Aqua-Internship Program

Asia Link Project

Faculty of Fisheries

Bangladesh Agricultural University, Mymensingh

A Report on
Maintenance of Nutritional Quality of Fish Feed

Name of Intern **:** Shekh Md. Arshad Bin Shahid

Name of MS Supervisor **:** Dr. Md. Nurul Absar Khan

Name of field Supervisor **:** Md. Sazzad Hossain

Name of Feed-Farm **:** "Shushama Feed Limited"

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A Report on
Maintenance of Nutritional Quality of Fish Feed In A Private Feed Company

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Content

1. Background:

Over the last decade, spectacular growth has taken place in aquaculture. Most production in developing countries is realized from pond-based or open-water extensive, improved extensive and semi-intensive practices using polyculture farming technologies. In contrast, the bulk of high-value freshwater finfish is produced in our country by intensive farming systems using high-cost nutrient inputs in the form of “nutritionally-complete formulated diets”.

Nutrition and feeding will play an essential role in the sustained development of this aquaculture. Therefore, it is imperative that fertilizers and feed resources continue to be produced and refined. Sustained development of aquaculture, however, must take into account and ensure that the needs of competing users are met, and that environmental integrity is protected. This study is reviewed with a number of specific issues in the fields of fish nutrition that are critical for sustainable aquaculture production in both private and govt. hatcheries. Some of the major issues are:

- Availability of feed resources and development of aqua feeds;
- Nutritional quality of feed ingredients that are used in feed formulation; and
- Nutritional composition of finished goods or formulated diets.

To maintain high quality of finished feed, good administrative structure of a feed industry committed to produce quality feed is important. As a student of fisheries sciences it is essential to have field level experience on fish feed industry operation. Aqua-internship brings that opportunity to gather practical experiences about production technique of fish feed, feed ingredients, composition of fish feed, types of fish feed, storage of fish feed and overall maintenance of nutritional quality of fish feeds.

2. Commencement of my internship:

I was selected as an intern and given the opportunity to carry out my study on maintenance of nutritional quality of fish feed. Shushama Feed Limited Company is the best option in Mymensingh to carry out such type of study and that's why I was selected to do my works in this feed company. I started my works from 05.07.10 in that feed farm and worked there about 3 months. Firstly, I observed the fish feed production procedure and then collected informations about different fish feed ingredients and the formulation method of these ingredients to make finished goods. These raw materials are brought from different areas of our country and some ingredients are imported from abroad as well. After that I worked in the newly opened nutrition lab to assess the nutritional value of imported raw materials as well as the finished goods or feeds. I assessed nutritional value of different raw materials and finished goods also in this lab with my own hand. Finally I have tried to learn the maintenance technique of nutritional values of fish feed and this is very important to know for every fisheries graduate as it is the prime condition to boost our aquaculture production. Basically I have worked in nutrition lab to assess nutrition quality of different feeds as the assurance of proper nutrition value in finished feeds is the prime objective of a fish feed company.

3. Objectives:

i. To know and learn the maintenance of nutritional qualities of fish feed ingredients and finished goods.
ii. To know the formulation of fish feed ingredients with proper nutritive value and amount.
iii. To observe the fish feed production procedure in Shushama feed industry.

4. Materials and Methods:

4.1 Quality assessment of raw materials:

In Shushama feed industry, raw materials are brought out from different areas of our country and some materials are imported from abroad also. In previous, when nutrition lab was not constructed these raw materials were assessed in the BAU nutrition lab and sometimes even these materials were processed without assessment. After the realization of urgency for the nutrition lab there were built a nutrition lab beside the feed production building. Now all raw materials are assessed in this farm before producing formulated or finished feeds. In this feed farm raw materials are brought by truck and then weighed the amount and then they are loaded inside the storage room. Some samples are taken to the lab to assess the nutritional value. Different types of feed ingredients are used to produce formulated finished feeds such as Rice polish, Rice bran, wheat bran, Maize, Meat and bone meal, Oil cake, lime stone, vitamin, salt etc.

(i) (ii)

Fig.1: (i) Unloading raw materials from Truck and

(ii) Truck is departing with finished goods or feeds

Here is given a list of ingredients consisting of their nutrition value that is found in scientific research-

Table 01: Gross nutritional composition (% dry matter) of major conventional feed ingredients.

Ingredients	Nutritional value (%)		
	Protein	CHO	Lipid
Fish meal	45-60	2-3	7-8
Rice bran	15-16	48-50	18-19
Wheat bran	15.5-16	52-55	5-7
Meat and bone meal	50-55	--	12-13
Oil cake	30-35	30-32	13-15
Maize	7-8	80-82	2-3
Soybean meal	50-52	30-32	3-4
Ata	12-13	75-77	3
Rice polish	9-10	55-60	12-13

I did several nutritional tests of different raw materials and found following composition in amount (%) is given below:

Table 02: Nutritional value of different fish feed ingredients found in Shushama feed limited nutrition lab.

Ingredients	Nutritional value (%)		
	Protein	Lipid	Moisture
Fish meal	52	7.5	12.5
Rice bran	15.2	13	9.2
Meat and bone meal	55	12	6
Soybean meal	51	3	10.5

4.2 Quality assessment of finished goods

Generally Meat and bone meal, fish meal, rape seed, soybean meal has high protein content and used as the main sources of protein and rice polish are used as energy source and wheat bran is used as binder in formulating fish feeds. Although lime stone, vitamin, salt, oil, flour are also used in formulated feeds. After assessing nutritional quality of raw ingredients then these raw ingredients are transferred to the automatic machine to produce formulated feeds. Different types of formulated feeds are produced in this farm for different fishes like AF Gold G-1, AF Special N-1 and N-2, Starter feed etc.

(i) (ii)

Fig. 2: (i) Nutrition Lab and
(ii) Formulated pellet feed

Different sizes and shapes of formulated feeds are produced in this farm. Pellet feeds, Mash feeds, Crumble feeds are common types. The diameter of pellet feed may vary like 3mm, 4mm etc. these feeds are given to the grow out pond and crumble feeds are given to the starter fish as well as mash feeds are given to the nursery pond. After Production of formulated feeds, again some samples are brought in the nutrition lab to assess the nutrition composition of feeds.

Then these formulated feeds are tested to find out the nutritional composition. In the lab usually Protein, Lipid and Moisture test are done as there are no equipments to determine the Ash or Carbohydrate tests.

Here is given a graph of general comparison of nutritional composition of pangus grower, pangus starter and koi grower that should be incorporated in these finished goods.

Pangus grower	6	7	26
Pangus starter	9.5	5.5	25.5
Koi grower	5	6.5	31

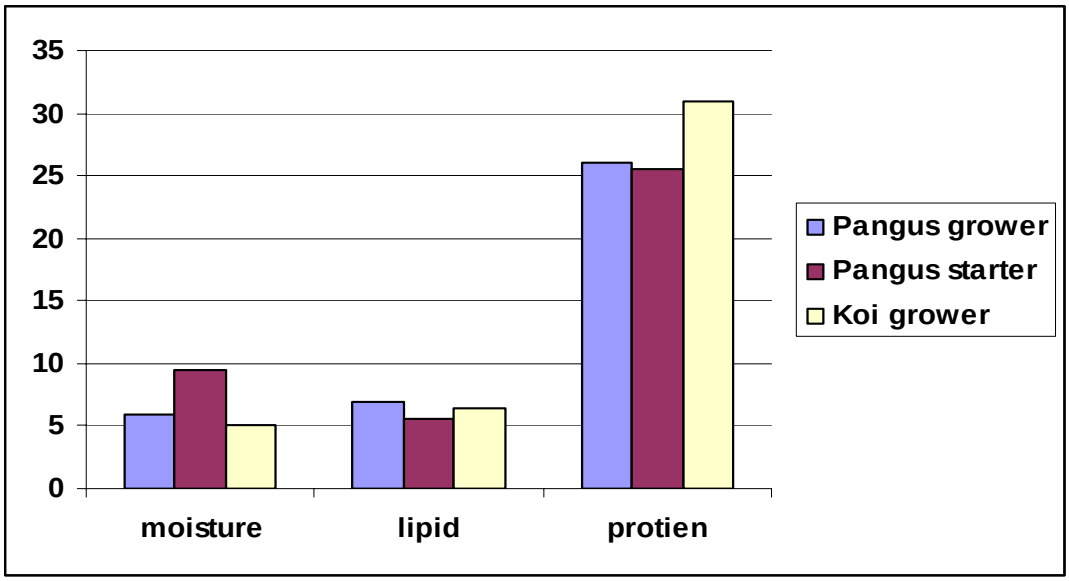

Fig. 3: Comparison of nutritional composition (%) of pangus grower, pangus starter and koi grower.

There are AF Gold G-1, AF Special N-1 and N-2 and Starter feed etc. which are produced in the Shushama feed industry and they are considered to have a certain amount of nutritional values. Every formulated should have optimal amount of balanced nutritional diets.

Table 03: General nutritional composition that should be incorporated in the finished formulated feeds.

Fish feeds	**Nutritional value (%)**				
	Protein	**Fat**	**Ash**	**Fibre**	**Moisture**
AF Gold G-1	27	5	16	6	11
AF Special N-1 and N-2	28	5	16	6	11
Starter	27	5	16	6	11

I tested some finished feeds those were produced in that farm. Among them in Pangus grower, I found the following compositions.

Table 04: Nutritional composition of Pangus grower feed found in nutrition lab

Nutrients	**Percent (%)**
Moisture	6.39
Fat	9.77
Protein	27.89
Hardness	4.5 (kg)

After being tested all formulated feeds if these feeds have acceptable nutritional value then they are ready to market and loaded in the truck to distribute in the local market. About 60% of feeds are used in their own hatchery and only 40% feeds are sold in the market.

5. Results

This study was carried out to gain detailed knowledge on the maintenance of nutritional quality of fish feed. To determine the quality of raw materials proximate composition of feed ingredients was analyzed in the lab. By analyzing different fish ingredients I have found that Meat and bone meal, fish meal, soybean meal have high amount of protein. These ingredients are used as main protein source of formulated feeds. We need to ensure that every formulated fish feed should have the certain optimal amount of protein as it plays a great role in growth rate of fish. Rice bran, rice polish etc. are used as energy source. To formulate fish feed ingredients sometimes limestone, vitamin, salt, oil, flour etc are also used where flour, wheat bran, polishes are used as binder to formulate feeds. From the **Table 02,** I have drawn a graph that represents the quality of different raw materials. In this graph I have shown the nutritional values of different raw materials those I tested in the nutrition lab.

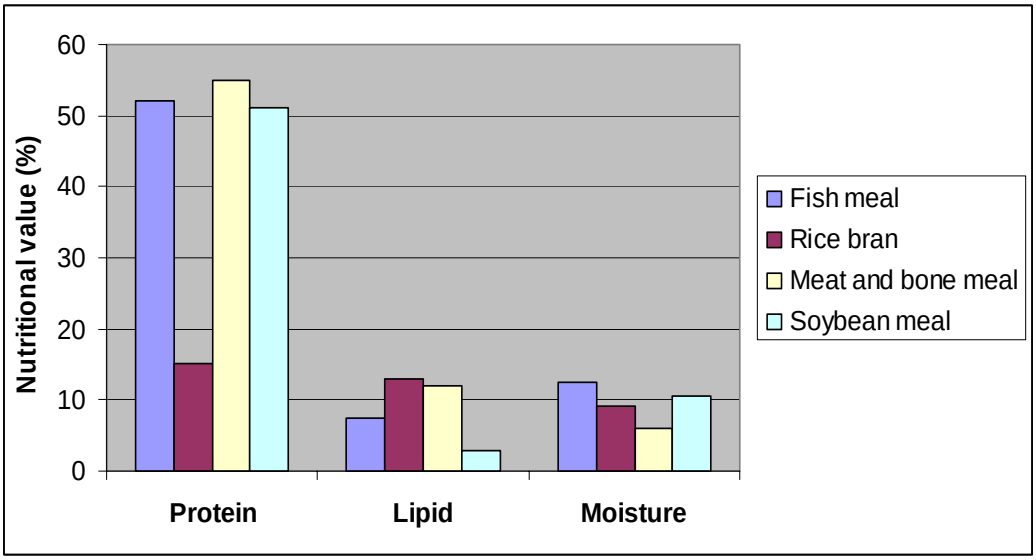

Fig 4: Nutritional compositions (%) of different raw materials which were found in the nutrition lab are shown in the graph.

From the **Table 04** we can draw a pie chart of Pangus grower feed that represents the quality of finished goods that is approximately similar to the general recommended fish feed composition.

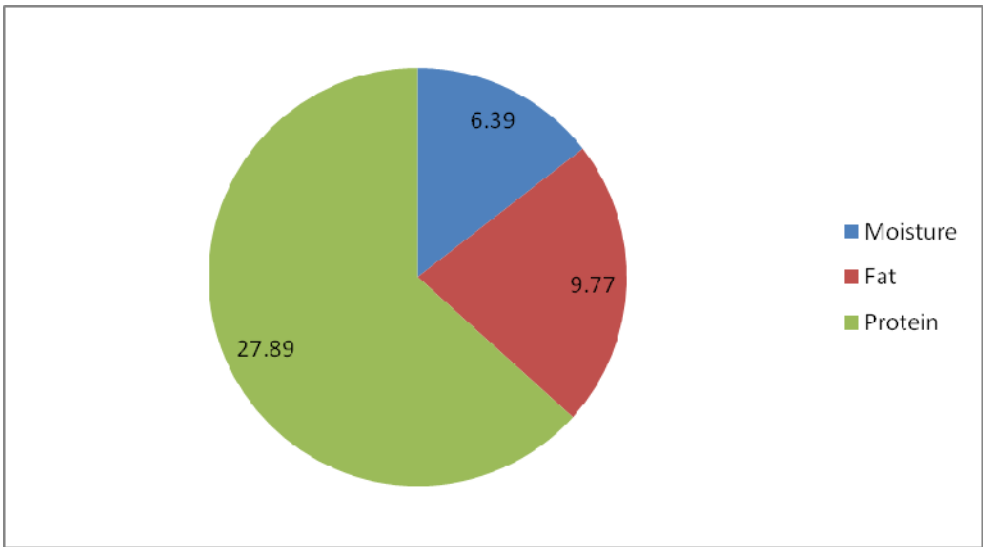

Fig. 5: Nutritional composition of Pangus grower feed

The nutritional composition of pangus grower which is produced by the Shushama feed limited is pretty good as this feed quality has fulfilled almost every nutrients requirement to the acceptable label and we can understand it from the Table 03.

6. Discussion:

This study was conducted to know about the maintenance of nutritional quality of fish feeds. During production of formulated fish feeds different raw materials are used to produce different types of finished goods in that farm. The raw materials which are brought from the outside are of good quality we can get the idea from the above study. Raw materials are assessed in the lab to find out the nutritional value of each ingredients and study shows that these ingredients have

approximately good amount of nutritional value. The formulated fish feeds which are produced by these ingredients are also good. Sometimes different types of vitamin are used for example; fish grower contains vitamin A, D, E, K, pantothenic acid, folic acid, and biotin. The fish grower also contain mineral like copper, iron, manganese, zinc, amino acid like lysine, all are used for growth promoter of fish. Above all quality of feed that are produced by Shushama feed are very good and growth performance of the feed is also good. Though there are still some lacking in the nutrition lab such as they don't have any machine to assess ash content of fish feed and ingredients and other instruments as well.

7. Recommendation:

Improvement of nutrition and feeding for sustainable aquaculture development can be achieved thorough:

- increased understanding of the dietary nutrient requirements of cultured species, including their application to practical culture conditions;
- better understanding of larval nutritional requirements, in order to develop suitable compound diets, which will further reduce the need for live food;
- Any types of hormone, antibiotics, chemicals and growth promoter should not be used to ensure public health security
- Proper assessment of nutritional quality for better quality of fish feeds.

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