



A Study on the Preparation of Fish Amino Acid (Faa) From Fish Waste of (Channa Striata) (Preparation of Organic Fertilizer from Fish Waste)

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Abstract

Fish processing produces a large amount of waste such as fish heads, bones, scales, skin, fins, and internal organs. If this waste is thrown away without proper treatment, it can cause environmental pollution and bad smell. Instead of wasting these materials, they can be used to prepare useful products. This study also showed that fish waste can be converted into a useful product instead of being thrown away. Using Fish Amino Acid helps reduce environmental pollution and decreases the use of chemical fertilizers. It is a simple, eco-friendly, and sustainable method that benefits both agriculture and the fisheries sector. This Fish Amino Acid (FAA) can improve soil fertility, enhance crop productivity and contribute to sustainable agricultural development. The study demonstrates that Fish Amino Acid is an effective alternative to chemical fertilizers. The main purpose of this project is to utilize fish waste effectively, reduce environmental pollution, and produce a low-cost and eco-friendly fertilizer. The application of FAA can improve plant growth by supplying organic nutrients and supporting healthy root and shoot development. Thus, Fish Amino Acid is a simple and sustainable way of recycling fish waste while promoting the use of organic fertilizers in agriculture.

Key words: Fish amino acid, Channa striata, jaggery, NaOH, Nitric acid, Distilled water.

Introduction

Generally, fish waste is rich in Amino acids, minerals, vitamins and oils it also contains organic nutrients these may help in growth of plants/Agriculture ways, but mostly of the industries, fish markets are dumping the waste without proper treatment because of this it may cause environmental Pollution. The best way to stop this activity is use the fish waste for the preparation of Biofertilizers like Amino acid (FAA), this is an organic liquid fertilizer widely used in natural farming practices this fertilizer is purely harmless to the plants and it enhances the growth of the plants and Inbuilt the strength to the roots and also helps in high yield production this fertilizer prepared from the fish waste and jaggery without using any chemicals in this. This may contains lack of micro and macronutrients helps in growth. The fish waste can also be converted as solid organic fertilizer (or) compost this can helps in Fertile the soil and also helps in crop productivity and this (FAA) fertilizer is eco-friendly and low cost and this fertilizer is harmless to the plant and crop this can also reduce the improper dumping of fish waste.



Fish Amino Acid plays a vital role in the crop growth and production and also helps in plant metabolism this helps the root and develops the strength of the root and also resist against the stress and promotes the healthy crop yield the preparation of this fertilizer is very simple process can also easily prepare in the house also without using any chemicals because of already the fish waste is rich in proteins and vitamins which helps in enhancing the growth of crop. Pusphakumari, W.H.D.U; Hisanithy P, & Wijesundara, A (2026) utilization of fish waste extraction as organic fertilizer for crop growth and yield improvement A review Ceylon journal of science ,55(1).

Fish Amino Acid (FAA) contains essential nutrients such as Nitrogen, calcium, phosphorus, potassium which helps in plant growth perfectly and it also rich in beneficial enzymes that promotes the microbial activity in the soil and (FAA) reduces the dependence on synthetic fertilizers and supports the sustainable agriculture, not only the liquid fertilizer from this fish waste we can also prepare the compost, in this compost preparation microorganism such as bacteria and fungi plays a vital role these organisms decomposes the waste into stable organic manure this helps for the soil fertility, and this compost mostly used for the vegetative plants and this compost improves the soil texture and water holding capacity and the growth of good bacteria and also enhances the nutrients availability almost all it reduces the cause of environmental pollution. There are many advantages are there in the preparation of (FAA) some of them are, Usually the fish waste is discarded as useless materials but the conversion into fertilizer creates the value added products and additional income opportunities and business opportunities and these are cheaper than the chemical fertilizers and this is budget friendly to the farmers, this can also help in reducing the disposal of the waste, some of the chemical fertilizers may create improper growth of the plant /crop and hardening the soil but this organic fertilizer may improve the soil fertility and promotes the growth because of (FAA) contains soil friendly Nitrogen, phosphorus, potassium and also good bacteria but before using this fertilizer to the crop or plant dilute the fertilizer with the water and use it in a proper way because of it contains lack of vitamins and minerals.

Amino acids are organic compounds these are main fundamental building blocks of proteins, these involve in every biological process these help in tissue repair of the plant and play an important role in every part of the plant body because of amino acids boost up the immunity and metabolism of the plants and this can also help in protein synthesis and helps in the enzyme formation and chlorophyll production, nutrition transport, stress resistance, and metabolic activities. Sometimes plant can synthesize the amino acids naturally through the metabolic pathways using nutrients from the soil and nitrogen absorbed by the plants in the form of nitrate (or) ammonium these converted into amino acids through the help of enzymatic reactions these may help in the production of proteins and other important compounds. The major function of amino acids is protein synthesis because proteins are very necessary for the formation of plant tissue, hormones and enzymes, during the plant growth plant produce new cells for the leaves, fruit development in this process the amino acid combine with different sequence and form the proteins, these proteins may regulate the enzyme production this leads to help in photosynthesis, respiration, nutrient absorption and energy. Wang ZH. Amino acids can promote rooting of cuttings. Chinese flowers bonsai 1988(1):13.

MATERIALS & METHODS

In this project the fish waste taken from the *Channa striata*, *Channa striata* commonly known as the striped snakehead or snakehead murrel is a predatory, freshwater fish this is native to South and Southeast Asia. This fish contains long cylindrical body with a broad flattened head resembling a snake with dark brown or black body with irregular stripes or blotches and also having large mouth with sharp teeth and having long dorsal and anal fins extending towards the tail and this fish prefers freshwater habitats with slow moving or stagnant water it can survive in low oxygen conditions because it has a special air breathing organ it is a carnivorous fish it feeds on small fish, frogs, insects, crustaceans, worms, average length of the fish is 30-60cm the maximum length about 100cm and the weight is up to 5kg under favorable conditions and this *Channa striata* and this widely cultured in freshwater aquaculture because of its fast growth, high survival rate, and excellent consumer demand. It can also culture in ponds, cages, tanks, and integrated farming systems

Fresh fish waste is collected from the nearest market iced fish wastage is not used because it will damage the concentration of Fish Amino Acid. The collected wastage was kept away from the contamination of any other things like plastic covers or any other waste materials, small size fish species are also used directly in the process because they contain high amount of protein and nutrients mostly fish intestine, gills and fins which are easily degradable



IUCN STATUS; LC	
Kingdom	Animalia
Phylum	Chordata
Class	Teleostei
Family	Channidae
Genus	Channa
Species	<i>C. striata</i>

Cleaning and chopping

First chopped the large fish parts into small using knife because small particles help in fast fermentation and decomposition

Mixing with jaggery

Collected fish waste and jaggery are mixed in equal ratios

1kg fish waste

1kg jaggery

Jaggery supports for the fermentation and mixed the mixture thoroughly until the fish pieces are dipped into the jaggery

Fermentation process

The prepared mixture is transferred into a clean plastic container but the container is not be filled completely 40% of the space is leaved for the gas formation during the fermentation and covered the plastic container with loosely fitted lid to allow the air and placed the container in a cool and shaded place to avoid from direct sunlight

Fermentation period

Observed that initial fermentation started within 5 days and the complete fermentation takes place around 30 days nearly one month for complete fermentation. During the fermentation the proteins in fish waste are broken down into amino acids and help in good bacteria grows rapidly and the mixture must should be stirred once in a week using a clean wooden stick

Filtration process

After completion of the fermentation the mixture appears a dark brown liquid with an odor and the liquid has separated using a mesh and transferred that liquid into a clean plastic container. After filtration the remaining waste used as compost for the plants

Test of amino acid (Xanthoproteic test)

Collected the 1ml sample of Fish Amino Acid in a clean test tube after that the sample diluted with 1ml of distilled water and mixed it well after this process in that test tube carefully added 1ml of concentrated nitric acid along one side of the test tube and heated the mixture gently in a double boiling method for 1-2 minutes after this process allowed the test tube to get cool and slowly added excess of NaOH solution drop wisely after few seconds the color changed. After the adding of nitric acid the color changed into yellow again the color changed into orange after adding the alkali. The appearance of yellow to orange color indicates the presence of aromatic amino acids mainly tyrosine and possible phenylalanine in the Fish Amino Acid sample. This xanthoproteic test showed a positive reaction confirming the presence of aromatic Amino

Acid in the Fish Amino Acid fertilizer

Method of application

Before applying (FAA) to the plants the fertilizer must be diluted with the water because high concentrated solution may damage the plants 1-2 ml of Fish Amino Acid (FAA) per liter of water for foliar spray 5-10 ml of Fish Amino Acid (FAA) per liter for soil application



Fish waste



jaggery



Mixing of fish waste with jaggery



Fermented liquid



fish amino acid



Plant with FAA



Plant without FAA

RESULT

The fermentation process is successfully converted fish waste into a nutrient rich liquid and the (FAA) Fish Amino Acid acted as an effective organic fertilizer and this Fish Amino Acid enhancing the growth of plants increasing the soil fertility and also help in microbial growth and some of the studies indicate that (FAA) Fish Amino Acid contains high levels of nitrogen, amino acids, vitamins, enzymes, calcium, phosphorus and trace elements beneficial for plant growth and (FAA) Fish Amino Acid showed better growth performance, healthy leaves and improved vigor compared to control plants. This project proved that fish waste can be utilized efficiently instead of being discarded as environmental waste one of the major advantages of (FAA) Fish Amino Acid is its contribution to sustainable agriculture and this project



promotes recycling of organic waste materials and supports long term agricultural productivity and also supports the principles of circular economy This project also highlighted the importance microbial fermentation in converting organic waste into useful agricultural products from this project we also learned that jaggery not only reduces the foul odor but also enhancing the microbial growth and fermentation efficiency many of farmers using (FAA) Fish Amino Acid in vegetable crops ,fruit plants and cereals these absorbed vigorous growth and improved crop health and another result of (FAA) Fish Amino Acid application is improved resistance of plants to stress conditions plants treated with (FAA) Fish Amino Acid are often more tolerant to drought temperature fluctuations and certain diseases and this reducing the need for chemical pesticides and the amino acids stimulates plant growth and development by improving the production of auxin and chlorophyll, increasing germination rate and water assimilation.

CONCLUSION

The preparation of Fish Amino Acid from the fish waste is an effective method of producing an organic fertilizers with multiple agricultural and environmental benefits and the conversion of this fish waste into a nutrient rich fertilizer with more value added nutrient make the growth of the plant and this is an effective economical and environmentally friendly method that supports sustainable agriculture this fish waste converted into a valuable agricultural input through the simple fermentation techniques and this amino acid proves that this works as a natural growth promoter for the plants and also nutrient source for the crops this fish amino acid is an excellent alternative for the chemical fertilizers and this is budget friendly to the farmers and this helps in soil moisture retention capacity and long term productivity without causing harmful side effects to the plants.

The use of this (FAA) Fish Amino Acid organic fertilizer contributes to sustainable farming practice and ecological balance and one of the most beneficial things is this can store for months without spoilage and this fertilizer can also increase the microbial activity enhancing the organic matter content in the soil

This (FAA) Fish Amino Acid contains readily available nitrogen which is very important for the vegetative growth leaf development and protein synthesis in plants this reduces the dependence on costly commercial fertilizers and decreases overall cultivation expenses especially small scale and marginal farmers

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