The Scientific Basis for the Development of Non-Conventional Food Products and Compounds

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Abstract:

The production of forage based on foraging insects provides the fishing industry with a source of uninterrupted, complete nutritional value. It also allows the cultivation of these insect species using ryaska and azolla macrophytes, which can be easily propagated.

Keywords: Forage insects, livestock, fisheries, Tenebrio molitor, macrophyte, ryaska, azolla.

In our country, too, there are problems in providing the livestock and fisheries sectors with a complete ration of food. As a result, in order to strengthen the food base of the rapidly growing livestock and fisheries sector in recent years, additional land for the cultivation of grain and 64,600 tons of grain per year from state resources. causes the amount of

Therefore, one of the most pressing issues is the production of non-traditional food products that are convenient to produce, inexpensive and rich in all the necessary ingredients.

Insects are the largest species species in the animal kingdom and a group that exhibits biodiversity and produces a large amount of biomass in nature [Chakravorty, et al., 2011]. According to Erwin's scientific hypothesis, there are more than eighty million species of insects, of which only about one million are known [Erwin, 2004]. According to Grimaldi's description, known species of insects make up only 20% of all insect species in nature [Grimaldi, 2005]. It is estimated that 58% of the biodiversity in nature is currently known to science [Footit & Adler, 2009]. It is estimated that 2,086 species of insects are consumed by people belonging to 3,071 ethnic groups worldwide [Ramos-Elorduy, 2006]. DeFoliart (1989, 1990) reported that in tropical and subtropical regions of Africa and the world, there is a food insect market in almost all cities and villages, and in these areas the food insect-based commercial network has developed as one of the main sectors of the economy.

According to Ruddle (1973), even in the advanced age of modern science, it is not possible to accurately calculate the species and numbers of food insects. It is only recently that in many countries, food insects have come to be considered as unconventional sources of protein or food.

Premalatha and colleagues (2011) estimate that billions of dollars a year are spent on exterminating insects that store up to 75% of high-quality protein in order to protect wheat, which has a protein content of only 14% worldwide, from insects. sadly. However, according to historical sources, the purposeful reproduction and use of insects by humans appeared 7,000 years ago [Laos, 2010].

Protein retention depending on the stage of development of the insect species [15]

Type of insect	Developmental stage	Protein storage, %
Coleoptera	Beetle and larva	23 – 66
Lepidoptera	Mushrooms and larvae	14 – 68
Hemiptera	Beetles and larvae	42 – 74
Homoptera	Beetles, larvae, eggs	45 – 57
Hymenoptera	Beetles, larvae, eggs	13 – 77

This can be seen in the example of cocoon worms and bees, which have been used by humans for thousands of years, or in 1936, when the first insects were bred on an industrial basis. An insect-based industrial network can be created if the insect-based industry is considered to be the main source of food for livestock, poultry and fisheries.

At present, industrial production based on several species of insects has been established worldwide. This can be explained by the fact that there is currently insufficient demand for these non-traditional sources, or that people are over-adapted to the traditional sources used in practice [Sanchez-Muros et al., 2014].

Some of the food insects used in fish farming nutritional values [3]

Get up and Latin name	**General name**	**The type of fish tested**	**Another extract substances**	**Crude protein**
			(in relation to dry matter %)	
Orthoptera				
Zonocerus variegatus	Variegated grasshopper	Afrika laqqasi	6,87	61,50
Acheta domesticus	House cricket	Sayyoh laqqa	8,5±3,1	57,3±11,8
Locusta migratoria	Migratory locust	Nil tilapiyasi		
Isoptera				
Macrotermes spp.	Termites	Vundi laqqasi, Afrika laqqasi	28,2	20,4
Lepidoptera				
Bombyx mori	Domesticate d silkworm	Sayyoh, Vundi va Afrika laqqasi	25,7±9,0	60,7±7,0
Diptera				
Hermetia illlucens	Black soldier fly	Tishli laqqa, kamalak rangli forel, atlantika lasos, oq tangachali paltus	15,6±0,1	40,7±0,4
Coleoptera				
Tenebreo molitor	Yellow mealworm	Afrika laqqasi, Sayyoh laqqasi, do‘ng peshona, Yevropa okuni, kamalak rangli forel	30,1±0,7	58,4±0,4
Zophabas morio	Superworm	Nil telapiyasi	38,0±0,3	58,4±0,4

Based on the above scientific data, the production of high-nutritional protein products with high nutritional value, replacing wheat, soybean and fish meal, which are widely used in animal husbandry, poultry and fisheries, on the basis of food insects. can be set up.

Therefore, it is important to select food species according to their nutritional value, to develop and implement technology for their industrial cultivation. A full scientific and practical substantiation of these issues will allow in the future to provide the livestock and fisheries sectors with low-cost, convenient production process, independent of abiotic and biotic factors and high nutritional value. .

Insect-based protein products are one of the most important and competitive alternative sources of animal protein substitutes. Their ability to consume nutrients with very low water requirements, to feed on organic waste products of any composition, and to be included in the category of cold-blooded animals allow them to organize their reproduction indefinitely.

However, there are a number of issues to be addressed in the production and implementation of feed baits and additives from edible insect species in the local context, including their cultivation, production, processing, storage, distribution of finished products, and market marketing. there is a need to establish special infrastructure. It is also necessary to develop regulations that require them to be used as feed and supplements. The scientific team of the Tashkent Institute of Chemical Technology, the Department of Biotechnology and the Department of Biology of the Kokand State Pedagogical Institute have shown the properties of protein synthesis in the reproduction of Tenebrio molitor on the basis of macrophytes.

The production of forage on the basis of forage insects will provide a fast-growing fishing industry in Uzbekistan with a source of uninterrupted, complete nutritional value. Cultivation of these insect species using ryaska and azolla macrophytes, which can be easily propagated, can reduce their cost and increase their nutritional value.

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