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FISH FEEDS AND FEED TECHNOLOGIES OF ICAR-CMFRI





ICAR- Central Marine Fisheries Research Institute Ministry of Agriculture and Farmers' Welfare, Govt. of India Post Box No. 1603, Ernakulam North P.O. Kochi- 682 018, Kerala, India

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Preface

India holds the second rank globally in aquaculture, making significant contributions to the nation's nutritional security, livelihoods, and economic growth. Feed is a crucial component of aquaculture production, and there has been a growing demand for high-quality feeds over the years. Ensuring the availability of affordable, species-specific formulated feeds is vital for the success of aquaculture operations. Presently, fish feed accounts for 40-60% of the total operational costs of a fish farm, making aquaculture a costly venture. Imported feeds are available in Indian markets, but their exorbitant prices make them unaffordable for small and medium-scale farmers.

The Central Marine Fisheries Research Institute (CMFRI) is committed to research and development in marine fisheries and mariculture. In recent decades, focused efforts have been made to enhance the nutrition of marine ornamentals, lobsters, and food fishes. Nutritionally balanced formulated feeds are integral to modern aquaculture, with feed costs comprising 60-70% of the total operational expenses.

A. Gopalakrishnan Director ICAR-Central Marine Fisheries Research Institute



Scientifically evaluated, marine ornamental fish feed with 38% protein, 9% fat, 7% minerals and 39% carbohydrates. The slow sinking pellets are produced through twin screw extrusion technology which is the state of art in aquatic feed production. Capable of maintaining growth, health, colour and vigour of the fishes. Available in different pellet sizes (250, & 750 microns, and 1.0 mm), and coded as CMFRI OFF 25538, CMFRI OFF 7538, and CMFRI OFF 138.

Directions

Feed approximately 2-3% of the body weight as a thumb rule. Observe whether the fish consumes feed given. Adjust the feeding rate based on consumption and ensure no feed is left over.

Fish Length-Weight indicator and feeding rate	Varna feed type		
	CMFRI OFF 25538	CMFRI OFF 7538	CMFRI OFF 138
Length (mm)	<10	10-20	>10
Weight (mg)	<200	300-800	900-1500
Feeding rate/ day (mg)	6	15-24	18-45

Ingredients

High quality marine protein, soy flour, wheat flour, vitamins, minerals, carotenoids, immune promoters, probionts, antioxidants and natural colour concentrate to enhance skin colouration.

Storage

Store in a cool and dry place away from direct sunlight, Shelf life: 12 months

CADALMINTM

VARSHA Freshwater ornamental fish feed



Description and Specification

Scientifically developed Fresh Water Ornamental Fish Feed. Central Marine Fisheries Research Institute's Freshwater Ornamental Fish Feed (CMFRI FWOFF) with protein contents 25, 30, 35, 40 and 45% as 1mm & 2mm slow sinking feed pellets coded as CMFRI FWOFF 134, 234, 139, 239, 144, 244

Directions

Feed approximately 2-3% of the body weight of fish as a thumb rule. Observe whether the fish consumes feed given. Adjust the feeding rate based on consumption and ensure no feed is left over.

Ingredients

High quality marine protein mixture (fish, shrimp, squid and clam meal), soy flour, wheat flour, fish oil, vitamins, minerals, spirulina, mixed carotenoids, anti-oxidants, anti-fungal and natural colour concentrate to enhance skin colouration.

Storage

Store in a cool and dry place away from direct sunlight Shelf life: 12 months

CADALMIN™

BROODMAX Formulated feed for marine ornamental fish broodstock



Description and Specification

Scientifically developed feed for brood fish. Contains protein- min. 42%, and fat- 8%. Adequately rich in essential nutrients to ensure high fecundity, good larval quality and survival. Enhances the health and condition of broodstock.

Directions

Feed approximately 3-5 % of the body weight of brood fish. Observe whether the fish consumes feed given and adjust the feeding rate accordingly.

Ingredients

High quality marine protein mixture (fish, shrimp, squid and clam), soy flour, wheat flour, fish oil, vitamins, minerals, spirulina, mixed carotenoids, lecithin, astaxanthin, ajowain oil, anti-oxidants and anti-fungal.

Storage

Store in a cool and dry place away from direct sunlight. Shelf life at room temperature: 3 months. Storing at 4°⊂ in a refrigerator is preferable to preserve the quality.





Specially formulated, feed for silver pompano to ensure higher growth with a better feed conversion ratio. Contains protein- min. 38%, and fat- 8%. Adequately rich in essential nutrients, suitable for pompano grow- out in sea cages and pond culture.

Directions

Feed approximately 3-5% of the body weight of fish. Adjust the feeding rate based on consumption.

Ingredients

High quality marine protein mixture (fish, shrimp, and clam), soy flour, wheat flour, fish oil, vitamins, minerals, anti-oxidants and anti-fungal.



Store in a cool and dry place away from direct sunlight.





A cost-effective indigenous micro-feed for marine fish larvae (suitable for cobia, Rachycentron canadum and silver pompano, Trachinotus blochii) for sustainable mariculture. Prepared through extrusion, spheronization, fluidized bed processing (drying and spray coating), and precision sieving which delivers the highest quality feed for fish larvae. Tested and evaluated in the marine fish hatcheries of ICAR-CMFRI. Ensures better growth, survival and condition of larvae. Available in particle sizes of 100 to 700 microns according to life-stage/ mouth size of larvae.

Directions

larvae

Observe the feeding activity of larvae and continue feeding till ad-libitum. Siphon out the left-over feed from the tank.

Ingredients

High quality marine protein mixture (fish, shrimp, squid and clam), soy flour, wheat flour, fish oil, vitamins, minerals, spirulina, mixed carotenoids, immune boosters, feed attractants, microalgal meal, oleoresins, protein hydrolysates, anti-oxidants and anti-fungal.

Storage

Store in a cool and dry place away from direct sunlight or preferably in a refrigerator. Shelf life: 3 months.



CADALMIN™ **BSF ZW** A Zero-Waste bio-conversion system

A pilot scale system for valorization of organic waste to fish feeds using black soldier fly larvae. An effective innovative & eco-friendly organic bioconversion model for the generation of high value sustainable protein and lipid rich ingredient for incorporation in fish feeds. A pilot scale unit was established at ICAR- CMFRI, Kochi for the bioconversion and valorisation of organic wastes (food waste, fish waste and vegetable cutting waste) to Black soldier fly (*Hermetia illucens*) larvae. The unit houses dark-light chamber for breeding, egg laying and pupal incubation, unit for early larval rearing (up to 6 days old larvae), unit for advanced larval rearing, self-harvesting unit and system for composting of frass. The frass can be utilized as an excellent soil amendment/ organic fertilizer.

Black soldier fly larvae are an excellent source of high value sustainable protein and lipid ingredients for aquafeeds.







A fish meal free feed was developed using Black soldier fly larvae meal (BSFLM) for the juveniles of Indian pompano (*Trachinotus mookalee*) and Silver pompano (*Trachinotus blochii*).

Feeding trials and evaluation using the standardized feed (having not less than 38% protein & 6% fat) have proven that BSFLM can be used as a total replacer for fish meal in the diets of pompano juveniles without any adverse effects on the growth and condition.

Directions

Feed approximately 3-5% of the fish body weight. Adjust the feeding rate based on consumption.

Ingredients

Black soldier fly larval meal, shrimp meal, soy flour, L- taurine, wheat flour, fish oil, vitamins, minerals, and anti-oxidants

Storage

Store in a cool and dry place away from direct sunlight.



CADALMIN™

FINE SIEVE Sieve shaker for the precision sieving

of fish feeds

Features

An economical and durable model of a sieve shaker was developed in-house using locally available components for the precision sieving of ornamental fish feeds. A significant reduction (almost one-third) in feed processing time, manpower and loss of feed as dust was recorded as compared to the manual sieving method. Different sizes of feed (0.25, 0.5, 0.75, 1.0, 1.5, 2.0 and 3.0 mm diameter) can be obtained simultaneously. The total cost of assembling the unit was less than 1/10th of that of existing commercial models with similar specifications available for INR 6 – 8.5 lakhs per unit.

Motor and gearbox		
Drive motor	1 HP, 220 V, AC	
Power transmission	v-belt	
Gear box type	with thrust bearing	
Phase power	AC, single phase	



Specifications of sieve shaker			
Total Length (mm)	600		
Width (mm)	445		
Height (mm)	580		
Base dia of tray holder (mm)	404		
Height of support rods (mm)	660		
Diameter of support rods (mm)	20		
Max batch capacity	3 Kg		
Measuring range	250µm to 3mm		
Sieving motion type	Circular orbit		
Sieve body material	Aluminium		
Sieve mesh material	Stainless steel		
Diameter of sieves (mm)	330		
Mesh size of sieves	0.250, 0.50. 0.75, 1.0,		
	2.0, 3.0 mm (7 nos)		
Height of each sieve (mm)	95		
Proximity sensor	Inductive type		
Ventilation	Forced air circulation		
Fan type	Centrifugal fan		
Fan power (W)	115 W		
Outer body material	Mild steel		
Outer body material thickness (mm)	3		
PVC rings per sieve	8		
PVC rings dia (mm)	64		
PVC ring thickness (mm)	3		

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