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Advantages Of Using Bio-Floc Technology In Feeding Artemia

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Abstract. The article provides information on the use of biofloc technology, its advantages and the results achieved when artificially feeding brine shrimp in the laboratory of the Department of Fisheries.
Key words: artemia, bio-floc, cyst, nauplii, metanauplii, pre-adult, adult, heterobacteria.

Aquaculture is developing rapidly in the world, in 2020 more than 80 million tons of fish were produced worldwide. (FAO, 2020)[1].

The main growth is due to the development of intensive aquaculture, and the main problem in it remains feeding, because the catch of fish, which is the raw material for the production of fishmeal, which is the basis of feeds, has reached its maximum limit, so fish are especially important for fry. the search for other sources of protein is underway. As part of the decision No. 845 of October 18, 2017 "On measures to strengthen the feed base of livestock and fishery industries", artemia is considered the most high-quality and nutritious live feed object as an initial feed for fish fry. We have high possibilities of artemia cultivation in the brackish water areas of our Republic that are not suitable for cultivation. Because the optimal environment needed for the growth of artemia is heat, light and salt water. But in the artificial cultivation of artemia, the preparation of feed for artemia is one of the urgent issues. For Artemia feed, we tested the bio-floc technology in the laboratory of our institute.

In aquaculture, low water exchange often results in the formation of "suspended organic matter" in the water, a collection of organic matter called "floc" or "bio-floc". The main components are bacteria (mainly heterobacteria), solids, unicellular algae, filamentous algae and yeasts. Bio-floc benefits the artemia population by: 1) It promotes the growth of artemia due to its nutritional components, 2) It improves the quality of artemia, 3) It improves artemia water quality by removing toxins such as ammonia, nitrite, and bass. [8; 533–543-p].

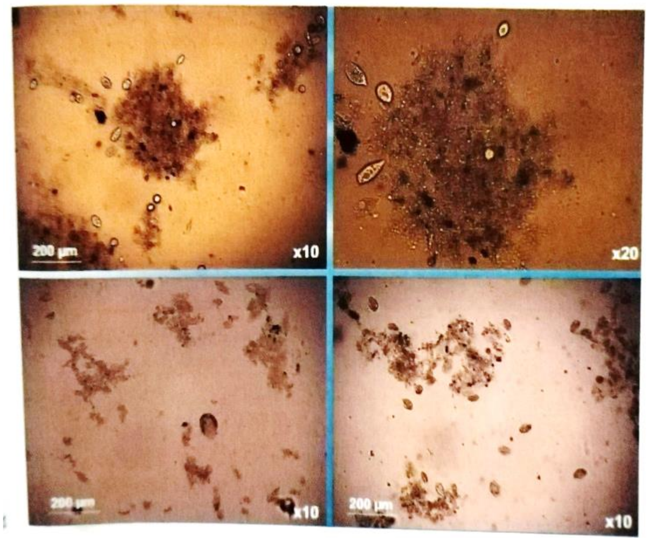
According to Emerenciano, bio-floc technology was first studied by French scientists in the early 1970s. [9; 447-457]

In the late 1980s and early 1990s, there were two different research groups: an Israeli research group (led by Avnimelech) and an American team (Waddell Mariculture Center led by Steve Hopkins) bio-floc on tilapia and whiteleg shrimp (Litopenaeus vannamei) began to study and develop technology. In 1988, bio-floc technology was used at the Sopomer seafood farm (Tahiti) in the production of white leg shrimp with a yield of 20-25 t/ha per year [5; 447–457]. Belizean seafood farms (Belize, Central America) also use this technology for white leg shrimp production and yield 11-26 t/ha/harvest.

Bio-floc helps eliminate pollution by converting nutrient sources in the aquatic environment into microbial biomass, while this biomass source can be used as an additional food source by shrimp and fish. Today, bio-floc technology (BFT) is widely used in small-scale greenhouse culture in many countries such as Asia, Latin America and Central America, the United States of America, South Korea, Brazil, Italy, and China. Avnimelech developed the bio-floc technique in aquaculture in 2006. The main principle behind the development of this system is to promote the development of heterobacteria in the bio-floc system [2; 172-178]

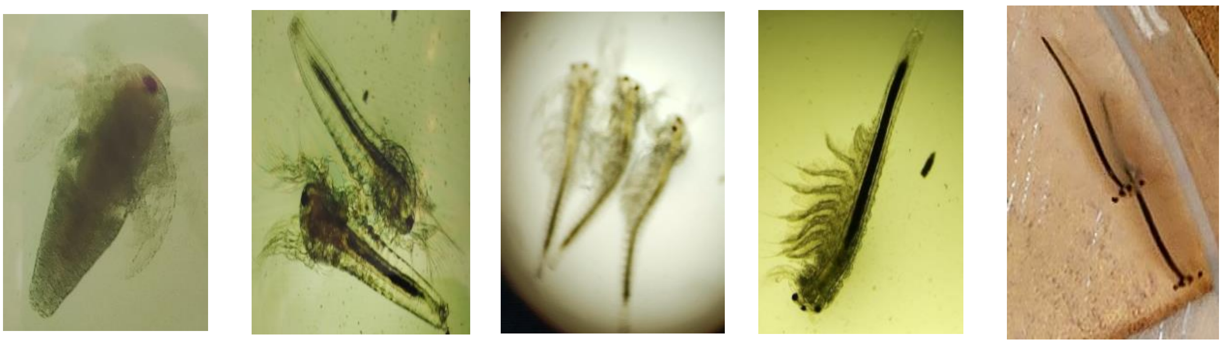
Methodology of preparation of bio-floc in the study of this scientific research work (Avnimelech,2009, 2-rasm) and was studied on the basis of the methods of determining important indicators for evaluating bio-floc [De Schryver va boshqalar.4; 125-137].

This type of product, which is being studied for the first time in our republic, was analyzed and studied for 20 days as food for artemia. In the conducted experiments, cysts of 1.8 g per 1 liter of SFB (Winchau) type of Vietnam were incubated in two samples (24 hours). The hatched nauplii were fed with licorice root bio-floc (2 rasm).



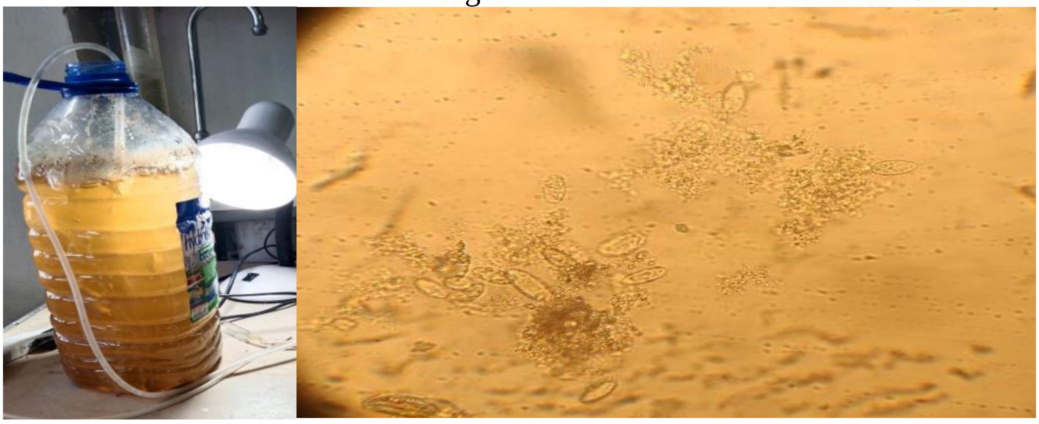
1-picture:Images of bio-floc under the microscope(Avnimelech,2009;1;P-182)

nauplius metanauplius Juvenile Preadult Adults



2-picture. Stages of development of Artemia fed on licorice root: nauplii, metanauplii, juvenile, preadult, adult. (It should be noted that the digestive organs of artemia are full of food at all stages)

Hari et al confirmed that the addition of carbohydrate to a tiger prawn culture system can increase the total amount of heterotrophic bacteria in the water and pond bottom[6; 248-263]. Some studies have shown that heterotrophic bacteria thrive when the C:N ratio in the medium is appropriate. Different authors express different opinions about the C:N ratio suitable for the growth of heterotrophic bacteria. For example, a C:N ratio of 5-5.5 shows that it helps the development of heterotrophic bacteria[7; 733-740-p]. Burford et al 2003 reported that increasing the C:N ratio can increase bacterial production in shrimp ponds[3; 393-411-p]. Ta Van Phuong et al (2014) investigated how to add organic carbon to a bio-floc system and also found that the addition of rice flour with a C:N ratio of 15:1 after 48 hours of incubation was good for bio-floc formation it was concluded that it gives results and good water environment and best shrimp growth was observed[10; 126-127]. In our experiment, we used bio-floc for artemia by aerating licorice root for 24-48 hours to stimulate the growth of microscopic organisms in the water and tried it for the first time in feeding artemia. The results were excellent, the bio-floc organisms adapted to the mouth structure of artemia at all stages and the artemia fed and thrived.



3-picture. Experiment conducted on Bio-floc technology at the Animal Ecology Laboratory of the Karakalpakstan Department of the Academy of Sciences of the Republic of Uzbekistan

Artemia is a natural filter feeder, but feeds on nutrients smaller than 50 µm in diameter. Naturally, in the biofloc we examine organisms with a diameter of less than 50 µm, which corresponds to the mouth structure of Artemia. We prepared bio-floc with chicken waste and N:P in a ratio of 3:1. According to the results, algae on which Artemia can feed on the biofloc developed and biofloc was formed. When the composition of the prepared biofloc was examined using a microscope, it was found that it contained single-celled algae such as Navicula sp, Chaetoceros sp, Cyclotella sp. The size of the detected algae is suitable for feeding Artemia (3picture). On the basis of the prepared biofloc, Vietnamese artemia and Artemia parthonegetica of the Big Aral Sea were fed. Motility activity was observed when feeding Artemia.

Bio-floc technology was studied in the Fisheries Laboratory of Karakalpakstan Institute of Agriculture and Agro-Technology in order to prepare feed for growing artemia in laboratory conditions (3picture). Bio-floc was prepared from the remains of the licorice plant root and was fed with live artemia species SFB(Winchau) for 20 days. (2picture).

4-picture. Bio-floc technology (The experiment conducted in the Fisheries Laboratory of the Karakalpakstan Institute of Agriculture and Agro-Technology)

We can conclude that the artemia species SFB(Winchau) of Vietnam was fed with bio-floc prepared from licorice root residues for 20 days under laboratory conditions. Licorice root was incubated for 24-48 hours. Artemias were actively developing in a nutrient-sufficient environment, but due to lack of heat and light, reproductive development and mating took place late in 18-20 days. (2-picture).

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