ton/ha. In the control pond, these indicators were 300 g and 0.7 ton/ga, respectively.

Chlorella suspension was also utilized in feeding carp in fish farming enterprises. The experiment was conducted in two ponds. In the first pond, traditional feeding methods were applied, while in the second pond, feeding was supplemented with zooplankton and *Chlorella* suspension. After a 100-day cultivation period, the average weight reached 34 g in the first cage and 41 g in the second one. Consequently, the best growth results were obtained with the assistance of *Chlorella* suspension.

As of today, the practice of algalization with *Chlorella* in fish farming enterprises has been successfully utilized for several years, proving its effectiveness in the fish farming industry.

Currently, utilizing *Chlorella* cultivation technology significantly enhances the economic indicators of fish farming, improves the quality of fish products, reduces fish diseases, and advances the cultivation of blue-green algae. Utilizing our *Chlorella* cultivation technology provides substantial benefits, such as increasing the economic performance of fish production, improving the quality of fish

products, reducing the occurrence of fish diseases, and enhancing the cultivation of blue-green algae. It effectively combats disease-causing bacteria, fungi, and viruses in farmed fish.

Fish farming ponds are thoroughly rehabilitated with mineral compounds. This process ensures the complete revitalization of natural biota in fish ponds, enhancing the ecological environment. Moreover, it increases the dissolved oxygen content in the water by 40-50%.

1. The natural food base for fish enriched with phytoplankton.
2. Serving as food for zooplankton, it shapes the natural food base for carp, allowing supplementary feed to be reduced by 20-25%.
3. Fish productivity and immunity are significantly enhanced.
4. Through *Chlorella vulgaris*, you can achieve fish yields 35-50% higher, retaining 70% of the mineral nutrients.

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