Fish Feed Making Unit

Introduction

Fish feed is a crucial aspect of aquaculture, providing essential nutrients for farmed fish. It plays a vital role in their growth, health, and overall productivity. Fish feed typically comes in various forms, including pellets, granules, and flakes, each designed to meet the specific dietary needs of different fish species.

The composition of fish feed is carefully formulated to include a balance of proteins, carbohydrates, fats, vitamins, and minerals. These nutrients are essential for various physiological functions, such as growth, reproduction, and immune response. The quality of fish feed directly impacts the growth rate, disease resistance, and ultimately, the profitability of fish farming operations.

With the increasing demand for seafood and the growing aquaculture industry, advancements in fish feed technology have become crucial. Research and development efforts focus on improving feed formulations, optimizing nutrient utilization, and exploring alternative protein sources to ensure sustainable and efficient fish production.

Raw Material

The raw materials for making fish feed are quite diverse, as they need to provide a balanced diet for the fish. Here's a breakdown of the common ingredients:

1. Protein Sources:

- **Fishmeal:** This is a major component, made from ground fish or fish by-products. It's rich in protein and essential amino acids.
- **Soybean Meal:** A plant-based protein source that's widely available and cost-effective.
- **Other Oilseed Meals:** These include cottonseed meal, peanut meal, and rapeseed meal, which provide additional protein and fats.
- **Animal By-products:** Poultry meal, meat meal, and blood meal can be used, but their use is sometimes controversial due to disease concerns.

2. Carbohydrate Sources:

- **Grains:** Wheat, corn (maize), rice bran, and sorghum are common sources of carbohydrates, providing energy for the fish.
- **Other Plant-based Ingredients:** Cassava, potatoes, and other starchy vegetables can also be used.

3. Fat Sources:

- **Fish Oil:** Provides essential fatty acids like omega-3s, crucial for fish health and growth.
- **Vegetable Oils:** Soybean oil, sunflower oil, and other plant-based oils can be used as alternative fat sources.

4. Vitamins and Minerals:

- **Premixes:** These are commercially prepared mixtures of essential vitamins and minerals, ensuring the fish receive a balanced micronutrient intake.

5. Other Additives:

- **Binders:** These help to hold the feed pellets together, preventing them from crumbling in the water.
- **Antioxidants:** These prevent the fats in the feed from going rancid.
- **Pigments:** These can be added to enhance the color of the fish flesh, particularly in species like salmon.

Market Outlook

The market outlook for fish feed is very positive, driven by several key factors:

1. Growing Aquaculture Industry:

- Global demand for seafood is increasing, and wild fish stocks are declining. This has led to the rapid expansion of aquaculture (fish farming) to meet this demand.
- As aquaculture grows, so does the need for high-quality fish feed to ensure efficient and sustainable production.

2. Increasing Awareness of Nutritional Needs:

- There's a growing understanding of the specific nutritional requirements of different fish species at various life stages.
- This drives demand for specialized feed formulations that optimize growth, health, and disease resistance.

3. Shift Towards Sustainable Practices:

- Concerns about the environmental impact of fishmeal production (which relies on wild-caught fish) are increasing.
- This is driving research and development into alternative, sustainable protein sources for fish feed, such as plant-based proteins, insect meal, and algae.

4. Technological Advancements:

- Ongoing advancements in feed formulation, processing technologies, and feed management practices are improving feed efficiency and reducing waste.
- This includes the development of extruded feeds, which are more digestible and have better water stability.

5. Increasing Disposable Incomes:

- Rising disposable incomes in many parts of the world are leading to increased consumption of seafood, further fuelling the growth of aquaculture and the demand for fish feed.

Market Trends:

- **Plant-based feeds:** The use of soybean meal, corn gluten meal, and other plant-based proteins is increasing as a sustainable alternative to fishmeal.
- **Insect meal:** Insect meal is emerging as a promising alternative protein source, with high protein content and good digestibility.
- **Algae-based feeds:** Algae are being explored as a source of protein, omega-3 fatty acids, and other essential nutrients.
- **Probiotics and prebiotics:** These feed additives are being used to improve gut health and disease resistance in fish.

Manufacturing Process

The manufacturing process of fish feed involves several key steps to ensure a nutritionally balanced and palatable product. Here's a breakdown:

1. Raw Material Reception and Pre-processing:

- **Inspection:** Raw materials are inspected for quality, freshness, and absence of contaminants.
- **Cleaning:** Ingredients may be cleaned to remove impurities like stones, dust, and metal fragments.
- **Grinding:** Ingredients are ground into a fine powder to increase surface area for better mixing and digestion. Hammer mills or grinders are commonly used.

2. Formulation and Mixing:

- **Formulation:** Based on the specific nutritional requirements of the target fish species, a precise formula is developed, determining the proportions of each ingredient.
- **Weighing and Batching:** Ingredients are accurately weighed and batched according to the formula.
- **Mixing:** Ingredients are thoroughly mixed in horizontal or vertical mixers to ensure a homogenous blend. Liquid ingredients like oils and additives are also added during this stage.

3. Conditioning:

- **Steam Conditioning:** The mixed feed is exposed to steam to increase moisture content and temperature. This helps to gelatinize starches, improve pellet binding, and enhance digestibility.

4. Pelleting or Extrusion:

- **Pelleting:** The conditioned feed is forced through a die with small holes to create pellets. This is a common method for producing sinking feeds.
- **Extrusion:** The feed is cooked under high pressure and temperature in an extruder, then forced through a die. This method is used to produce both sinking and floating

feeds. Extrusion provides better control over pellet density and expansion, allowing for the creation of floating feeds.

5. Drying:

- **Drying:** The pellets or extruded feed are dried to reduce moisture content, preventing mold growth and extending shelf life. This is typically done using hot air dryers.

6. Cooling:

- **Cooling:** The dried feed is cooled to ambient temperature to prevent condensation and maintain quality.

7. Coating (Optional):

- **Coating:** Some feeds may be coated with oils, vitamins, or other additives to enhance nutritional value, palatability, or water stability.

8. Sieving and Grading:

- **Sieving:** The feed is sieved to remove any broken or undersized particles, ensuring a uniform pellet size.
- **Grading:** Pellets are sorted into different sizes to match the mouth size of the target fish species.

9. Packaging and Storage:

- **Packaging:** The finished feed is packaged in bags or other containers to protect it from moisture, pests, and contamination.
- **Storage:** Feed is stored in a cool, dry place to maintain its quality and nutritional value.

machines involved and some general images to illustrate.

1. Grinding Machines:

- **Hammer Mill:** This uses rotating hammers to crush ingredients into a fine powder.

- **Grinder:** Similar to a hammer mill, but often uses rotating plates or burrs for grinding.

2. Mixing Machines:

- **Horizontal Mixer:** This type of mixer uses rotating paddles or ribbons to blend dry ingredients.

- **Vertical Mixer:** Ingredients are mixed in a vertical drum using a rotating screw or auger.

3. Conditioning Machines:

- **Conditioner:** This machine uses steam to pre-cook and moisten the feed mixture before pelleting or extrusion.
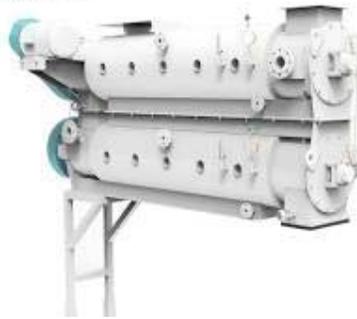
4. Pelleting Machines:

- **Pellet Mill:** This machine forces the conditioned feed through a die to create pellets.

5. Extrusion Machines:

- **Extruder:** This machine cooks the feed under high pressure and temperature, then forces it through a die to create expanded pellets.
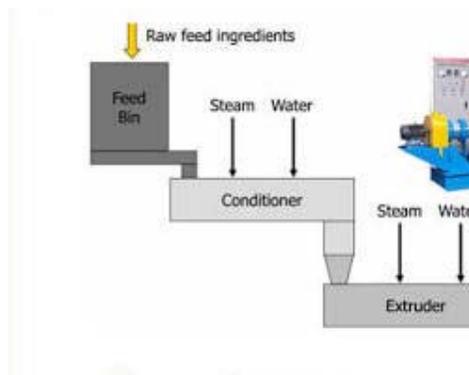
6. Drying Machines:

- **Dryer:** This machine removes moisture from the pellets to prevent spoilage.

7. Cooling Machines:

- **Cooler:** This machine cools the dried pellets to ambient temperature.

8. Coating Machines:

- **Coater:** This machine applies a coating of oil or other additives to the pellets.

9. Packaging Machines:

- **Packaging Machine:** This machine weighs and bags the finished feed.

PROJECT AT A GLANCE - TOP SHEET

1	Name of the Beneficiary		**XXXXXX**		
2	Constitution(Legal Status)		**Individual**		
3	Father/Spouse Name		XXXXXXX		
4	Unit Address		XXXXXX		

Taluk/Block: **XXXXXX**
District : **XXXXXX**
Pin: **XXXXXX**   State: **XXXXXX**
E-Mail   :   **XXXXXX**
Mobile   **XXXXXX**

5	Cost of Project	:	**Rs.**	**9.52**	**in Lakhs**
(i)	Plant & Machinery			**6.50**	**in Lakhs**
(ii)	Furniture & Fixtures			**0.80**	**in Lakhs**
(iii)	Working Capital Required			**2.22**	**in Lakhs**
6	Means of Finance	:	**Rs.**		
(i)	Term Loan			**6.57**	**in Lakhs**
(ii)	Working Capital			**2.00**	**in Lakhs**
(iii)	Own Capital			**0.95**	**in Lakhs**
				9.52	**in Lakhs**
7	Debt Service Coverage Ratio	:		**4.06**	
8	Break Even Point	:		40.70%	
9	Plant & Machinery	:	Mixing Machines,Grinding Machines,Pelleting Machines Other equipments.		
10	Major Raw materials	:	Fishmeal, soy, starch etc.		
11	Employment	:	6		
12	Power Requirement	:	5		
13	Name of the project / business activity	:	Fish Feed Making Unit		

PROJECTED CASH FLOW STATEMENT

PARTICULARS	YEAR-I	YEAR-II	YEAR-III	YEAR-IV
SOURCES OF FUND				
Capital	0.95	-	-	-
Reserve & Surplus	4.82	6.43	8.04	9.74
Depriciation & Exp. W/off	1.06	0.90	0.77	0.66
Increase in Cash Credit	2.00	-	-	-
Increase In Term Loan	6.57	-	-	-
Increase in Creditors	0.68	0.16	0.16	0.20
Increase in Provisions	0.50	0.03	0.03	0.03
TOTAL :	**16.58**	**7.52**	**9.00**	**10.62**
APPLICATION OF FUND				
Increase in Fixed Assets	7.30	-	-	-
Increase in Stock	0.73	0.17	0.18	0.21
Increase in Debtors	4.35	1.24	1.23	1.35
Repayment of Term Loan	1.31	1.75	1.75	1.75
Drawings	1.50	2.00	4.00	6.00
TOTAL :	**15.20**	**5.16**	**7.16**	**9.31**
Opening Cash & Bank Balance	-	1.39	3.74	5.58
Add : Surplus	1.39	2.36	1.84	1.31
Closing Cash & Bank Balance	**1.39**	**3.74**	**5.58**	**6.89**

PROJECTED BALANCE SHEET

PARTICULARS	YEAR-I	YEAR-II	YEAR-III	YEAR-IV
SOURCES OF FUND				
Capital Account	-	4.28	8.71	12.75
Add: Addition	0.95			
Add : Net Profit	4.82	6.43	8.04	9.74
	5.78	10.71	16.75	22.49
Less : Drawings	1.50	2.00	4.00	6.00
NET OWN FUNDS	**4.28**	**8.71**	**12.75**	**16.49**
Term Loan	5.26	3.50	1.75	-
Cash Credit	2.00	2.00	2.00	2.00
Sundry Creditors	0.68	0.84	1.00	1.20
Provisions & Other Liab	0.50	0.53	0.55	0.58
TOTAL :	**12.71**	**15.58**	**18.06**	**20.27**
APPLICATION OF FUND				
Fixed Assets	7.30	7.30	7.30	7.30
Less : Depreciation	1.06	1.96	2.72	3.38
Net Fixed Assets	6.25	5.34	4.58	3.92
Current Assets				
Sundry Debtors	4.35	5.59	6.82	8.17
Stock in Hand	0.73	0.90	1.08	1.29
Cash and Bank	1.39	3.74	5.58	6.89
TOTAL :	**12.71**	**15.58**	**18.06**	**20.27**
	-	-	-	-

PROJECTED PROFITABILITY STATEMENT

PARTICULARS	YEAR-I	YEAR-II	YEAR-III	YEAR-IV
Capacity Ulisation %	50%	55%	60%	65%
SALES				
Gross Receipts/Sale	43.50	55.87	68.20	81.68
Total	**43.50**	**55.87**	**68.20**	**81.68**
COST OF SALES				
Purchase & Consumables	20.45	25.14	30.01	35.94
Elecricity Expenses	3.92	5.03	6.14	7.35
Other Direct Expenses	2.61	3.35	4.09	4.90
Cost of Production	26.97	33.52	40.24	48.19
Add: Opening Stock /WIP	-	0.73	0.90	1.08
Less: Closing Stock /WIP	0.73	0.90	1.08	1.29
Cost of Sales	**26.24**	**33.35**	**40.06**	**47.98**
GROSS PROFIT	17.26	22.52	28.14	33.70
	39.68%	**40.31%**	**41.26%**	**41.26%**
Salary to Staff	8.27	9.92	11.90	13.09
Selling & Adm Expenses Exp.	2.18	4.47	6.82	9.80
Depriciation	1.06	0.90	0.77	0.66
Interest on Term Loan	0.72	0.58	0.39	0.19
Interest on Working Capital	0.22	0.22	0.22	0.22
TOTAL (D+G)	**12.44**	**16.09**	**20.10**	**23.96**
NET PROFIT	**4.82**	**6.43**	**8.04**	**9.74**
	11.09%	**11.51%**	**11.79%**	**11.92%**
CASH ACCRUALS	**5.88**	**7.33**	**8.81**	**10.40**

COMPUTATION OF PRODUCTION

Production Capacity	200	Kg/Hr
No. of Working Hour	10	
Total	2,000	Kg/day
No of Working Days per month	25	
No. of Months	12	
Total Production Per Annum	6,00,000	Kg

Year	Capacity Utilisation	Kg
YEAR-I	50%	3,00,000
YEAR-II	55%	3,30,000
YEAR-III	60%	3,60,000
YEAR-IV	65%	3,90,000

COMPUTATION OF SALE

Particulars	YEAR-I	YEAR-II	YEAR-III	YEAR-IV
Op Stock	-	10,000	11,333	12,378
Production	3,00,000	3,30,000	3,60,000	3,90,000
	3,00,000	3,40,000	3,71,333	4,02,378
Less : Closing Stock	10,000	11,333	12,378	13,413
Net Sale	2,90,000	3,28,667	3,58,956	3,88,965
Rate Per Pcs	15.00	17.00	19.00	21.00
Net Sale (in lacs)	**43.50**	**55.87**	**68.20**	**81.68**

COMPUTATION OF DEPRECIATION

Description	Plant/Machinery Equipments	Furniture	TOTAL
Rate of Depreciation	**15.00%**	**10.00%**	
Opening Balance	-	-	-
Addition	6.50	0.80	7.30
	6.50	0.80	7.30
Less : Depreciation	0.98	0.08	1.06
WDV at end of Year-1	5.53	0.72	6.25
Additions During The Year	-	-	-
	5.53	0.72	6.25
Less : Depreciation	0.83	0.07	0.90
WDV at end of Year II	4.70	0.65	5.34
Additions During The Year	-	-	-
	4.70	0.65	5.34
Less : Depreciation	0.70	0.06	0.77
WDV at end of Year III	3.99	0.58	4.58
Additions During The Year	-	-	-
	3.99	0.58	4.58
Less : Depreciation	0.60	0.06	0.66
WDV at end of Year IV	3.39	0.52	3.92

TERM LOAN

Year	Opening Balance	Repayment	Closing Balance	Interest @ 11%
1st	**6.57**	**1.31**	**5.26**	**0.72**
2nd	**5.26**	**1.75**	**3.50**	**0.58**
3rd	**3.50**	**1.75**	**1.75**	**0.39**
4th	**1.75**	**1.75**	**0.00**	**0.19**

BREAK EVEN POINT & RATIO ANALYSIS

Particulars	1st Year	2nd Year	3rd Year	4th Year
Fixed Cost	11.82	14.88	18.10	21.65
Variable Cost	27.59	34.73	42.23	50.51
Total Cost	39.41	49.61	60.34	72.16
Sales	43.50	55.87	68.20	81.68
Contribution (Sales-VC)	15.91	21.15	25.97	31.17
Capacity	50%	55%	60%	65%
B.E.P in %	37%	39%	42%	45%
Break Even Sales in Rs.	16.16	21.63	28.52	36.87
Net Profit Ratio	11.09%	11.51%	11.79%	11.92%

CALCULATION OF D.S.C.R

PARTICULARS	YEAR-I	YEAR-II	YEAR-III	YEAR-IV
CASH ACCRUALS	5.88	7.33	8.81	10.40
Interest on Term Loan	0.72	0.58	0.39	0.19
Total	6.60	7.91	9.20	10.59
REPAYMENT				
Instalment of Term Loan	1.31	1.75	1.75	1.75
Interest on Term Loan	0.72	0.58	0.39	0.19
Total	2.04	2.33	2.14	1.94
DEBT SERVICE COVERAGE RATIO	**3.24**	**3.40**	**4.30**	**5.45**
AVERAGE D.S.C.R.			**4.06**	