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Formulation Of Fish Feed Using Vermi Wash Fish Pellets Prepared From Recycled Kitchen Organic Waste And Feed Tilapia (Oreochromis Mossambicus) To Increase Fish Growth Under Controlled Condition.

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Abstract

Fish farming is hailed by some as a solution to the overfishing problem. However, these farms are far from benign and can severely damage ecosystems by introducing diseases, pollutants and invasive species. The damage caused by fish farms varies, depending on the type of fish, how it is raised and fed, the size of the production, and where the farm is located. analyzing the nutrient quality and improve in future and further research of our vermi wash fish pellets we can make informed decisions about using it as a soil amendment and fertilizer to support healthy fish growth and improve fish production in our indoor rearing center and ornamental fish rearing center.

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KEYWORD: Eisenia foetida, vermicompost, vermi wash, nutrient-rich compost, Vermiwash pellets, *Tilapia fish.*

INTRODUCTION

Today, about half the fish consumed globally are raised in these artificial environments. Commonly farmed species include salmon, tuna, cod, trout and halibut. These "aquafarms" can take the form of mesh cages submerged in natural bodies of water, or concrete enclosures on land. Fish farming is hailed by some as a solution to the overfishing problem. However, these farms are far from benign and can severely damage ecosystems by introducing diseases, pollutants and invasive species. The damage caused by fish farms varies, depending on the type of fish, how it is raised and fed, the size of the production, and where the farm is located. One significant issue is that—rather than easing the impact on wild populations—the farms often depend on wild fish species lower on the food chain, like anchovies, in order to feed the larger, carnivorous farmed species. Overfishing of these smaller "forage" fish has repercussions throughout the ocean ecosystem. The case with industrial animal farms on land, the fish is often housed in unnaturally crowded and cramped conditions with little room to move. Fish may suffer from lesions, fin damage and other debilitating injuries. The use of antibiotics can create drug-resistant strains of diseases that can harm wildlife populations and even humans that eat the farmed fish escaped fish introduce yet another threat into the environment. Each year, hundreds of thousands of fish escape farms and threaten the genetic diversity and survival of native species. High stocking densities result in a significant amount of pollution from fish excrement and uneaten food, which in turn lead to poor water quality high in ammonia and low in oxygen. Outdoor fish farms can also attract predatory marine animals, such as sea birds and sea lions. Slaughter methods in the aquaculture industry are appalling. Little to no attention is given to the suffering of the animals and most are fully conscious during slaughter, which can take many minutes. Fish are most often not stunned and are killed by bleeding out, being hit on the head repeatedly, suffocating or freezing. They are then kept in sea farms for 3–6 months and fattened with thousands of pounds of smaller wild-caught fish before being killed and exported. The Bhavani River originates from Nilgiri hills of Eastern Ghats. Bhavani River is one of the important longest tributaries of Cauvery River. Lower Bhavani River Basin extends between 11.24°N and 11.72°N latitude and 77.00°E and 77.68°E longitude with total geographical areas of 2243 sq km. Variety of fish feeds need energy to maintain basic metabolic activities and to support growth, reproduction, activity and health. Proteins, carbohydrates and lipids provide this energy and also some essential nutrients, micro nutrients cannot calories but also required for good performance. Fishes were collected using a cast net and dragnet from the stream and river. The present research work, one such organic fertilizers “Vermi wash” has been tested for the production of live fish food organisms. Vermi wash is an indispensable part of vermicompost, which is a watery extract of earthworms. It is basically a combination of secretion and wash of earthworms, present in the medium, honey brown in color. It is a nutrient rich liquid produced by earthworms, feeding on organic waste material and plants residues. It is also nontoxic and ecofriendly, which arrests bacterial growth and forms as a protective layer for their survival and growth. Vermi wash contains N, P, K, Ca and hormones such as auxin, cytokinin, some other secretions and many useful microbes like heterotrophic bacteria, fungi etc. The quality of “Vermi wash” produced by earthworms depends on the vermicompost that is used. In natural system, earthworms along with soil microorganisms degrade organic waste material of soil and thus maintain nutrient flux and act as excellent biological agents for recovery of “Vermi wash” and vermi protein for wide use in Agro-ecosystem, aquaculture and poultry. The coelomic fluid of earthworm is called as “Vermi wash”. Decomposition is the natural process of biological degradation and composting is the process of sanitary disposal and reclamation of organic material is termed as composting (Abbasi, S. A., 2001). The compost prepared from organic materials using earthworms is a low cost and ecofriendly technology called vermicomposting. The fine granular peat-like end product, vermicompost that is produced contains higher levels of nitrogen, phosphorus, and potassium (NPK) in available form, micronutrients, microflora, enzymes, and growth regulators. Earthworm species such as Eisenia foetida, Perionyx excavates and Eudrilus Eugenia are easily adaptable to agricultural wastes like after harvesting scribbles, sugarcane thrash, coir waste, paper pulp, fecal matter of cow, sheep, horse, activated sludge and biogas sludge of poultry droppings. The break-down of these materials or the degrades organic matter by a worm activity is called the “vermicompost”. The process of producing vermicompost is called ‘vermicomposting’ (Bhatnagar & Palta, 1996).

MATERIALS AND METHODS

Collection of kitchen waste:

Collecting kitchen waste for composting is an important step in the process of turning your organic kitchen vegetables wastes into nutrient-rich compost. Here's how you can effectively collect and store kitchen vegetable wastes for composting to Start by designating a container or bin specifically for collecting kitchen waste. This container can be kept on your kitchen countertop, under the sink, or in a convenient location. To use the right container, have several options for containers, such as a plastic or metal compost pail with a lid, a lidded bucket, or even a DIY container. The key is to have a container with a secure lid to prevent odors and pests.to Collect a variety of kitchen vegetable waste and including fruit wastes and vegetable peels, coffee grounds, tea bags, eggshells, and non-oily leftovers. Do not include meat, dairy, and heavily seasoned or oily items, as these can attract pests and slow down the composting process. Cut or break large scraps into smaller pieces this helps speed up decomposition. Keep a small container for food scraps in your kitchen and empty it into the larger collection bin regularly. Line the container with newspaper, paper bags, or compostable liners to make it easier to empty and clean. Empty our kitchen waste container into your composting system (vermicomposting bin, outdoor compost pile, or compost tumbler) regularly to avoid odors and fruit flies. To maintenance Clean your kitchen waste container regularly to prevent odors and pests. with warm soapy water or use vinegar to neutralize odors and Store in a Cool Place store it in a cool place to minimize odors and slow down decomposition. Educate Household Members Ensure that everyone in your household knows what can and cannot be added to the kitchen waste collection container. Proper sorting is crucial for efficient composting. A Separate Bin for Non-Compostables have a separate container for items that cannot be composted, like plastic or other non-biodegradable waste. Finally labeling have multiple bins or containers for waste separation, labeling them with "compost," "recycle," and "landfill" can help ensure proper disposal.

Figure 1**:COLLECTION OF KITCHEN WASTE AND PREPRATION OF VERMI SOIL**

CONSTRUCTION OF VERMIOMPOSTING CONTAINER AND VERMI WASH FILTERING PLANT

Constructing a vermicomposting pit house yard area is a great way to recycle kitchen waste and create nutrient-rich Vermi wash for garden build a vermicomposting pit at home Shovel, Bricks or concrete blocks, Wooden or plastic boards, Mesh or fine wire mesh, Gravel or small stones, Worms (Red Wiggler worms, Eisenia fetida), Bedding material (shredded newspaper, cardboard, coconut coir), Kitchen waste Choose a Location Select a suitable location for your vermicomposting pit. It should be well-drained, receive partial shade, and be easily accessible for adding kitchen waste and harvesting vermicompost. Excavation Dig a hole in the ground. The size will depend on household's composting needs, but a common size is about 3 feet by 3 feet and 2-3 feet deep. Prepare the Base add a layer of gravel or small stones to the bottom of the pit to imp rove drainage and prevent waterlogging. Build the Walls Use bricks or concrete blocks to construct the walls around the pit. Leave space between them to allow airflow. Create a Lid Build a lid or cover for pit using wooden or plastic boards. This lid will help control moisture and temperature inside the pit hinge it for easy access. Install a Drainage System receives heavy rainfall, consider installing a drainage system, such as a PVC pipe with holes, at the bottom of the pit to prevent waterlogging. Add a Mesh Barrier Place a fine wire mesh or hardware cloth over the gravel to keep the worms from escaping into the soil while allowing them to move between the pit and the soil below Create Bedding Fill the pit with a bedding material, such as shredded newspaper, kitchen vegetable remains, or coconut coir. Dampen the bedding material, so it is moist but not soggy, add Worms Introduce red wiggler worms into the bedding material. Start with a population of worms appropriate for your kitchen waste production. Feed the Worms Begin adding kitchen waste to the pit. Bury the scraps in the bedding material. Worms will consume the waste and turn it into nutrient-rich vermicompost. Maintain the Pit Regularly monitor and maintain the vermicomposting pit. Ensure it remains moist, but not waterlogged. Adjust bedding and temperature as needed. Turn the contents periodically harvest Vermicompost When the bedding material is fully converted into vermicompost, usually in a few months to a year, can harvest it. Move the compost to one side of the pit and add fresh bedding and food scraps to the other side. Worms will migrate to the new food source, making it easier to collect the compost. Vermicomposting pits are a convenient and eco-friendly way to manage kitchen waste and produce valuable compost for garden and use extracted vermi wash (Figure 2).

Figure 2: VERMI WASH FILTERING METHOD

PREPARATION OF VERMIWASH PELLATES FROM RECYCLED WITH VERMI WASH

Verm wash extract prepared from recycle kitchen waste is an environmentally friendly way to create nutrient-rich fish pellets for fish growth. It involves using dry kitchen waste powder from to break down kitchen organic materials, such as kitchen vegetables and fruits scraps, into nutrient-rich and fertile compost called kitchen waste dry with suitable place with mild sun light sources area. Dried kitchen waste to collect and make a powder from flour mill. The powder gathers Supplies Worm Bin, a container or bin. Harvest the Vermi wash from composting process can take a few months to a year, depending on conditions. When the Vermi wash looks dark, brown fluid and has a rich, earthy smell, it's ready for making fish pellets. Push the finished Vermi wash to one side of the bin and add fresh bedding and kitchen scraps to the other side. Over time, more nutrients new food source, making it easier to collect the Vermi wash. Use Vermi wash as a nutrient-rich fish pellets amendment in your fish fed or for fish growing tank. It's an excellent nutrient and growth promotor. Vermi wash is an excellent way to reduce kitchen waste, enrich fish growth, and minimize your ecological solid waste recycled method. It's a sustainable and eco-friendly approach to managing organic waste from kitchen.

Figure-3: PREPARATION OF VERMIWASH PELLATES FROM RECYCLED VERMI WASH

NUTRITION QUALITY OF VERMIWASH FISH PELLATES AND STUDY OF MINERALS CONTENT.

Analyzing the nutrition quality of vermi wash fish pellets is essential to determine its suitability as a soil amendment and fertilizer for your plants. The nutrient content of vermi wash fish pellets can vary depending on the feedstock used and the conditions of the vermicomposting process. To analyze the nutrition quality of Vermi wash fish pellets by Sampling: Take a representative sample of vermi wash fish pellets. This sample should be collected from different parts of your vermi wash fish pellets preparatory system to account for any variations. vermi wash fish pellets Preparation by remove any large debris, worms, and undecomposed materials from the sample. Laboratory Testing for a comprehensive analysis of the nutrient content, send vermi wash fish pellets to a certified testing laboratory. They can conduct various tests to determine the nutrient levels, pH, and other important properties. These tests can include: Total Nitrogen (N), Phosphorus (P), Potassium (K), Calcium (Ca), Magnesium (Mg), Sulfur (S), Micronutrients (e.g., iron, manganese, zinc, copper), Organic Matter Content level, Electrical Conductivity (EC) for salinity and Interpretation the review the laboratory results to understand the nutrient content of vermi wash fish pellets are The composition of commonly available nutrients in vermicompost is as follows: Organic carbon 9.5–17.98%, Nitrogen 0.5–1.50%, Phosphorous 0.1–0.30%, Potassium 0.15–0.56%, Sodium 0.06–0.30%, Calcium and Magnesium

22.67–47.60 meq/100 g, Copper 2–9.50 mg/kg, Iron 2–9.30 mg/kg, Zinc 5.70–11.50 mg/kg, Sulfur 128–548 mg/kg. This will help you determine its suitability for different types of fishes and whether any additional fish verities are required. Adjusting Application Rates Use the nutrient analysis to calculate the appropriate application rates of vermi wash fish pellets for your fish culture. Different fishes have varying nutrient requirements, so you may need to adjust the quantity you use. Records to Keep a record of the nutrient analysis results and your fish growth rates. This will help you make informed decisions about managing your fish culture farms.

RESULT AND ANALYSIS

Periodically retest your vermi wash fish pellets to ensure that the nutrient content remains consistent. This is particularly important change the feedstock fish conditions of our breeding system. It's important to note that vermicompost is typically rich in organic matter, beneficial microorganisms, and humic substances, which can improve soil structure, water-holding capacity, and microbial activity. These qualities are often just as valuable as the macronutrients (N, P, K) and micronutrients in the fish rearing food named vermi wash fish pellets like Organic Matter-46-50%,Nitrogen- (N)2-3%,Phosphorus-(P)-0.5-1.5%, Potassium (K)-1-2%,Calcium-(Ca)1-2%,Magnesium-(Mg)-0.3-0.6%,Sulfur(S)-0.10.3%,Iron(Fe)-600-3,000ppm(partspermillion),Manganese(Mn)-300-ppmZinc(Zn)-11-300ppm,Copper(Cu)-11-70ppmp,pH-6.5-8.0 (typically neutral),C:N Ratio15:1 25:1 (indicating good decomposition) presentation Table:1.We analyzing the nutrient quality and improve in future and further research of our vermi wash fish pellets we can make informed decisions about using it as a soil amendment and fertilizer to support healthy fish growth and improve fish production in our indoor rearing center and ornamental fish rearing center.

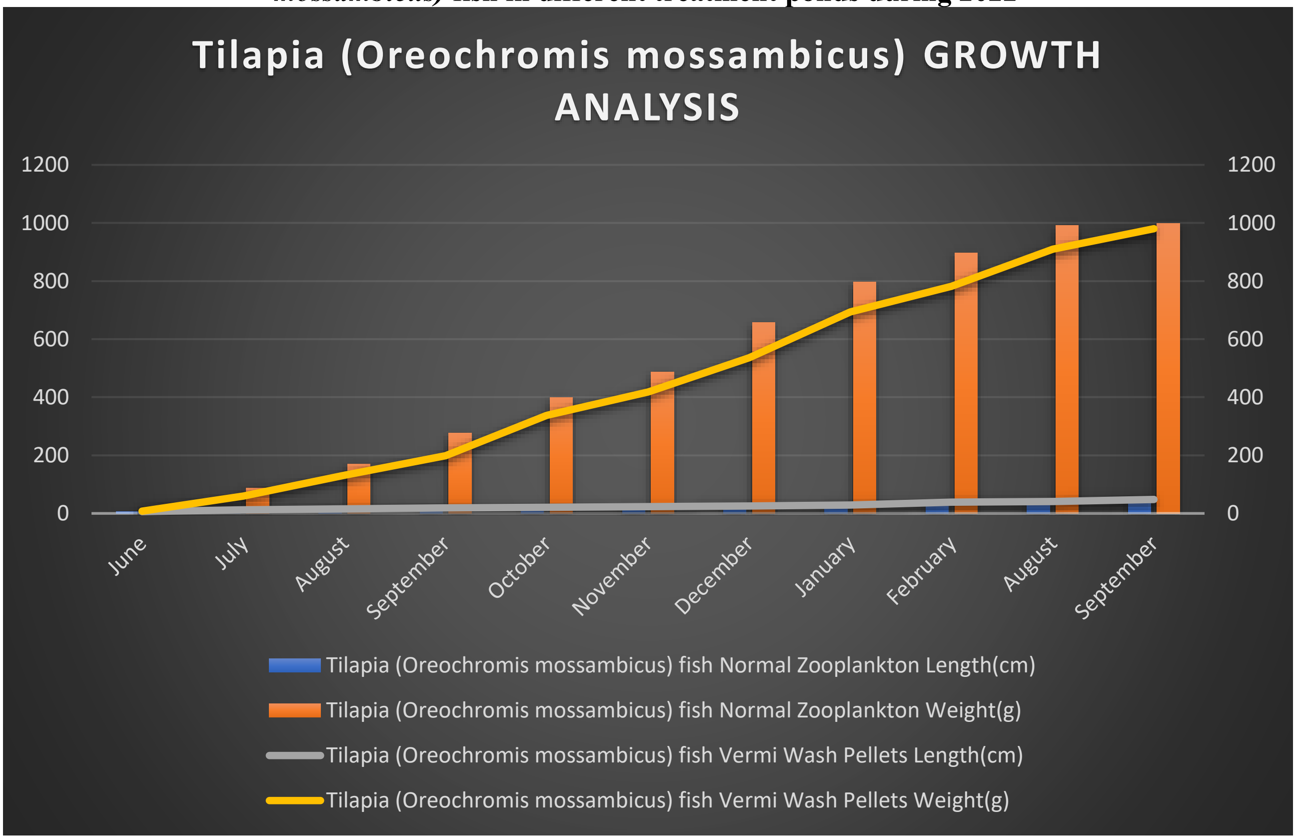
Table: 1. NUTRIENT CONTENT OF VERMI WASH PELLETS

S.no	Name of the Nutrients	% of Nutrients
1	Organic Matter	46-50%
2	Nitrogen (N)	2-3%
3	Phosphorus (P)	0.5-1.5%
4	Potassium (K)	1-2%
5	Calcium (Ca)	1-2%
6	Magnesium (Mg)	0.3-0.6%
7	Sulfur (S)	0.1-0.3%
8	Iron (Fe)	600-3,000 ppm (parts per million)
9	Manganese (Mn)	300-900 ppm
10	Zinc (Zn)	11-300 ppm
11	Copper (Cu)	11-70 ppm
12	pH	6.5-8.0 (typically neutral)
13	C: N Ratio	15:1 to 25:1 (indicating good decomposition)

Table: 2: MONTHLY INCREASE IN FISH BODY LENGTH(CM) AND BODY WEIGHT(G) OF *Tilapia (Oreochromis mossambicus) FISH* IN DIFFERENT TREATMENT PONDS DURING 2022-2023.

Tilapia (Oreochromis mossambicus) fish				
Period (Months)	Normal Zooplankton		Vermi Wash Pellets	
	Length(cm)	Weight(g)	Length(cm)	Weight(g)
June	6.2	7.8	6.2	7.8
July	13.2	86.8	12.1	59.8
August	17.1	169.4	16.0	131.2
September	19.9	277.1	18.9	198.9
October	22.7	399.8	20.6	337.5
November	24.9	487.6	23.4	418.6
December	26.8	658.3	25.9	536.1
January	29.8	797.5	29.0	693.7
February	31.7	897.2	38.6	781.9
August	37.0	992.3	41.2	909.3
September	41.1	998.1	48.1	980.2

GRAPH 1: Monthly increase in fish body length(cm) and body weight(g) of *Tilapia (Oreochromis mossambicus)* fish in different treatment ponds during 2022



SUMMERY AND CONCLUTION

This review elaborates various mechanisms involved in vermin wash promotion and the mitigation of biotic and abiotic stresses using vermicompost and its derivatives. The application of Verm wash fish pellets enhances fish health and high protein productivity due to improved nutrient uptake, the presence of Vermi Wash pellets, high vitamins and minerals particularly Ca and Phosphate and Nitrogen with Growth hormones, and enhanced microbial activities in fish metabolism. The current review also addresses questions related to the Verm wash fish pellets help to fish growth, increase high protein content, and disease resistance by continuous assessment of fish growth in fish under controlled condition with high growing capacity and increase body mass content, Vermi Wash fish pellets reduces the detrimental effects of Metabolic stress. It aids in improving fish tolerance against metabolic stress by stimulating nitrogen metabolism and suppresses fish diseases by various mechanisms, such as competition, predation, releasing metabolites, and inducing systemic resistance against foliar pathogens under controlled condition. However, the possibility of using vermi wash fish pellets for the reduction of toxic elements needs to be addressed common major carps. The role of Verm wash fish pellets in improving fish bioconversion efficiency, BMI values of fish, fish fertility, beneficial microbial population in fish is also discussed. Verm wash fish pellets and its nutrient content are environmentally safe cultivable fish products and should be used to consumer. This review gives an updated perspective on the possible use of Verm wash fish pellets to improve fish growth rate and high bioconversion efficiency such as body mass on common major carps in study area every month increase fish body weight details.

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