English Monthly from Hyderabad, India

RNI Regn. No. 52899/93

Aqua International

Estd. 1993

28 Years

Health • Nutrition • Management • Processing

May 2022

Annual Subscription: Rs 800 Foreign $ 100

Inside...

Editorial:

FAO Report says Insurance Coverage for Fisheries & Aquaculture Units is inadequate in India

Aqua International organises IIAE 2022 at Chennai

Bentoli organises seminar on "Management of Pond & Feeding in Carp culture"

FAO Report: Insurance Coverage for Fisheries & Aquaculture Units Inadequate in India

Fisheries department to launch aquaculture, farm tourism projects in Kannur, Kerala

Effective Feed Management in Shrimp farming with reference to L.Vannamei

Corals Reefs

WATERBASE

FEEDING GROWTH
SINCE 1993

Maximise your profits with Waterbase Feed

BayWhite

Balanced Shrimp Nutrition for Good Returns

- **Balanced Nutrition -** Highly palatable with marine specialty ingredients
- **HP Boost -** Boosts hepatopancreas function with functional ingredients
- **Healthy Gut -** Maintains healthy *microflora in gut and limits Vibro Sp in gut*

VanaMax

Max Immunity, Max Nutrition & Max Growth for Max Profits

- **Advanced Nutrition -** Maximises shrimp growth with highly digestible & soluble marine proteins for efficient protein conversion
- **Amino Balance -** Right combination of protein sources with balanced amino acids for maximum nutrient absorption
- **OptiTrace -** Pack of vital trace minerals that enhance maximum nutrient absorption and provides natural immunity to the shrimps
- **HP Boost -** Boosts hepatopancreas function with functional ingredients
- **Healthy Gut -** Maintains healthy *microflora in gut and limits Vibro Sp in gut*

Corporate Office: **The Waterbase Limited,** Thapar House, 37 Montieth Road, Egmore, Chennai - 600 008, Tamil Nadu, India
Ph: +91 44 4566 1700, www.waterbaseindia.com

Registered with Coastal Aquaculture Authority (CAA) as Antibiotic-free inputs.

Quality Inputs - Quality Management... Towards Sustainable Aquaculture!!

SRIBS

SRIBS BIOTECHNIQS PVT. LTD.

302, Wing-A, Cello Triumph, I.B.Patel Road,Off Western Express Highway, Goregaon East, Mumbai 400063, Maharashtra, India. Phone: +9122 2686 1441/ 2685 1442

Email: info@sribsbio.in • Web: www.sribsbio.in

SRIBS sustainability simplified®

SDC Solutions for optimizing your Aquaculture business performance

HEALTHY ANIMALS, HEALTHY FOOD, HEALTHY WORLD

Pervic-A™

Ultimate high level Disinfectant

SDC Biobac-N®

Water & Soil Probiotic

ODOCLEAR-A40®

Natural protection for super natural growth

For Details Contact:

SDC AGRO-VET (INDIA) PVT. LTD.,

#103 & 104, SDC HOUSE, D. NO. 12-13-97, Tara Tycoon,Tarnaka,
SECUNDERABAD-500 017. T.S. INDIA.
Ph: +91-40-27006075, Fax : +91-40-27006076.
email : info@sdcagrovet.com www.sdcagrovet.com

An ISO 9001 : 2015 Certified company

SDC Products Registered with CAA as Antibiotic-free product


biomed
NO ANTIBIOTICS
FEED SUPPLEMENT
Pure-Min
100% Soluble & Ionically Balanced Minerals
" Introducing Purest form of Minerals specifically designed for Shrimp Nurseries "
Pure-Min
100% Soluble & Ionically Balanced Minerals
Shrimp Nursery Care
Advanced
Shrimp Nursery Care
Dosage
1 kg/ 1 Lakh seed, once in a day, based on salinity and alkalinity
or
as advised by Aquaculture consultant
Manufactured & Marketed by:
Biomed Techno Ventures
54-9-17, Plot No. 1 &2, Block F XIX, 100 Feet Road, Jawahar Autonagar, Vijayawada - 520 007.
0866-3500700
hr@biomed.org.in
www.biomed.org.in
Follow us On

Gentle Bio-Sciences Pvt. Ltd.

Excellence! Everyday In Every Way!!

ALL OUR PRODUCTS REGISTERED WITH CAA AS ANTIBIOTIC FREE INPUTS

Regd. Off: Unit No. 7, V.S.P. Homes, Road No.3,
Madhavapuri Hills, Hyderabad,
Telangana - 500 050.
Ph: +91 7680079990
E-mail: gentleho2013@gmail.com

Gentle Biosciences Pvt. Ltd. ISO 9001:2015 CERTIFIED COMPANY

Marketing Off: # 7-616/3, Plot No. 2,
Aananda Nilayam, Flat No. 201, 2nd Floor,
KCP Colony, Bandar Road, Kanuru,
Vijayawada, AP -520007.
Ph: 0866 2452345
E-mail: info@gentlebio.in

www.gentlebiosciences.com

Spiral Stopper

Bevel Gear Box

2 HP Motor


Spiral


Worm Shaft & Wormwheel


Spiral [Helical] Gear Box

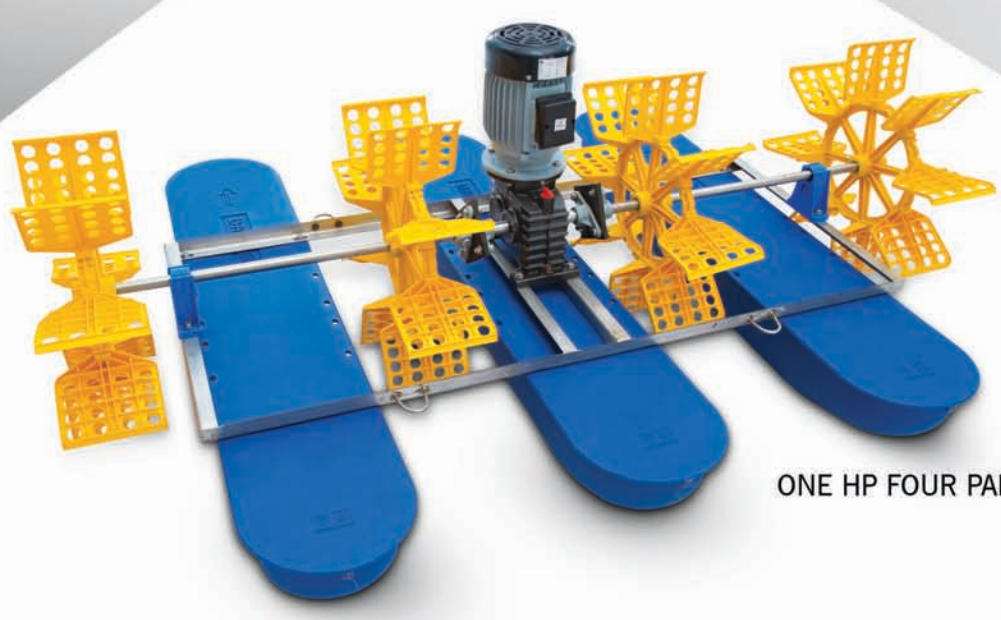

1 HP Gear Box


Paddle Wheel


Long Arm Gland


2 HP Gear Box


2 HP Out Put Shaft


ONE HP FOUR PADDLE WHEEL AERATOR

1 HP Two Paddle - 2 HP Four Paddle - 2 HP Six Paddle

High Productivity - Excellence Performance - Easy Installation - Low Maintenance - Long Life

Nandini Gears™

www.nandinigears.com - nandinigears@yahoo.co.in

M : +91 98422 43447

Spiral Gear Box Movable Joint

Bearing Stand For Spiral

Long Arm Gear Box

Movable Joint

Paddle

Float

1 HP Motor

2 HP Motor

HDPE Cover

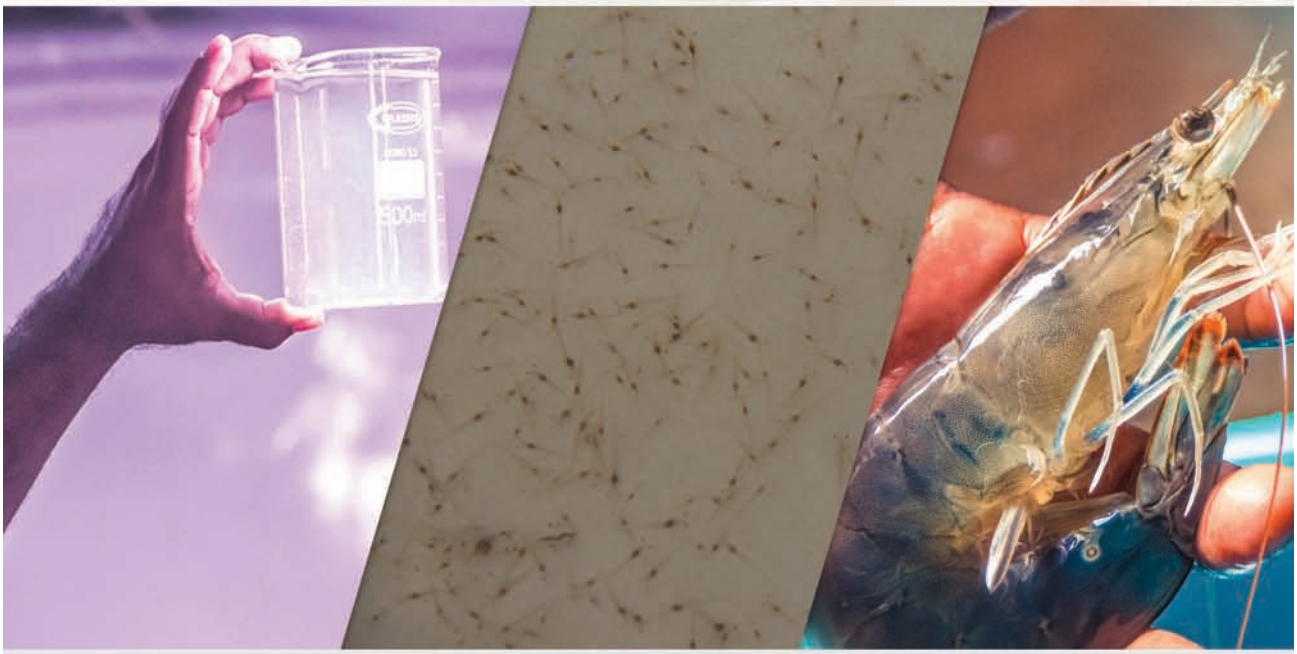
TWO HP SPIRAL AERATOR

QUALITY IS OUR MAIN CONCERN

10th 2008-2018
Harvesting Dreams Year after Year

GOLDEN MARINE HARVEST
G M H
INDIA

The *BEST* You Can Get



*L.Vannamei

"Satisfaction is a Rating
Loyalty is a Brand"

BEST AQUACULTURE PRACTICES CERTIFIED ®
Cert. No. H10305
www.bapcertification.org

The Responsible
Seafood Choice

"A Thankful Receiver
Bears a Plentiful Harvest"

Corporate Office

GOLDEN MARINE HARVEST
Valathamman Koil Street
Chettikuppam
Marakkanam
District : Villupuram
Tamil Nadu, India

GOLDEN WHITE PRAWNS
Valathamman Koil Street
Chettikuppam
Marakkanam
District : Villupuram
Tamil Nadu, India

GOLDEN MARINE HARVEST
Thoduvai Village, Kooliyar
Thirumullaivasal
District : Sirkazhi
Tamil Nadu, India.

GUJARAT GOLDEN MARINE
Survey N0- 312
Velan – 362720
District – Gir-Somnath
Gujarat, India

Email : info@goldenmarine.in
Website : www.goldenmarine.in

Contact : +91 99944 35858
FOLLOW US ON facebook Golden-Marine-Harvest GMH

Aqua International

English Monthly Magazine
(Established in May 1993)

Volume 30 Number 01 May 2022

Editor & Publisher
M. A. Nazeer

Editorial & Business Office:
AQUA INTERNATIONAL
NRS Publications,
BG-4, Venkataramana Apartments,
11-4-634, A.C.Guards,
Hyderabad - 500 004, India.
Tel: 040 - 2330 3989, 96666 89554
E-mail: info@aquainternational.in
Website: www.aquainternational.com

Annual Subscription
India : Rs. 800
Foreign Countries : US $ 100
or its equivalent.

Aqua International will be sent to the subscribers in India by Book Post and to the foreign subscribers by AirMail.

Edited, printed, published and owned by M. A. Nazeer and published from BG-4, Venkataramana Apts., 11-4-634, A.C.Guards, Hyderabad - 500 004, India. Printed at Srinivasa Lithographics.
Registered with Registrar of Newspapers for India with Regn. No. 52899/93. Postal Regn. No. L II/ RNP/HD/1068/2021-2023.

Views and opinions expressed in the technical and non-technical articles/ news are of the authors and not of Aqua International. Hence, we cannot accept any liability for any loss or damage arising from the use of the information / matter contained in this magazine.

- Editor

NRS PUBLICATIONS
www.aquainternational.in

CONTENTS

Editorial

11. FAO Report says Insurance Coverage for Fisheries & Aquaculture Units is inadequate in India.

News

14. FAO Report: Insurance Coverage for Fisheries & Aquaculture Units Inadequate in India.
14. Fisheries department to launch aquaculture, farm tourism projects in Kannur, Kerala.
16. Bentoli organises seminar on "Management of Pond & Feeding in Carp culture".
16. Avitech Nutrition launches PhyGeno, a new division specializing in natural solutions.
18. TARS 2022, Asia's leading aquaculture event is back in person with focus on Asia's aquafeed industry.
18. ICAR-Central Institute of Fisheries Education Celebrates 15th Convocation.

Special Feature

PP. Special feature.

Articles

32. Effective Feed Management in Shrimp farming with reference to L.Vannamei.
38. Corals Reefs.
48. A look at Integrated Multi-Trophic Aquaculture (IMTA) system.
52. Potential of Omega 3 Fatty Acids Producing Marine Microalgae from Indian Coastal Waters for Industrial Application.

ADVERTISERS' INDEX

Angel Yeast Co Ltd	BC	K.G.N. Hatchery	58
Avitech Nutrition Pvt Ltd	15	Megasupply Co.	39
B K M N Aqua	47	Nandini Gears	6 & 7
Biofera	57	Nihal Traders	56
Biomed Techno Ventures	4	Poseidon Biotech	45
Century Aquaculture	37	Poseidon Microbasia	41
Compro China Ltd	13	SDC Agrovet (India) Pvt Ltd	3
Deepak Nexgen Foods & Feeds Pvt Ltd	53	Shandong Longchang Animal Health	59
Doctor's Vet-Pharma Pvt Ltd	20 & 21	Skretting West Coast Pvt Ltd	51
Famsun Co Ltd	17	Sribs Biotechniqs Pvt Ltd	2
FECPI India Pvt Ltd	49	Soon Strong Machinery	35
Gentle Bio-Sciences Pvt Ltd	5	Team Agrotech Pvt Ltd	55
Gishnu Gears	10	The Waterbase Limited	FC
Golden Marine Harvest	8	Uni-President Vietnam Co. Ltd	19
Grobest Feeds	43	Zhanjiang Hengrun Machinery	28 & 29w
Hitech Life Sciences Pvt Ltd	33		

Subscriptions for Aqua International, English monthly, should be sent to:
The Circulation Department, Poultry Fortune, BG-4, Venkataramana Apartments, 11-4-634, A.C.Guards, Near Income Tax Towers, Hyderabad - 500 004, India. Email: info@aquainternational.in

MM Gears Pvt Ltd.
Delivering Innovation

A' Series - Aqua Culture Gearbox

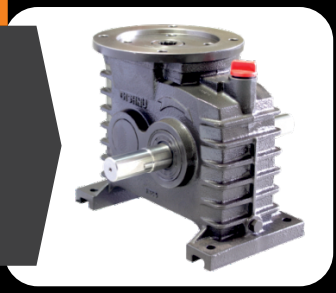
GISHNU
Transforming Innovation

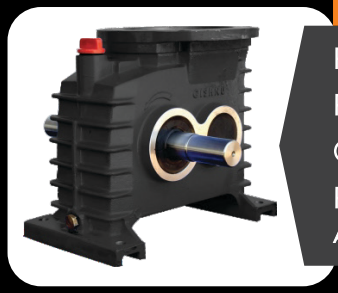
Gishnu Gears, an ISO 9001-2015 certified company is a leading manufacturer of gearboxes in India, backed by expertise spanning to three decades - The company offers superior products of international standards

FLOATING BEVEL GEAR BOX

Type : A3 Power (Casting)

Range : 1 hp to 3 hp
Pedals : 4, 6 & 8
O/p RPM : 105, 120, 140 & 160
Power savings : 75%





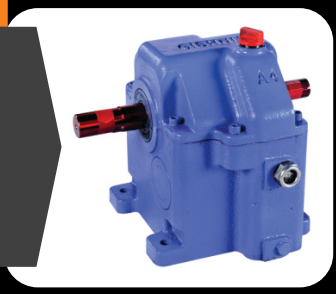
Type : A3 Aero RF (Aluminium)

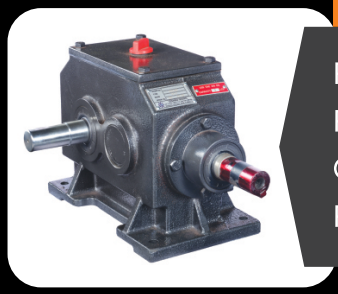
Range : 1 hp to 3 hp
Pedals : 4, 6 & 8
O/p RPM : 105 & 120
Power savings : 75%
Aluminium housing with Anti-rust coating

LONG ARM GEAR BOX

Type : A4 Single Side

Power savings : 70%
O/p RPM : 72 & 115
2 hp = 12 Pedals
3 hp = 16 Pedals





Type : GBH

Range : 3 hp & 5 hp
Pedals : 8+8 & 20+20
O/p RPM : 105 & 120
Power savings : 60%

Delivering More than Expectation

A' SERIES SPARES


Spiral Bevel Pair


Helical Pinion


Helical Gear


Worm Wheel Pair

SF No: 796/1B, Near Hotel Le Meridien,
Neelambur, Coimbatore - 641 062,
Tamil Nadu.

Mob : 99439 17774 | 96558 63638

E : marketing@gishnugears.in / marketing@mmgears.in
www.gishnugears.com I www.mmgearsindia.com

FAO Report says Insurance Coverage for Fisheries & Aquaculture Units is inadequate in India

Knowledge of shrimp behavior and feeding habits and continuous feedback on pond environmental parameters and shrimp population management must be considered together. This must be coupled with an understanding of the biological aspects of the targeted species and the chemical and biological processes that control water and pond bottom quality. Effective management practices will produce maximum shrimp growth and survival concurrent with the lowest feed conversion.

Dear Readers,

The May 2022 issue of ***Aqua International*** is in your hands. In the news section you may find news about ...

India International Aquaculture Expo 2022 (IIAE 2022), a 3-day Exhibition, Conference and Awards Function was held in Chennai Trade Centre, Chennai on 6-7-8 April 2022. Nine Government Officials, Scientists, Experts, Entrepreneurs and Farmers addressed and made presentations on different topics and aspects of Aquaculture sector in the one day Conference held on April 6 titled as *"UPDATE Knowledge on Aquaculture"*. On this occasion, 18 stakeholders of Indian Aquaculture sector were honoured with Awards for the excellence they achieved in their profession and for their contribution to aquaculture development in India. Though the size of Exhibition was small and moderate with exhibitors and visitors, it was an expo with quality and standards.

Bentoli Agri Nutrition, subsidiary of Bentoli Inc, USA recently organized a seminar on "Management of pond and feeding management in Carp culture" at Rajnagar, East Midnapore, West Bengal. The session was interactive and quite participative from the attendees. Dr Jayanta Bhattacharyya, DGM - Techno-Commercial elaborated the role of balanced feed and proper feeding for better performance of the stock. He highlighted identifying the best alternate feed ingredients and on quality tests optimizing the nutritional value of feed and reducing the cost of feed. He explained that Bentoli customer service laboratory is well equipped to identify and test the best cost effective feed ingredients. Abhijit Das discussed on management of ponds and the application of probiotics for improving water quality and for growth of the planktons in ponds.

Avitech Nutrition has announced the launch of PhyGeno, a new division specializing in natural solutions. PhyGeno manufactures plant-based products (phytogenics) for poultry, aquaculture, cattle and swine sectors. PhyGeno embraces Ayurveda's vast knowledge of plants and combines it with modern manufacturing and evaluation techniques to offer safe, healthy and effective solutions. The company says that PhyGeno represents Avitech Nutrition's commitment towards a more sustainable world-healthier products for human consumption with a minimal impact on the environment.

The Fisheries Department of Kerala with the support of the Kannur District Panchayat is planning to launch aquaculture and farm tourism projects in Dharmadam - Anjarakandy river. A senior official in the department said the project not only aims to attract tourists, but also to conserve local fish varieties. For this, the department will set up facilities and provide technical support for native fish breeding. Besides, cage culture will be encouraged. Around five acres will be demarcated as fish protected area in the river near Dharmadam. No fishing will be allowed there. The initiative is aimed at improving native fish varieties, which will subsequently help local fisherman.

Contd on next page

NRS GROUP

Aqua International

Our Mission

Aqua International will strive to be the reliable source of information to aquaculture industry in India.

AI will give its opinion and suggest the industry what is needed in the interest of the stakeholders of the industry.

AI will strive to be The Forum to the Stakeholders of the industry for development and self-regulation.

AI will recognize the efforts and contribution of individuals, institutions and organizations for the development of aquaculture industry in the country through annual Awards presentation.

AI will strive to maintain quality and standards at all times.

TALK TO US

SEND AN EMAIL:

info@aquainternational.in

Please do not send attachment.

FOLLOW US:

facebook.com/aquainternational.nrs

twitter.com/nrspublications

Send a letter: *Letters to the Editor must include writer's full name, address and personal telephone and mobile numbers. Letters may be edited for the purposes of clarity and space. Letters should be addressed to the Editor:*

AQUA INTERNATIONAL, BG-4, Venkataramana Apartments, 11-4-634, A.C.Guards, Near Income Tax Towers, Masab Tank, Hyderabad - 500 004, T.S, India.
Tel: +91 040 - 2330 3989, 96666 89554. Website: www.aquainternational.in

FAO Report: Insurance Coverage for Fisheries & Aquaculture Units is inadequate in India. Given the low penetration of insurance products in the fisheries sector, the ***FAO World Review of Capture Fisheries and Aquaculture 2022*** has recommended that public and private insurance service providers work together to take proactive measures to help India's fisheries and aquaculture insurance market recover. With the weather being a factor in the fisheries industry, insurance service providers should be encouraged to participate in order to improve the sector's overall competitiveness and efficiency of service delivery.

In the Articles section – *Effective feed management in Shrimp farming with reference to L.Vannamei,* *authored by* Dr Raghavendrudu, Product Manager, Aqua Feed, Skretting India, discussed that the shrimp aquaculture sector represents one of the most lucrative and fastest growing segments of the global seafood industry. Farming practices currently employed for shrimp vary widely both between and within countries, which vary according to the species farmed, the financial resources of the farmer and the production methods employed. In general, shrimp production methods can be divided into three basic types depending upon the shrimp stocking density and the external inputs received over the production cycle; these range from extensive non-fed pond-based farming systems to semi-intensive compound feed-fed pond-based farming systems. There are a variety of methods used to estimate feed inputs. Irrespective of the methods employed, all feeding protocols should at least include the following considerations. First, feed utilization should be planned, and daily feed inputs should be limited. Daily inputs must be reasonable and should consider the growth of the shrimp as well as nutrient recycling capacity of the pond ecosystem. Growth is easily estimated based on weekly sampling of the shrimp.

Aqua feed management should aim at making available the best quality, formulated aqua feed in adequate amounts and at the right time and location. Feeding methods and techniques are as important as feed quality and are closely interdependent. Feeding practices must be continually modified and adapted to account for natural and induced changes in feeding activity and preferences as the animals grow and environmental conditions change. Knowledge of shrimp behavior and feeding habits and continuous feedback on pond environmental parameters and shrimp population management must be considered together. This must be coupled with an understanding of the biological aspects of the targeted species and the chemical and biological processes that control, water and pond bottom quality. Effective management practices will produce maximum shrimp growth and survival concurrent with the lowest feed conversion.

Another article titled **Corals Reefs,** *authored by* D.P. Rajesh and H.N. Anjanayappa, Department of Fisheries Resources and Management, College of Fisheries, Mangaluru, Karnataka, said that Coral colonies grow continuously in size by budding of polyps and often form extensive masses, known as coral reefs. A coral reef is a ridge or mound of limestone, the upper surface of which is near the surface of the sea and which is formed chiefly of $CaCO_3$ secreted by coral polyps. Principal builders of coral reefs are stony corals (Madreporaria), but other important contributors are the hydrocorallines and alcyonarians.Coralline algae and Foraminiferan Protozoa also take part in the formation of coral reefs. Reef-building corals require warm, shallow waters (normally above 20°C). Corals are marine animals in the class Anthozoa of the phylum Cnidaria typically living in compact colonies of many identical individual "polyps". The group includes the important reef builders that inhabit tropical oceans and secrete calcium carbonate to form a hard skeleton. Coral reefs are sometimes referred to as a "rain forest in the ocean" because, like tropical forests which have a large variety of life, coral reefs also have a large variety of life. The polyps use their tentacles to catch tiny animals that float in the water called zooplankton. But corals get most of their food from marine plants that actually *live inside* the coral.

Article titled ***A look at Integrated Multi-Trophic Aquaculture (IMTA) System***, *authored by* Monica K.S., Dr Ganapathi Naik M. and Jayashree Swamy, Department of Aquaculture, College of Fisheries, Mangaluru, Karnataka, discussed that Integrated Multi-Trophic Aquaculture (IMTA) is a type of aquaculture that combines fed species with organic extractive species and inorganic extractive species that thrive on aquaculture waste. The IMTA concept is simple and adaptable. IMTA systems can be land-based or open-water, such as marine or freshwater, and can include a variety of species combinations. The principal goal of IMTA is to ecologically engineer systems for environmental, economic and social sustainability. Integrated multi-trophic aquaculture, or IMTA, is similar to polyculture, where it involves the farming of two or more species together. Multiple aquatic species from various trophic levels are farmed together in IMTA to increase efficiency, minimise waste and provide ecosystem services like bio-remediation.

Another article titled ***Potential of Omega 3 Fatty Acids Producing Marine Microalgae from Indian Coastal Waters for Industrial Application,*** *authored by* Rani V., Thamarai Selvi M.J., Abarna K., Department of Aquatic Environment Management, Fisheries College and Research Institute, Tamil Nadu Dr J. Jayalalitha Fisheries University, Thoothukudi, Tamil Nadu, said that Microalgae are the unicellular photosynthetic organisms with wide range of diversity estimated around 200,000 to 800,000 (Saharan et al. 2013). Microalgae produce variety of primary and secondary metabolites. These metabolites show numerous activities including immune-modulating, anti-inflammatory, anti-cancer, antimicrobial, antioxidative activity, with potential use in the production of pharmaceuticals, nutraceuticals and cosmetic industry. The antimicrobial, antioxidative, anti-inflammatory, and anti-cancerous properties of microalgal derivatives contribute towards their varied industrial applications. Among these Omega-3 fatty acids like eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) provide important health benefits which led to an increased consumption as dietary supplements for both humans and animals. Omega-3 unsaturated fatty acids EPA and DHA are found in animals, plants, fungi and many other microorganisms but it was typically derived from fatty fish, creating extra pressures on worldwide fish stocks.

Readers are invited to send their views and comments on the news, special feature and articles published in the magazine which would be published under "Readers Column". Time to time, we shall try to update you on various aspects of Aquaculture sector. Keep reading the magazine Aqua International regularly and update yourself. Wish you all fruitful results in your efforts.

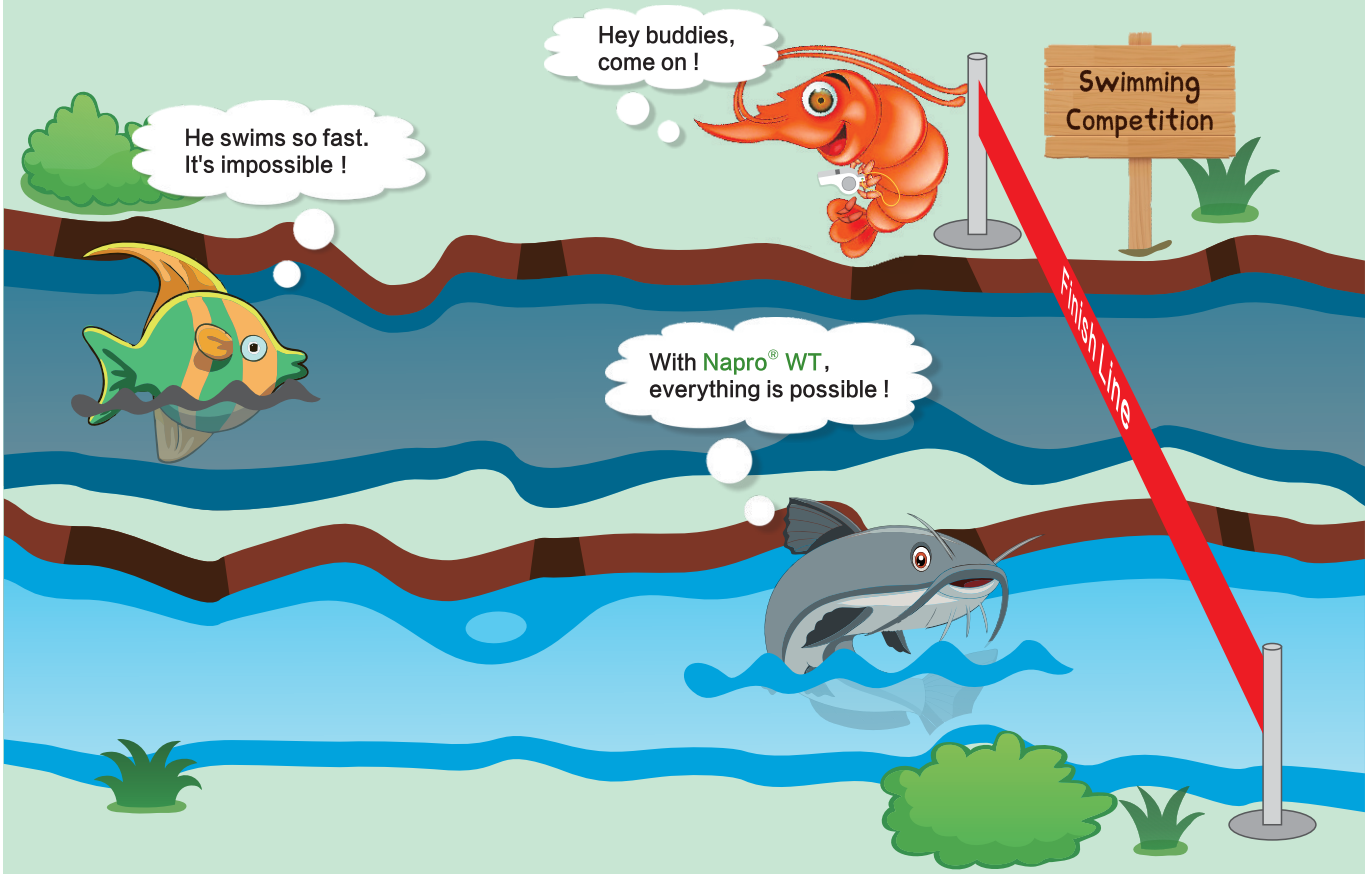
M.A.Nazeer
Editor & Publisher
Aqua International

Compro®

WhatsApp WeChat

Welcome Distributor to Join us

Recruitment of Sales Representative



Copyright © 2022 Compro

Napro® WT (Probiotics)

- Improve water quality & clarity
- Remove odors like ammonia & nitrite & nitrate
- Boost immune system of aquatic animals
- Strengthen resistance against diseases
- Enhance digestion & absorption of nutrients in aqua feeds

Compro (China) Limited

China Bio-Medicine Park,
Beijing 102600 China

+86 10 5952 8253

info@compro.cn

www.compro.cn

FAO Report: Insurance Coverage for Fisheries & Aquaculture Units Inadequate in India

Fishermen and aquaculture farmers, on the other hand, are generally unaware of insurance options. In India, fishing vessels, coastal immovable property, and aquaculture units have abysmal insurance coverage.

Given the low penetration of insurance products in the fisheries sector, the 'FAO World Review of Capture Fisheries and Aquaculture 2022' has recommended that public and private insurance service providers work together to take proactive measures to help India's fisheries and aquaculture insurance market recover.

With the weather being a factor in the fisheries industry, insurance service providers should be encouraged to participate in order to improve the sector's overall competitiveness and efficiency of service delivery.

When occupational hazards to fishers' and fish farmers' lives and property are on the rise as a result of more frequent extreme weather events in recent years, the report takes on greater significance.

Fishermen and aquaculture farmers, on the other hand, are generally unaware of insurance options. In India, fishing vessels, coastal immovable property, and aquaculture units have abysmal insurance coverage. Appropriate extension efforts by government agencies, non-governmental organizations, and aquaculture societies, with appropriate participation from the fishing community, could bridge the gap and facilitate insurance product marketing at the grassroots level.

The report suggested that bundling disaster risk insurance packages with existing micro-credit schemes could be a viable option, given the strong network of micro-finance institutions and self-help groups in coastal areas.

One of the reasons for the low adoption of the fishing vessels and asset insurance in the coastal region, according to Shinoj Parapppurath, senior scientist, ICAR-CMFRI, Kochi, and author of the report's India chapter, is the prohibitive cost of the policies currently available.

> *"Given the low penetration of insurance products in the fisheries sector, the FAO World Review of Capture Fisheries and Aquaculture 2022 has recommended that public and private insurance service providers work together to take proactive measures to help India's fisheries and aquaculture insurance market recover. With the weather being a factor in the fisheries industry, insurance service providers should be encouraged to participate in order to improve the sector's overall competitiveness and efficiency of service delivery. (Repeat Highlight in the Article in box in quotes)"*

Fisheries department to launch aquaculture, farm tourism projects in Kannur, Kerala

Project to offer direct employment to inland fishermen

The fisheries department in Kerala with the support of the Kannur District Panchayat is planning to launch aquaculture and farm tourism projects in the Dharmadam - Anjarakandy river.

A senior official in the department said the project not only aims to attract tourists, but also to conserve local fish varieties. For this, the department will set up facilities and provide technical support for native fish breeding. Besides, cage culture will be encouraged, he added.

"Around 5 acres will be demarcated as fish-protected area in the river near Dharmadam. No fishing will be allowed there. The initiative is aimed at improving native fish varieties, which will subsequently help local fishermen," he said.

The department will develop a fish farm at Eranholi. The idea is to attract tourists to the farm, where facilities like seafood restaurants, pedal boating, and row boating will be available. Tourists can make a boat ride from the farm at Eranholi to protected areas in Dharmadam through the backwaters, the official said, adding that the project would be implemented at an estimated cost of ₹ 20 crore.

The project will offer direct employment to inland fishermen and indirect jobs to those from the tourism sector, he said.

PhyGeno
Plant Based Solutions

The new name in plant-based solutions.

Avitech Nutrition presents PhyGeno – a range of plant based solutions (phytogenics) for the feed industry.

PhyGeno combines Ayurvedic knowledge with modern evaluation and manufacturing techniques to offer solutions that enhance the nutritive and safety values of animal feeds.

- **Avitriol**
  Natural Bioactive Vitamin D3
- **PhyCholine**
  Herbal Choline
- **GenoLiv**
  Herbal Hepatoprotective
- **Green-C**
  Herbal Vitamin C

For more details visit
www.phygeno.com
connect@phygeno.com

Bentoli organises seminar on "Management of Pond & Feeding in Carp culture"

Bentoli AgriNutrition, subsidiary of Bentoli Inc, USA recently organized a seminar on " Management of pond and feeding management in carp culture" at Rajnagar, East Midnapore, West Bengal.

The session was interactive and quite participative from the attendees. Abhijit Das, Sales Executive Aquaculture discussed on management of ponds and the application of probiotics for improving water quality and for growth of the planktons in ponds.

Dr Jayanta Bhattacharyya, DGM- Techno-commercial elaborated the role of balanced feed and proper feeding for the better performance of the stock. He highlighted identifying the best alternate feed ingredients and on quality tests optimizing the nutritional value of feed and reducing the cost of feed. He explained that Bentoli customer service laboratory is well equipped to identify and test the best cost effective feed ingredients.

Abhijit Das, Sales Executive- (Aquaculture) Explaining the role of water quality in aquaculture

DrJayanta Bhattacharyya emphasized on few of the key customer services including feed formulation support using advanced formulation software, proximate analysis of the aqua feed ingredients and microbiological tests.

Anghsuman Roy Territory Sales Manager detailed the aqua culture products of Bentoli and emphasized on identifying and using the best products for the cost effective aquaculture.

Angshuman Roy, Territory Sales Manager detailing the Bentoli' aquaculture products

Dr Jayanta Bhattachryya, discussing on the role of quality control of feed ingredients and laboratory services for better aquaculture

About Bentoli:

Bentoli has been in the business of feed additives and farm products for over 50 years. Bentoli is a privately owned company specializing in the development, manufacturing and distribution of additives for aquaculture and livestock feeds. Bentoli specially focuses on feed preservation, processing and nutrition. Bentoli's corporate headquarter is based in Elgin, Texas, the USA. Bentoli maintains development and manufacturing facilities in the USA and Asia, serving the customers through an extensive network of sales offices and valued distributor partners throughout the globe. Bentoli India Manufacturing facility is certified for ISO 9001:2015, HACCP, GMP, FAMI QS

Avitech Nutrition launches PhyGeno, a new division specializing in natural solutions

Avitech Nutrition announced the launch of PhyGeno, a new division specializing in natural solutions. PhyGeno manufactures plant-based products (phytogenics) for the poultry, aqua, cattle and swine sector.

PhyGeno embraces Ayurveda's vast knowledge of plants and combines it with modern manufacturing and evaluation techniques to offer safe, healthy and effective solutions.

PhyGeno initial product portfolio includes Avitriol (Natural Bioactive Vitamin D3), GenoLiv (Herbal Hepatoprotective), Green-C (Herbal Vitamin C) and PhyCholine (Herbal Choline).

PhyGeno represents Avitech Nutrition's commitment towards a more sustainable world - healthier products for human consumption with a minimal impact on the environment.

FAMSUN

Integrated Solution Provider

Vacuum coater

Exceptional design & Flexible operation

Vacuum coater for the application of oil or fat, pigments, flavors, functional improver, vitamins, etc. onto pellets after drying and/or cooling. Aquafeed and pet food in particular.

FAMSUN Co., Ltd.

Add: No.1 Huasheng Road, Yangzhou, Jiangsu, China 225127
T:+86-514-87848880
E-mail:mypublic@famsungroup.com
www.famsungroup.com

India Office

Add: No 401 , Dega Towers , Raj Bhavan Road , Somajiguda , Hyderebad , Telangana - 500082
T: +62-21-30027458; 30027459
Contact: Arun Kumar K
E-mail : arunkumar@famsungroup.com
Mob: +91 9901916554

Contact: Shelby
E-mail: lxb@famsungroup.com
Mob: +91 9100436652

TARS 2022, Asia's leading aquaculture event is back in person with focus on Asia's aquafeed industry

April 22 2022: Asia's aquafeed industry is facing unprecedented challenges arising not only from the pandemic, but also global trends such as rising prices of major feed ingredient sand high freight charges, leading to a the push to use more sustainable feed ingredients. The ongoing Ukraine-Russia conflict is creating more pressure on supply and energy costs.

Just as critical is the need to future proof the industry for the next decade, among them with sustainable feeds to meet consumer demand and reduce its carbon footprint.

"Particularly for the aquafeed sector, these supply chain disruptions and inflationary pressures force feed millers to constantly look at alternatives ranging from novel feed to raising feed prices," says Zuridah Merican, editor of Aqua Culture Asia Pacific and chair of TARS 2022."In Asia, where the aquafeed industry actively supports the growth of the farming sector, the situation has been difficult."

The Aquaculture Roundtable Series® (TARS) 2022 seeks to help the aquafeed industry and other stakeholders navigate these challenges to find a new equilibrium with feed costs and feed efficiency. TARS 2022 with the theme Aquafeeds: A New Equilibriumis an in-person event which will take place in Ho Chi Minh, Vietnam on October 5 to 6, 2022.

TARS 2022 will review the state of the global aquafeed industry and Vietnam's successful growth in this sector, as well as strategies to improve feed efficiency; functional feeds and nutrition and health interventions; uptake of novel feed ingredients and additives; smart feed management; risk management and sustainability issues to meet the relevant United Nations Sustainability Development Goals.

As with the past 10 years, a host of international and industry experts will facilitate the Plenary and Interactive Breakout Roundtables sessions and panel discussions that have become hallmarks of this critical series. The Hard Talk with Business Leaders will debate on cost challenges for industry's adoption of novel feed ingredients.

Our role at this TARS is to bring all stakeholders together to deliberate, collaborate and recalibrate efforts to meet current and future challenges, Merican adds.

TARS 2022 is the ideal platform for networking and dialogue among Asia's key players in the shrimp and freshwater and marine fish aquaculture sectors. As with the previous TARS in 2019 which also focussed on aquafeed industry, the target audience will be CEOs, feedmillers, farmers and integrators, processors, nutritionists, formulators, feed ingredient, additive and equipment suppliers, industry leaders, marketeers, institutional researchers, academicians, government and non-government organizations, and other stakeholders in aquaculture supply chain.

TARS 2022 is organized by Aqua Culture Asia Pacific and Corporate Media Services with support from industry sponsors that include INVE Aquaculture, Diamond V, BioMar, Phibro, Adisseo and Grobest.

ICAR-Central Institute of Fisheries Education Celebrates 15th Convocation

New Delhi: ICAR-Central Institute of Fisheries Education (CIFE), Mumbai, the premier organization in the country involved in human resources development in the field of fisheries and aquaculture, celebrated its 15th convocation today. Union Minister of Fisheries, Animal Husbandry and Dairying Shri Parshottam Rupala was the chief guest at the function. Dr Trilochan Mohapatra, Secretary, Department of Agricultural Research & Education (DARE), Govt. of India and Director-General, Indian Council of Agricultural Research (ICAR) presided over the function.
Shri Parshottam K. Rupala,in his address, congratulated all the students of ICAR-CIFE graduating today with Masters and Doctoral degrees in various disciplines of fisheries science. He also congratulated those students who have secured University medals for their outstanding academic performances. The Minister in his address emphasized the role of fisheries institution in making fisheries sustainable in India and doubling the farmers' income, which can be achieved by integration of fisheries into the existing farming systems of crops and livestock. Dr Ravishankar C. N., Director and Vice Chancellor, CIFE, in his welcome address, highlighted the salient academic and research achievements of the institute. He also underlined the research and thrust areas and the achievements in the flagship programmes taken up and new academic initiatives undertaken by the institute. Dr Mohapatra in his convocation address emphasised the importance of fisheries for food and nutritional security and underlined the role of young graduates to achieve this goal. He urged the students to work towards the goal of bringing in blue revolution in the country and to double the farmers' income. He also stressed upon the need for entrepreneurship development to make the graduates as 'job providers' rather than 'job seekers'. During the convocation, former Director of CIFE, Dr Dilip Kumar was awarded honorary degree of D.Sc. 230 M.F.Sc. and 91 Ph.D. degrees were awarded besides presenting 45 gold medals to meritorious students.

Uni-President

AQUACULTURE PROBIOTICS EXPERT

Nu Ri

NET 200 g **BSL**

Probiotics for water treatment

1. WATER QUALITY CONDITIONING

Best choice of *Bacillus* spp. that rapidly decompose uneaten feed, feces and other organic substances in pond water, keeps water quality optimal

2. HIGH ACTIVITY OF SPORES

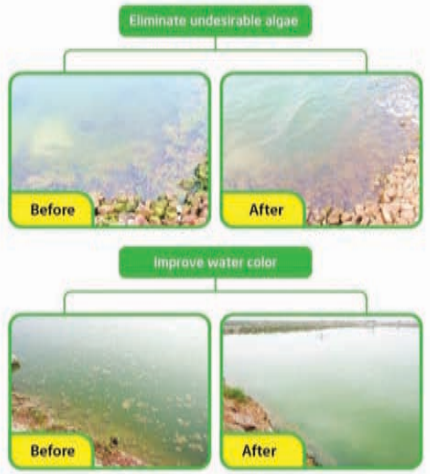
No cultivation is needed. Easily adapt to the changes of surroundings and grow fast in freshwater or seawater culture farming, even under low oxygen environment

3. DECREASE AMMONIA CONTENT

Prevent the accumulation of toxic substances such as NH_3, NO_2, etc.

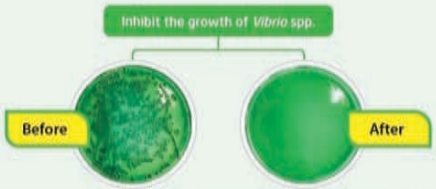
4. IMPROVE WATER COLOR

Improve water color regulate the algae and bacteria balance in water, turning your pond from green to clear



5. ESTABLISH BALANCED POND BACTERIA SYSTEM

Compete nutrition with vibrio and inhibit them to grow. Provide nutrition for probiotics in the pond, to establish a well-balanced farming system.



6. INCREASE AQUACULTURE PRODUCTION

Good quality of water prevents fish/prawn infections, making high profit of production

* COMPOSITION:

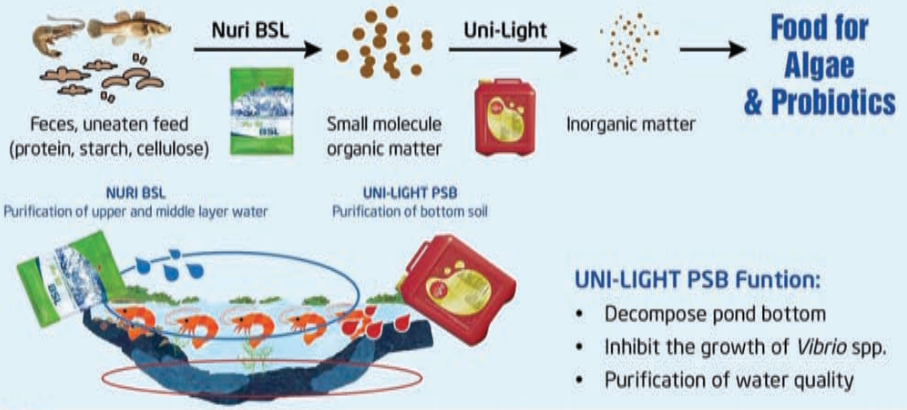
Bacillus spp. > 1x 10^{11} cfu/kg	15%
(Bacillus subtilis, Bacillus amyloliquefaciens, Bacillus licheniformis)	
Carrier (rice bran, corn gluten)	75%
Moisture	10%

* STORAGE:

Keep at dry, well-ventilated condition. Avoid direct sunlight exposure and use as soon as possible once opened for best quality.

* DIRECTION OF USE:

No cultivation is needed. Apply Nuri BSL with water-soluble bag near to the working water wheel or pour into the pond evenly. Recommend apply Uni-Light PSB together with Nuri-BSL on sunny day to achieve a clear pond more efficiently.



UNI-LIGHT PSB Funtion:

- Decompose pond bottom
- Inhibit the growth of *Vibrio* spp.
- Purification of water quality

BSL Dosage:

/10,000 m³ Quantity	10 - 30 pl/m² tiger prawn or < 80 pl/m² Vannamei	For >30 pl/m² tiger prawn or > 80 pl/m² Vannamei	For > 150 pl/m² Vannamei
7 days before stocking	800 g - 1,000 g	1,200 - 1,500 g	1,200 - 1,500 g
Day of stocking	300 g - 500 g	800 g - 1,000 g	800 g - 1,000 g
Every 7 - 10 days after stocking	300 g - 500 g	800 g - 1,000 g	3 - 5 days / use 1,000g - 2,000g

****Dosages can be adjusted according to the water conditions and practices.*

UNI-PRESIDENT VIETNAM CO., LTD

No. 16-18-20, DT 743 Road, Song Than II Ind Zone, Di An Ward, Di An City, Binh Duong Province, Vietnam.

aquafeed@upvn.com.vn

www.uni-president.com.vn

Gassen Plus

Bon Ammonia and obnoxious Gasses

Shrimp / Fish performs all their body functions and growth in water. Good quality water and proper D.O. levels determines the success or failure. Good quality water, optimum D.O. level is of prime importance for health and growth of Shrimp / Fish.

Irregular water exchange, excess and leftout feed, dead algae, fecal matter, increases the organic load at the pond bottom. Accumulation of such waste absorbs available oxygen, creating anaerobic condition which leads to pollution of pond bottom. Polluted pond bottom and unhealthy environmental conditions triggers the release of toxic gasses like Ammonia, H_2S, Methane, etc, The toxicity of Ammonia, Hydrogen Sulphide, Methane attributed mainly due to unionized form. As the concentration in water increases, ammonia excretion by aquatic organism diminishes and the level of ammonia in blood and in other tissues increases. Ammonia increases oxygen consumption by tissues, damage gills and reduces the ability of blood to transport oxygen, and increases the disease susceptibility. To eliminate / overcome the above problems 'GASSEN PLUS' Yucca Schidigera, it contains Steroidal"Saponin" which help to reduce ammonia and other noxious gasses such as H_2S, Methane, etc., Microbial enzyme "Urease' Production inhibited by Saponin which leads to an increases D.O. and reduction of BODand COD levels.

Bacterial strains such as Bacillus Subtilis, Nitrobactor, Nitrasomonas, rapidly converts ammonia into Nitrates, Nitrites and finally non-toxic Nitrogen. Hydrogen Sulphide converts into Sulphates, Sulphites and finally non-toxic Sulphur, Methane into Non-toxic carbon. This conversion reduces the obnoxious gasses in the pond bottom. Reduction of this gasses improve the D.O. level in the water and bottom.

COMPOSITION:
YUCCA SCHIDIGERA
ALOEVERA
BACILLUS SUBTILIS
BACILLUS POLYMIXA
BACILLUS LICHENIFORMIS
NITRASOMONAS
NITROBACTOR
STABILIZERS

DOSAGE : 1 Kg per Acre or consult your Aqua Technician For Specific Usage & Dosage

PRESENTATION: 500 gms &1 kg

DOCTOR'S VET-PHARMA PVT. LTD
cG.M.P. Certified an ISO 9001:2008 Company
Survey No. 263/1, 264/1, P.R. Palem (V), Kovur (M),SPSR Nellore Dist.- 524137. A.P. INDIA.
Tel. 08622 - 210902. Email: dvpl33@yahoo.com, www.doctorlifesciences.com

ANTIBIOTIC FREE,
STEROIDAL FREE.


Versatile Growth promoter and Immuno Booster in Gel Form
ALL IN ONE
gel
A UNIQUE COMBINATION OF FAT SOLUBLE VITAMINS, WATER SOLUBLE VITAMINS, AMINO ACIDS , TOXIN BINDERS, HEPATO PANCREATIC STIMULANTS, ANTI STRESSORS, USFA, LDLP, APF, AND MACRO & MICRO ELEMENTS IN GEL FORM
COMPOSITION :
Vitamin-A - 5000IU
Vitamin-D3 - 1000 IU
Vitamin-E - 15 mg.
Vitamin-B1 - 1.86 mg.
Vitamin-B2 - 1.25 mg.
Vitamin-B6 - 0.62 mg.
Niacinamide - 30 mg.
D-Panthenol - 1.26 mg.
Inositol - 10 mg.
Folic Acid - 10 mg.
Biotin - 15 mcg.
Vitamin-B12 - 6.25 mcg.
L-Lysine - 175 mg.
DL-Methionine - 150 mg.
Vitamin-C - 200 mg.
Toxin Binders - 200 mg.
Hepato Pancreatic stimulants - 100 mg.
LDLP - 15mg.
USFA - 5 mg.
APF - 30 mg.
Calcium Gluconate - 20 mg.
Magnesium - 25 mg.
Manganese - 15 mg.
Cobalt - 15 mg.
Zinc - 25 mg.
Selenium - 2.5 mcg.
Protein Hydrosylate - 1000 mg.
Betaine Hydrochloride - 1000 mg.
BENEFITS :
Improves feed conversion and growth rate. Enhances resistance against diseases. Ensures uniform growth. Neutralizes imbalances of Vitamins, Minerals, Amino Acids and Proteins Detoxify toxic materials and improves health. Improves absorption of the Calcium, Phosphorous and reduce incidence of loose shell.
DOSAGE :
50 ml per kg.
of feed or consult
your aqua technician
for specific usage
and dosage.
Presentation: 5 Ltr. & 25 Ltr.
Antibiotic Free, Steroidal Free
DOCTOR'S VET-PHARMA PVT. LTD
cG.M.P. Certified an ISO 9001:2008 Company
Survey No. 263/1, 264/1, P.R. Palem (V), Kovur (M),SPSR Nellore Dist.- 524137. A.P. INDIA.
Tel. 08622 - 210902. Email: dvpl33@yahoo.com, www.doctorlifesciences.com

IIAE discusses Industry Issues

Aqua International organises 36th Aquaculture Expo at Chennai

Chennai: ***India International Aquaculture Expo 2022 (IIAE 2022),*** a 3-day Exhibition, Conference and Awards Function was held in Chennai Trade Centre, Chennai on 6-7-8 April 2022. Nine Government Officials, Scientists, Experts, Entrepreneurs and Farmers addressed and made presentations on different topics and aspects of Aquaculture sector in the one day Conference held on April 6 titled as *"UPDATE Knowledge on Aquaculture"*. On this occasion, 18 stakeholders of Indian Aquaculture sector were honoured with Awards for the excellence they achieved in their profession and for their contribution to aquaculture development in India. Though the size of Exhibition was small and moderate with exhibitors and visitors, it was an expo with quality and standards.

In his welcome address Mr M.A. Nazeer, Chief Executive of the Expo and Editor, Aqua International said that he is indeed happy to see and meet all the participants after two years of COVID-19 Pandemic. All of us had lived in fear and threat in the last two years and by the grace of God, we are all safe and meeting today. I wish you all happy time and togetherness in the next three days in Chennai, a very prominent state for aquaculture in the country. Tamil Nadu state is a pride one in India for shrimp seed production and also for shrimp production and exports.

Dr A. Karuppasamy, Shrimp Farmer from Ramanathapuram, Tamil Nadu, inaugurating India International Aquaculture Expo 2022 at Chennai on April 6. Dr Babu Sudhakar, Harshavardhana Reddy, Udaya Ram Jothy, K. Nagarajan, N. Anil Kumar, M.A. Nazeer and others are seen

The Conference – **UPDATE Knowledge on Aquaculture** with the theme: **"Solutions for Sustainable Aquaculture Development – Need of Promoting Domestic Shrimp Consumption"** was addressed by the speakers.

M.A. Nazeer welcoming

The idea of the title of the conference "ÜPDATE Knowledge on Aquaculture" is to provide knowledge on advanced measures and methods in preparing shrimp and fish ponds, water quality, pond management, biosecurity, proper

Speakers in the Conference 'UPDATE Knowledge on Aquaculture' at Chennai on April 6.

Balasubramaniam V.
General Secretary,
Prawn Farmers Federation of India.

Dr G. Sugumar
Vice Chancellor,
Tamil Nadu Dr J. Jayalalitha Fisheries University, Nagapattinam

Dr Satender Arya
CEO, Agriculture Skill Council of India, New Delhi

Neeraj Kumar Srivastava
Chairman - CLFMA of India &
MD- South & South-East Asia
Novus International, Inc.

Dr R. Rajkumar Singh
Assistant Vice President,
C P Aquaculture (I) Pvt Ltd,
Andhra Pradesh

Dr Akshaya Panigrahi, Ph.D.
Principal Scientist,
Central Institute of Brakishwater Water Aquaculture, Chennai, Tamil Nadu.

Dr A. Jesu Arockia Raj
Founder & Head of FAITT,
Aquaculture Innovations &
Technology Transfer (FAITT),
Andhra Pradesh

Dr P.E. Cheran
AISHA - Tamil Nadu Region

Hogne Abrahamsen
International Account Director,
Zooca, Norway

nutrition and healthcare of the species, getting better yield at the end of the crop, harvesting and post harvesting measures, and export of quality produce to overseas, he stated.

The farmers in aquaculture should focus on producing quality Shrimps, Fish and Crabs to provide quality protein food for the domestic as well as export market. I wish that the participants will have good takeaway message updating their knowledge on aquaculture and be useful to the farming community and to the business community in the industry.

Dr G. Sugumar, Vice Chancellor, Tamil Nadu Dr J. Jayalalitha Fisheries University was the Chief Guest of the occasion.

Dr Satender Arya, CEO, Agriculture Skill Council of India, New Delhi, **Mr Balasubramaniam V.,** General Secretary, Prawn Farmers Federation of India, **Dr P.E. Cheran,** AISHA – Tamil Nadu Region, **Mr Neeraj Kumar Srivastava,** Chairman - CLFMA of India, Managing Director - South & South-East Asia, Novus International, Inc., **Dr Akshaya Panigrahi,** Principal Scientist, Central Institute of Brakishwater Water Aquaculture, **Dr R. Rajkumar Singh,** Assistant Vice President, C P Aquaculture (I) Pvt Ltd, Andhra Pradesh,

Mr Hogne Abrahamsen, International Account Director, Zooca, Norway and **Dr A. Jesu Arockia Raj,** Founder & Head of FAITT, Aquaculture Innovations & Technology Transfer addressed and made presentations in the Conference.

Expo Chief Executive and Editor, Aqua International, M. A. Nazeer presenting Mementos to Exhibitors at IIAE 2022 in Chennai on 8 April.







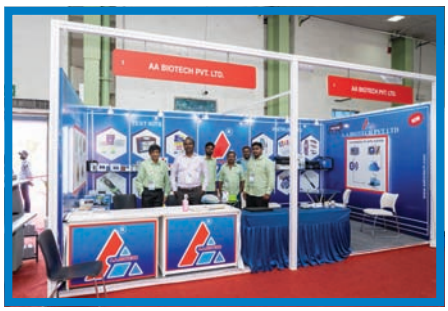




Water Quality
Specialised
Products Range
Farming
Fish Cult
Stem
PL 6+

A view of India International Aquaculcutre Expo 2022 held at Chennai on April 7 & 8


I&V BIO
... a better choice
NEEVA
AERO SOLUTIONS


AA BIOTECH PVT. LTD.


AGRICULTURE SKILL COUNCIL OF INDIA - ASCI


25 MEGAPLAST INDIA PVT. LTD.


PRAJAKT LIFE SCIENCE PVT. LTD.


FAITT R&D FOUNDATION


3 SHRIMP CARE SOLUTIONS
SHRIMP CARE SOLUTIONS


AQUASSTAR


Genetix Bio-Sciences Pvt. Ltd.


JAY JA. GROUP


HARIOM

HRIN 恒润机械

Hengrun HR Series Extruder

Suitable for all kinds of floating & sinking aquatic feed
The screw permutation is adjustable to fit different formulation.
Advanced automatic touch screen control system

Model	HR165	HR118X2	HR145X2	HR168X2
Capacity(t/h)	3-5	3-6	6-10	10-15
Type	Single-screw	Twin-screw	Twin-screw	Twin-screw

Hengrun HRHG (FB) Series Rotating-Type Dryer

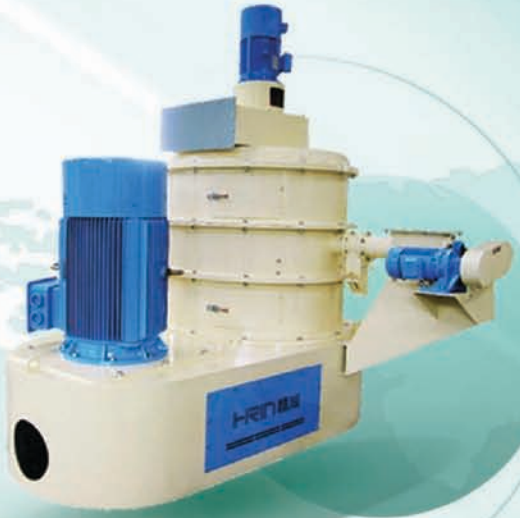
Moisture evenness≤1.5%
Use only one-third power compared to other competitors.

CE

ZHANJIANG HENGRUN MACHINERY CO., LTD

Add: Shapo Industrial Zone, Suixi, Zhanjiang, Guangdong, China (524300)
E-mail: hirin_co@126.com
Tel: +86 759 7770818 Fax: +86 759 7769088
Web: www.hirin.cn

Professional Feed Machinery Manufacturer



Hengrun SWFL Series Vertical Pulverizer

Vertical shaft with no-screen grinding, Bearing no maintenance. The production is uniform and the fineness is adjustable (Range from 40~200 mesh.)

Hengrun HRYTZ Series Vacuum Sprayer

Totally enclosed spraying space, Precision & Efficient spraying proportion widely ranged from 2%-30%.

AI Awards 2022 Winners along with Chief Guest Dr G. Sugumar, Vice Chancellor, Tamil N
(Details of AI Awards 2022 Function will be published in th

Panel Discussion in progress during the Confe

Nadu Dr. J. Jayalalitha Fisheries University and Chief Executive of IIAE 2022 M.A. Nazeer.
he June 2022 issue of Aqua International, English monthly)

erence "UPDATE Knowledge on Aquaculture".

Effective Feed Management in Shrimp farming with reference to *L.Vannamei*

Email: raghavendrudu.gullipalli@nutreco.com

Dr Raghavendrudu,
Product Manager Aqua Feed,
Skretting India, Hyderabad, India

The shrimp aquaculture sector represents one of the most lucrative and fastest growing segments of the global seafood industry. Farming practices currently employed for shrimp vary widely both between and within countries, which vary according to the species farmed, the financial resources of the farmer and the production method employed. In general, shrimp production methods can be divided into three basic types depending upon the shrimp stocking density and the external inputs received over the production cycle; these range from extensive non-fed pond-based farming systems to semi-intensive compound feed-fed pond-based farming systems. There are a variety of methods used to estimate feed inputs. Irrespective of the methods employed, all feeding protocols should at least include the following considerations. First, feed utilization should be planned, and daily feed inputs should be limited. Daily inputs must be reasonable and should consider the growth of the shrimp as well as nutrient recycling capacity of the pond ecosystem. Growth is easily estimated based on weekly sampling of the shrimp.

Using nutritionally balanced feeds and adopting good feed management practices can improve the production efficiency and reduce the environmental impacts of the feed. It is generally recommended to use high quality feed that would result in better cost-effectiveness due to better digestibility and reduced nutrient load on the culture system. The use of not so well formulated feeds would fail to meet the nutritional requirements of culture species unavoidably causing inefficiencies and increased production costs. Nutritionally balanced feed is a prerequisite to lucrative production; nevertheless,

Shrimps

the final success will depend on a combination of factors such as feed transport & storage, feeding regime and farm management, as depicted in Fig. 1.

Fig. 1: Factors affecting efficiency of shrimp farming

Well-managed feeding program will deliver precise feed rations to meet nutritional demands and suit feeding habits of culture animals at different development stages, ensuring effective nutrient utilization from both compound feed as well natural food.

Significance of Feed Management

In general, the nutritional performance of a shrimp feed depends upon five interconnected factors, namely:

- The nutrient content and composition of the diet being fed.
- The physical properties and water stability of the diet being fed.
- The transportation and storage of the diet prior to feeding on the farm.
- The feeding method employed for feed application and usage on the farm.
- The farming system, stocking density, water management and availability of natural foods.

Factors Influencing Feed Management

Feeding Behavior of Shrimp

• In natural environmental conditions, shrimp are scavenging opportunistic feeders. Under farming conditions as well they harness food particles suspended

Min Total™

Organic & Inorganic Mineral

- Natural Moulting
- Growth of Plankton
- Controls Body Cramp
- Pond Water Mineralization
- Shell Formation

Net Weight : 10 kg

HI-TECH PHARMA
Solutions for Animal Health & Nutrition

An ISO 9001 : 2015 Certified Company
An ISO 22000 : 2018 Certified Company
A GMP Certified Company

Corporate Office :
D.No. 15/395, 3rd Floor, Brindavanam, Nellore-524001. A.P. INDIA.
email : info@hitechpharma.co, website : www.hitechpharma.co
Mfg. Unit : 6-82/1, P.R. Palem, Kovur, Nellore-524137. A.P. INDIA.
Cust. care No.: +91 97010 22555

in the water column (e.g., phytoplankton, zooplankton, microbial flocs, organic detritus, etc.) and food organisms living on the pond bottom (e.g., plant and animal biota), in addition to the compound feeds.

• Shrimp have poorly developed eyes and thereby vision, hence consequently rely primarily on chemical attraction and stimulation to locate and consume their food, including compound feeds. This necessitates the compound feeds to remain immersed in water for prolonged periods of time (typically for several hours) prior to being externally masticated and then consumed.

Factors Influencing the growth of the shrimps

Under practical farming conditions, the feeding response, feed intake (Expressed as percent shrimp body weight), feed utilization efficiency and growth of shrimp vary with numerous biological, environmental, and human factors, including:

• **Shrimp body weight:** compound feed intake decreases with increasing body weight and decreasing metabolic rate over the culture cycle.

• **Water temperature:** compound feed intake and growth increases with increasing water temperature up to an optimum level (typically between 29 and 310 C for L. vannamei and P. monodon), with water temperatures and consequently dissolved oxygen levels. This may sometimes vary widely over a working day depending upon the culture system used and season.

Feeding

• **Natural food availability:** compound feed intake increases with decreasing natural food availability within the culture system (which includes natural foods present within the water column and/or pond bottom), with pond bottom natural food availability generally decreasing with increasing shrimp stocking density, increasing shrimp weight and increasing total shrimp biomass over the culture cycle.

• **Compound feed formulation and nutrient density:** feed intake and growth are dependent upon the water stability, palatability, and nutrient composition of the diet fed. The better the water stability and palatability and the higher the nutrient content of the diet fed, the higher the potential feed intake and feeding response of the diet (may not always be true).

Checktray checking after feeding

• **Shrimp feed application method:** compound feed intake and growth are usually easier to control and monitor during daylight hours within smaller hand-fed intensively stocked ponds (as compared with larger semi-intensively stocked ponds), with optimum feeding frequency. The timing of application is dependent upon the size of the shrimp and the nutrient density of the diet fed, and generally being highest for small, rapidly growing shrimp, and thereafter decreasing with increasing shrimp size.

• **Shrimp molt cycle, lunar cycle phase and feeding behavior:** feed intake and growth is dependent upon the physiological state and condition of the shrimp, with feed intake usually decreasing immediately prior to and during the molting cycle and natural feeding activity being highest during non-daylight hours.

• **Shrimp health and wellbeing, including ecosystem health:** feed intake and growth are generally lowest for stressed and diseased shrimp, including those in polluted and environmentally stressed pond ecosystems.

Effective Feed Management in Seasons

1) In summer adjust the feed content to three times; skip afternoon feeding to reduce feed wastage. During high temperature gut retention capacity is less so it consumes more feed so increase feed according to check tray observation.
2) In winter broadcast feed after sunrise because in lower temperatures feed intake will be less
3) During rainy day decrease feed 10% in total daily feed ration
4) Cloudy weather and rainy season adjust feeding according to check tray
5) During molting time reduce feed by 10% in total daily feed ration
6) Before feeding run aerators for 30 min so it increases more oxygen levels in water so feeding will be effective
7) Reduce 5% feed during high ammonia and other toxicants in pond water

CREATING MICRO-FLOATING FEEDS

LET US BUILD AND SUPPLY YOUR PLAN FOR AQUA FEED INDUSTRY.
WE PROVIDE TURNKY PROJECTS AND EXCELLENT SALES SERVICE

EXTRUDER

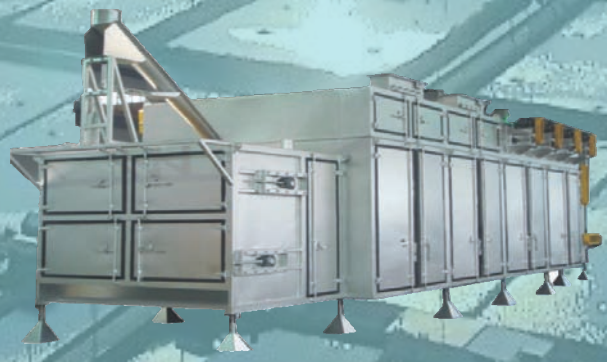
OIL COATING

We developed ϕ 0.5-0.8 mm (dies) floating fish feeds extruder in the world and commercial production succeeded in Southeast Asia and other countries.

The Extruder can do production in continuous without dies blocking and running for 8 hours. This tiny feeds product is suitable feeding on small fish, shrimp larval and etc.

AIR CLASSIFIER MILL

DRYER



COOLER

INDIA REGIONAL AGENT
ROTOSQUARE ENTERPRISES LTD.
www.rotosquare.com.tw
Email: boryu.roto@msa.hinet.net
Local contact : +91-9491383650
Dr. K.C. Patra
Email: kumuda123@yahoo.co.in

TAIWAN HEADQUARTER
SOON STRONG MACHINERY WORKS CO.,LTD.
NO.2 LUNG SHIANG 1 RD. SUAO CHEN,I-LAN TAIWAN
Tel :+886-3-9901815
Fax : +886-3-9905677
E-mail : soon.strong@msa.hinet.net

Nutritionally balanced feeds - Skretting Gamma & Lorica feeds

Gamma - Skretting's feed with high protein and right pellet size are formulated with high precision to deliver balanced nutrition with equal emphasis been placed on species specific formulation. Gamma feeds promise to deliver optimal amino acid balance, immuno-stimulants and attractants which provides highly digestible and bio-absorbable nutrients along with apt palatability. This ensures that the nutritional requirement of the *L.Vannamei* is met leading to optimal growth of the shrimp in various rearing conditions.

Gamma feed comes in 8 different pellet sizes, according to the life stage of shrimp and thereby eliminates the possibility of size variation. Consistent quality and nutrient density in Gamma, enables lesser feed intake for specific growth rates, leading to better Feed Conversion Ratio (FCR). It also stimulates the feed intake, thus allowing the shrimps to reach their full growth potential and possesses excellent water stability.

At the same time **Lorica - Skretting's Functional Feed for Nursery Stage** contains highly digestible protein with high animal protein inclusion suited for nurseries as well as high density farming. Lorica contains immunostimulants which effectively work against bacteria in gut leading to higher survival rate in shrimp. Lorica possesses all nutrients in line with the requirements of the L.vannamei in nurseries as well as grow-out ponds. Lorica can also be used during the entire production cycle of shrimp to improve the overall farm zootechnical performances.

Xpand shrimp feed is the outcome of Skretting Aquaculture Innovation (AI) Norway. Xpand is a new high performance functional feed which provides flexibility to reduce the grow out phase and harvest shrimp earlier or harvest a bigger size in the same duration. It is developed based on improved nutrition, improved growth, and improved pond support with high amount of feed attractants, immuno-stimulants that improves better immunity as well as lowers FCR. It also has higher animal protein content which results in faster growth of shrimps.

Summary

Aquafeed management should aim at making available the best quality, formulated aquafeed in adequate amounts and at the right time and location. Feeding methods and techniques are as important as feed quality and are closely interdependent. Feeding practices must be continually modified and adapted to account for natural and induced changes in feeding activity and preferences as the animals grow and environmental conditions change.

Knowledge of shrimp behavior and feeding habits and continuous feedback on pond environmental parameters and shrimp population management must be considered together. This must be coupled with an understanding of the biological aspects of the targeted species and the chemical and biological processes that control, water and pond bottom quality. Effective management practices will produce maximum shrimp growth and survival concurrent with the lowest feed conversion.

SUBSCRIPTION ORDER FORM

Aqua International

English monthly on Aquaculture

Subscribe to Aqua International and Update yourself on Aquaculture

☐ 1 Year (12 issues): Rs 800 ☐ 2 Year (24 issues): Rs 1500

☐ 3 Year (36 issues): Rs 2100 ☐ 5 Year (60 issues): Rs 3500

Payment for subscription should be sent by Cheque/Bank Draft drawn in favour of **NRS Publications**, payable at Hyderabad.

Name of the Company: .....

Mr/Ms: ..... Designation : .....

Address: .....

.....

.....

Place / City : ..... State : ..... Pin Code :.....

Mobile: ..... Tel: .....

E-mail: .....

PAYMENT: Please find enclosed a Bank Draft/Cheque No ..... Dated .....

for Rs ..... favouring **'NRS PUBLICATIONS'**, payable at Hyderabad, India.

Please send the magazine to the above address.

Date: Signature

Payment may also be sent through wire transfer. Our Bank Account details are: ***A/c Name:*** *NRS Publications,* ***Bank Name:*** *ICICI Bank Limited,* ***A/c No:*** *000805004644,* ***IFSC Code:*** *ICIC0000008,* ***PAN No.*** *ABMPM6671L,* ***Swift Code:*** *ICICINBBNRI.*

NATURE OF ACTIVITY (Please mark √ in the appropriate box)

☐ Farmer ☐ Hatchery ☐ Feed Manufacturer

☐ Healthcare & Nutrition Co. ☐ Technical Expert

☐ Aerators & Equipment Suppliers ☐ Consultant

☐ Processing / Exporter ☐ Insurance Company

☐ Dealer / Distributor for: Seed / Feed / Healthcare & Nutrition Products / Equipment ☐ Others

Mail this Subscription Order Form duly filled in along with payment to:

The Circulation Department,
AQUA INTERNATIONAL, NRS PUBLICATIONS
BG-4, Venkataramana Apartments,
11-4-634, A.C.Guards, Near IT Towers,
Hyderabad - 500 004, India.

Tel: 2330 3989, Mob: 96666 89554

E-mail: info@aquainternational.in, forum@aquainternational.in

Website: www.aquainternational.in

NRS PUBLICATIONS
www.aquainternational.in

FOR OFFICE USE

Inward No. ..... Received on ..... DD/Cheque No: .....

Date : ..... Subscription No. : ..... Initial: .....

New
Most advanced
Technology
best Quality

Century
AQUACULTURE PRODUCTS

100% MADE IN INDIA

6 Wheel Paddle Aerator

4 Wheel Paddle Aerator

Root Blower

Air Blower 2hp

Stocking Blower Aerator

Pump with Motor

Submersible Pump Aerator

Monoblock Pump

HDPE P-Lining

INDIA'S 1st ISI Company

IS : 10889

Sludge / Mud Pump

Shovel

www.princegraphic.com +9198242 20316

Manufactured By : **Century Aquaculture Products Pvt. Ltd.**
8, Maninagar, Mavdi Plot, RAJKOT - 360 004. E-mail : info@centuryaquaculture.com
Visit us :www.centuryaquaculture.com Cell No. : 098242 99885, 090334 59993

CORALS REEFS

D.P. Rajesh and H. N. Anjanayappa
Department of Fisheries Resources and Management, College of Fisheries, Mangaluru - 575 002, Dakshina Kannada – District., Karnataka, India.
Email: d.prajesh@yahoo.com

Highlight Points

- Significant values for coral reefs.
- Coral reef has a positive impact on the economy.
- Coral reef benefit the economy.
- Coral reefs are a popular tourism attraction.
- A healthy habitat of coral reefs.
- Common threat to coral reefs.

Taxonomy:
Kingdom -Animalia
Phylum - Cnidaria
Class -Anthozoa (Ehrenberg, 1831)
Subclass - 1-Octacorilla (soft corals)
2-Hexacorilla (Hard corals)
Class - Anthozoa

What are **Coral Reefs**?
Coral colonies grow continuously in size by budding of polyps and often form extensive masses, known as coral reefs. A coral reef is a ridge or mound of limestone, the upper surface of which is near the surface of the sea and which is formed chiefly of $CaCO_3$ secreted by coral polyps. Principal builders of coral reefs are stony corals (Madreporaria), but other important contributors are the hydrocorallines and alcyonarians.Coralline algae and Foraminiferan Protozoa also take part in the formation of coral reefs. Reef-building corals require warm, shallow waters (normally above 20°C).

Corals are marine animals in the class Anthozoa of the phylum Cnidaria typically living in compact colonies of many identical individual "polyps". The group includes the important reef builders that inhabit tropical oceans and secrete calcium carbonate to form a hard skeleton. Coral reefs are sometimes referred to as a "rain forest in the ocean" because, like tropical forests which have a large variety of life, coral reefs also have a large variety of life. The polyps use their tentacles to catch tiny animals that float in the water called zooplankton. But corals get most of their food from marine plants that actually *live inside* the coral.

A coral reef is made of millions of tiny animals called coral polyps. These coral polyps are nocturnal animals. Corals produce children that are called planulae. A coral "head" is a colony of myriad genetically identical polyps.

The International Union for the Conservation of Nature (**IUCN**) has named coral reefs as one of the life-support systems essential for our own survival. Found around coastlines in the tropics, coral reefs provide homes for about a third of all fish species on Earth and numerous other marine organisms.

Reefs are physically as well as biologically important; coral reefs play a fundamental role in protecting coastlines from erosion and contribute to the formation of white sandy beaches.

Why are coral reefs important?

Coral reefs are some of the most diverse and valuable ecosystems on Earth. Coral reefs support more species per unit area than any other marine environment, including about 4,000 species of fish, 800 species of hard corals and hundreds of other species. Scientists estimate that there may be millions of undiscovered species of organisms living in and around reefs. This biodiversity is considered key to finding new medicines for the 21st century. Many drugs are now being developed from coral reef animals and plants as possible cures for cancer, arthritis, human bacterial infections, viruses, and other diseases.

Functions of Coral Reefs: Coral reefs are important for many different reasons aside from supposedly containing the most diverse ecosystems on the planet.

- protect coastlines from the damaging effects of wave action and tropical storms
- provide habitats and shelter for many marine organisms
- are the source of nitrogen and other essential nutrients for marine food chains
- Assist in carbon and nitrogen fixing, help with nutrient recycling.

Habitat: They are home to 33% of all known fish species.

Nursery: And a nursery ground for over 25% of all marine species.

Income: They provide millions of dollars of income annually for people living coral reefs.

Medical Future: Coral reefs have the potential to be used as medical cures to treat cancer, heart disease, HIV and arthritis among others.

Coastal Protection: They protect 20% of the world's coast from wave erosion.

Food Resources: They are a food source for millions of people.

Tourist attraction: Coral reefs attract tourists from all over the world.

A world's first super food To feed super larvae.

We combined probiotics and organic acids in a dry, non-GMO, food product that doesn't exist anywhere else in the world: Introducing

MegaSphe.

Your larvae will benefit from animal proteins from 100% marine origin.
It's unique, just like your hatchery.

megaSphe Nurturing from the start.

www.megasupply.com . orders@megasupply.net

Let's aquaculture together
MEGASUPPLY

ECMPS
Exclusive distributor for India

EAST COAST MARINE PRODUCTS AND SUPPLIES
Contact: 9380246133 . E-mail: info@ecmps.in
New. No.294, Old Nº.186, Malhotra House IInd Floor, Thambu Chetty Street, Parrys Chennai-600001, Tamilnadu, India.

Economic importance of coral reefs:

- Corals of the remote geological past formed reef structures that were highly favorable sites for the accumulation of petroleum deposits.
- Thus, coral reefs are of much importance to the oil industry.
- Large quantities of corals are shipped every year for the curio trade.
- The coral reefs serve as habitats for many plants and animals like sponges, molluscs, echinoderms, fishes, etc.
- Some coral reefs are used as habitations by man as well.
- Some corals are highly-priced for their decorative value.
- *Corallum rubrum* is considered to be a precious stone in India and China and treated as auspicious.
- The red coral and organ pipe coral are used in some indigenous systems of medicine in India.
- Chunks of a coral skeleton belonging to species *Porites* are used as a building material.
- Coral skeletons serve as raw material for the preparation of lime, mortar and cement because of their calcium carbonate and magnesium carbonate content.
- Coral skeletons are also helpful in making ridges that may act as natural barriers against sea erosion and cyclonic storms.
- Coral reefs serve as good nursery grounds for commercially important fishes.
- Reef fish varieties are more colorful than others.

An Economic Resources :

- Supporting millions of people as a source of food and income
- Function of coral reefs considered as that forest
- At least 500 mil. People rely on reefs for food. Coastal protection, and livelihoods.
- Fisheries for food
- Fisheries for jobs
- Tourism
- Building materials
- Aquarium trade

The economic significance of coral reefs.

microbasia

Plot No. 4/328, Sivapatham Street, Mel Ayanambakkam, Chennai - 600 095 . INDIA. Customer Care: +91-9445211141 / customercare@microbasia.com

Underwater heat waves triggered an increase in lethal coral bleaching.

The first economic resource relating to this ecosystem is tourism. Almost all Tropical countries and many countries in the Indian Ocean have wonderful reefs along their coasts. Tourists include lovers of underwater sports, All the Caribbean countries depend on tourism for about one half of their gross domestic product. Coral ecosystems are a source of food for millions; protect coastlines from storms and erosion; provide habitat, spawning and nursery grounds for economically important fish species; provide jobs and income to local economies from fishing, recreation, and tourism; are a source of new medicines, and are hotspots. Healthy coral reefs support commercial and subsistence fisheries as well as jobs and businesses through tourism and recreation. Biodiversity is the variety of living species that can be found in a particular place—region, ecosystem, planet, etc. Coral reefs, thanks to their diversity, provide millions of people with food, medicine, protection from storms, and revenue from fishing and tourism.

Types and Identification of corals:

Based on their appearance, the reef building corals are classified.

Hard corals

Hard corals are most often referred to as corals that contain a 'hard' calcium skeleton and they are also referred to as stony corals and are a member of the order Scleractinia. In most cases, these skeletons grow very slowly, i.e. 1 cm a year.

Massive corals

Massive corals are characteristically ball or rock shaped and relatively slow-growing. They have very stable profiles; massive corals are relatively undamaged by strong wave action unless they are dislodged from their holdfasts.

Branching corals

Branching corals are characterized by having numerous branches, usually with secondary branches. They are attractive, colorful and fragile. It's highly used for ornamental purposes.

Digitate corals

Digitate corals are characterized by finger-like branches and they are distinguished from branching corals in that they have no secondary branches. It does not grow very long and is dull in color.

Table corals

Corals that form broad horizontal surfaces are commonly called Table corals, they resemble that of a table. The size of the Table corals may vary from small round shaped plates to large round tables.

Folios corals

Corals with false or coil-like growth patterns of beautiful structures that have been compared to the open petals of a flower. The coral's folds and densities greatly increase their surface area, and the space in between the coils may provide shelter for fish and invertebrates.

Cup corals

Cup corals resemble exactly like that of a cup. The size may vary from small caps to large cups and they are locally called 'Vattai'.

Solitary corals

Solitary corals are often flat or dome-shaped and circular or slightly oval in shape, resembling the cap of a mushroom. Most mushroom-shaped corals are solitary forms living unattached to any underlying substrate.

Soft corals

Soft corals are dominant elements of the reef environment, providing all sorts of shapes and colors ranging from red and yellow to orange and purple, they resemble that of a sponge. They contain minute, spiny skeleton elements called sclerites. Thus, they are not reef-building corals and do isn't laying new foundations for future corals. Soft corals are found worldwide in the reef environment. This near-surface-depth allows for currents that provide the soft corals with food and oxygen.

Sea fans

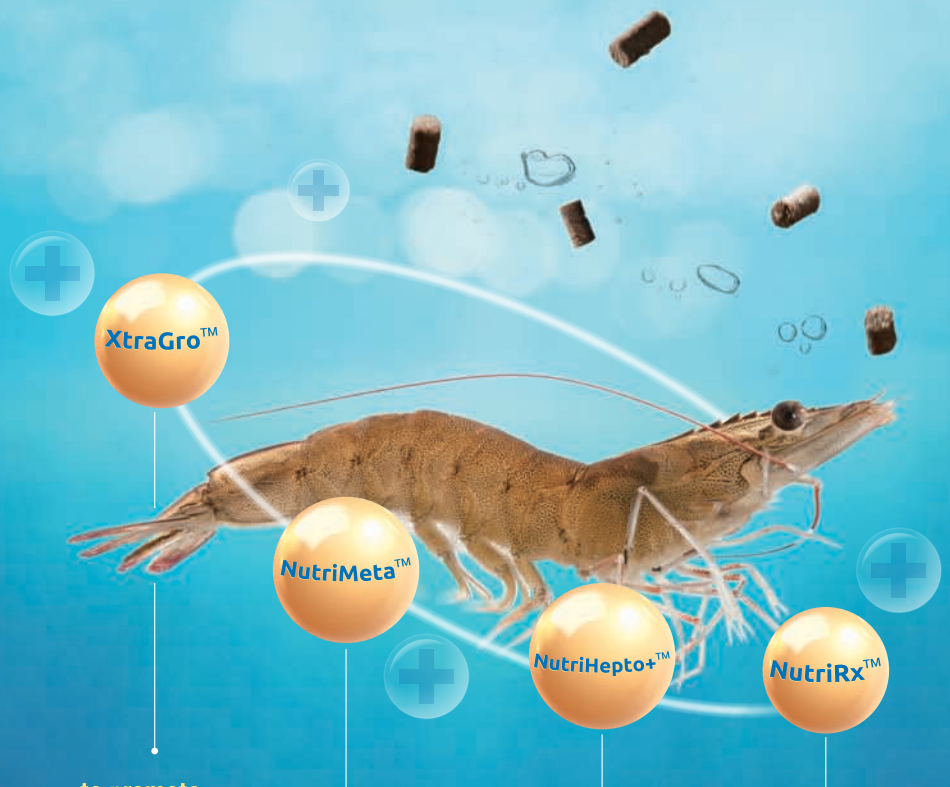
Sea fans look a lot like plants with colorful, forked branches, but they are actually animals, they look very much like manual fans. They are made up of many tiny individual animals that work together as one. The individual animal lives along the sea fan's branches and look like little anemones. The main structural skeleton of a sea fan colony is formed from a flexible, horny substance called gorgonin with living polyps covering the surface. Sea fans do not attach themselves to a hard substrate; instead, they anchor themselves in mud or sand. Each sea fan polyps have eight tentacles which catch plankton that is consumed.

Types of reef

About 150 years ago, Charles Darwin, the father of evolution, divided the reefs into three types. The three different types of reefs are **fringing reefs, barrier reefs,** and **atolls**. Coral reef organisms can be found in different parts of the reef called zones. The zones are called the reef flat (0-2 meters in depth), reef bench (2-10 meters in depth), reef slope (10-30 meters in depth), and the rubble (30-40 meters in depth) zones. The coral community varies according to distance and depth from shore. Different environmental conditions can be found in the zones such as wave action, salinity, and temperature. Many reef organisms can survive only in a certain zone. The three principal reef types are:

GROBEST

Only Grobest delivers Grobest quality and Grobest results



to promote the growth

to enhance the absorption and digestion

to improve the vitality

to enhance the immunity system

The Grobest Difference.
We provide the most advanced, effective and sustainable aquatic feed and nutrition solutions.

GroStronger *GroFaster* *GroSustainably*

GROBEST FEEDS CORPORATION (INDIA) PVT. LTD.

25/1A&1B, Perambur Redhills High Road, Kathirvedu, Vinayagapuram, Chennai -600 099. TN, India

Phone: +91 44 25651813 / 75500 41414 • Email: gb_india@grobest.com • Web: https://in.grobest.com

Fringing reef - These are generally narrow platforms directly attached to a shore, They can develop in shallow waters along the coast of tropical islands or continents. These are relatively young. This type of coral reef is the most common type of reef found in the Caribbean and the Red Sea. A fringing reef may extend out to a distance of a quarter-mile from the shore with the most active zone of the coral growth facing the sea. This seaward zone is commonly called the edge or front. A shallow water channel, 50 to 100 meters broad, lies between the reef-edge and shore. At low tide, the water of a channel recedes at quickly exposing a flat bottom surface, called reef flat. It is largely composed of coral sand, mud, dead and living coral colonies, and other animals.

Barrier reef – Like fringing reefs, these also run parallel to the coastline, but separate from the land mass by a shallow lagoon. They are usually found 1/2 to 3 miles from shore, but can also be found farther out than that. They can also survive rough waters. The stretch of water, separating the barrier reef from land, may be half a mile to 10 miles or more in width. It is called a lagoon. It is 10 to 50 fathoms deep and suitable for navigation.

Atoll reef - this more or less circular or continuous barrier reef extends all the way around a shallow, sandy, sheltered lagoon without a central island. An atoll is also termed a coral island or lagoon island. It is a ringlike or horse-shoe-shaped reef that encircles a lagoon but not an island.

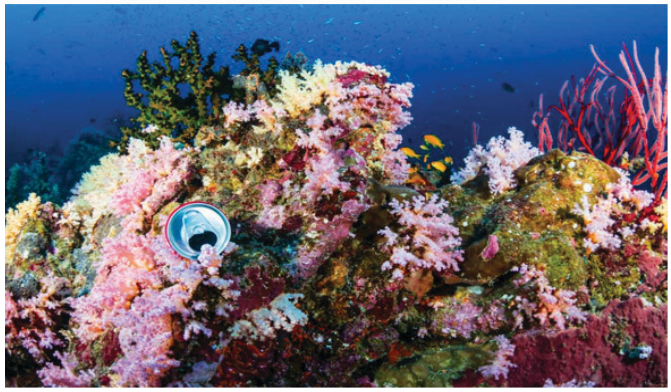
How a healthy environment for coral reefs:
Healthy coral reefs support commercial and subsistence fisheries as well as jobs and businesses through tourism and recreation. The conditions for healthy coral to grow.

Light: Reef-building corals contain single-celled algae in their tissues called zooxanthellae. The algae live in a symbiotic relationship with the coral (i.e. They are reliant on each other for their mutual survival). The algae provide the coral with food manufactured from photosynthesis and in return, the algae receives a safe home as well as nutrients from the waste created by the coral polyp. The zooxanthellae rely on light; therefore these reef-building corals are restricted to the shallow depths of coral reefs, about 60 m or 200 ft.

Low nutrient and clear water: The numerous organisms that inhabit coral reef waters are incredibly efficient at taking up nutrients as soon as they become available from decomposing organisms or dissolved in the water column. Nearly all nutrients are taken up by living organisms leaving the water nutrient-poor and clear**.** Clearwater is important to allow light to penetrate to the corals so that the zooxanthellae can photosynthesize.

Salinity: Salinity of between 32 - 42 ppm (parts per million) is optimal for most coral reef organisms. Coral growth is reduced in areas with large freshwater inputs.

Temperature: Optimal temperatures for tropical coral reefs range between 23° and 29°C. Some corals are adapted to survive outside this range. Some reefs have recently been discovered in deep, cold water areas, but these are different from the coral types found in shallow, tropical waters. Excessive temperatures from 33°C upwards (although this varies according to the locality and tolerance of individual corals) can cause the loss of zooxanthellae, bleaching and potentially death.



Coral Reef Destruction

POSEIDON INDIA
25 years
1995 2020
... of living and growing with nature

POSEIDON BIOTECH

An ISO 9001 : 2015 certified company

2&3, PKM Cross Street, School Road, Mel Ayanambakkam, Chennai - 600 095 INDIA.

Customer Care: +91 94440 24888 / customercare@poseidonbiotech.com / www.poseidonbiotech.com

Water circulation: waves and currents bring in oxygenated water, prevent sediment deposition, and renew the plankton food supply. Reef development is usually greatest in areas subject to moderate wave action and other important are turbidity& Sedimentation, Wave action and aerial exposure.

Common threat to coral reefs:

Coral reefs face many threats from local sources, including Physical damage or destruction from coastal **development**, **dredging**, quarrying, destructive **fishing** practices and gear, boat anchors and groundings, and recreational misuse (touching or removing corals).

Anchors, Ship grounding, Divers and snorkelers, Coastal development, Fishing and Collecting, Boating. Overfishing, thermal pollution. Discharge of nutrients. Coral bleaching. Coral reefs are severely threatened by pollution, disease, and habitat destruction. Once coral reefs are damaged, they are less able to support the many creatures that inhabit them and the communities near them. When a coral reef supports fewer fish, plants, and animals, it also loses value as a tourist destination.

Read and Advertise in

Aqua International

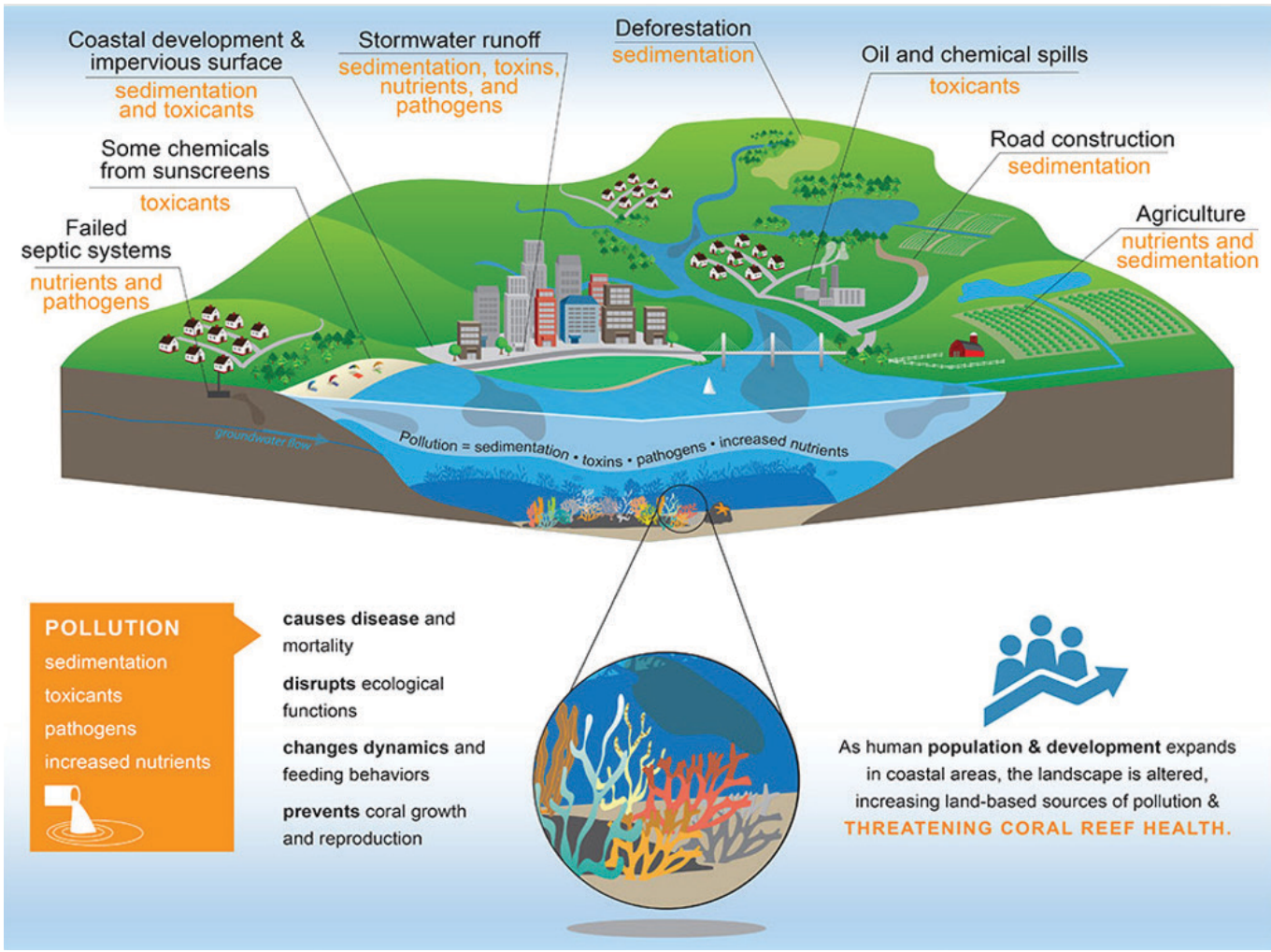
English Monthly Magazine

Annual Subscription Cost: Rs 800

To subscribe, Contact:

NRS Publications

BG-4, Venkataramana Apartments,
11-4-634, A.C. Guards,
Hyderabad - 500 004, Telangana, India.
Tel: 040-2330 3989 • Mobile: 96666 89554
Email: info@aquainternational.in



Threats to coral reefs from terrestrial sources

BKMN

BKMN AQUA

SPF. L. vannamei Seed Production Center.

"YOUR SUCCESS IS OUR GOAL"

- Well Experienced & Qualified Team.
- Antibiotic Free Seed Production.
- Own Maturation Centers.
- Equipped with High-Tech Facilities.
- Screening of Nauplii & Post Larvae By PCR.

Vijayawada
Ongole
Nellore
Gudur
Pondicherry

HATCHERIES

Amaravathi karakata road, Undavalli Village, Tadepalli Mandal, Guntur Dist Vijayawada, Andhra Pradesh - 522501

SY No. 1189/2, 1190/1,2,6 Srikakulam Village, Ghantasala Mandal, Krishna Dist - 521132

R.S. No. 248, Ramudupalem Village, Challapalli Mandal, Krishna Dist - 521126

SY No. 206, Vajjireddypalem Village, Rajupalem Post, Kothapatnam Mandal, prakasam Dist, Andhra Pradesh - 523280

SY No. 489/2A Ramudupalem Village, Madivathipalem Post, Indukurpet Mandal, SPSR Nellore - 524313

Tupilipalem Village, Vakadu Mandal, SPSR Nellore Dist, Andhra Pradesh - 524415

1/5, Anna Street, Chinna Kuppam, Kadalur Village, Seyyur Taluka, Kanchipuram Dist Tamilnadu - 603305

BKMN Aqua
BKMNAquaHatcheries
www.bkmnaqua.com
1800 572 6232
info@bkmnaqua.com
bkmnaqua@gmail.com
For Bookings:
8179751745, 9603769095

A look at Integrated Multi-Trophic Aquaculture (IMTA) system

Email: monicasomannak@gmail.com

Monica K.S., Dr. Ganapathi Naik M. and Jayashree Swamy
Department of Aquaculture, College of Fisheries, Mangaluru

Highlight Points

Integrated Multi-Trophic Aquaculture (IMTA) is a type of aquaculture that combines fed species with organic extractive species and inorganic extractive species that thrive on aquaculture waste. The IMTA concept is simple and adaptable. IMTA systems can be land-based or open-water, such as marine or freshwater, and can include a variety of species combinations. The principal goal of IMTA is to ecologically engineer systems for environmental, economic, and social sustainability.

Introduction

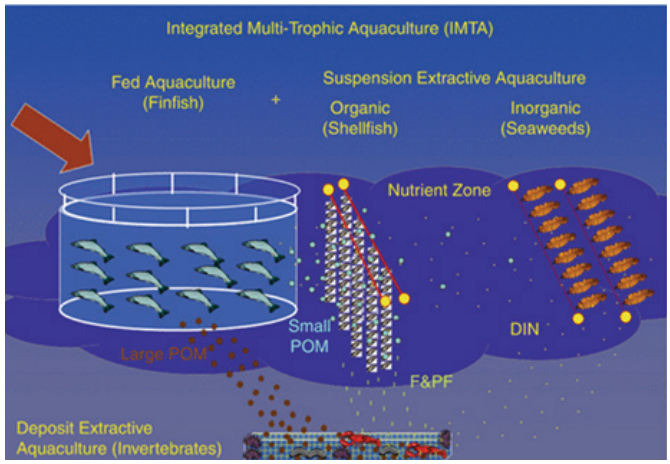
The rising global population has a growing hunger for seafood, and with supplies from catch fisheries stagnating, aquaculture is being pressed to fill the gap. The shift from fisheries to aquaculture has been rising at a pace of more than 6% per year, and aquaculture now supplies more than half of the fish consumed globally. The aquaculture sector has to produce more creative, responsible, sustainable, and lucrative techniques that are ecologically efficient, environmentally benign, product-diversified, and societally helpful in order to continue to expand while improving management techniques. Maintaining sustainability has become a crucial concern, not just from an environmental standpoint, but also from an economic, social, and technological standpoint, as a result of growing customer awareness of quality, traceability, and manufacturing circumstances. Integrated multi-trophic aquaculture (IMTA) has the potential to help achieve these goals by combining fed species (e.g., finfish or shrimp fed sustainable commercial diets) with extractive species (e.g., suspension- and deposit-feeders) that use the inorganic (e.g., seaweeds or other aquatic vegetation) excess nutrients from aquaculture for their growth.

Integrated Multi-Trophic Aquaculture

Integrated multi-trophic aquaculture, or IMTA, is similar to polyculture, where it involves the farming of two or more species together. Multiple aquatic species from various trophic levels are farmed together in IMTA to increase efficiency, minimise waste, and provide ecosystem services like bio-remediation. Lower trophic level species (generally plants or invertebrates) get nutrients from waste products such as excrement and uneaten feed from higher trophic level species (primarily finfish). The lower trophic species can then be collected alongside the fish to increase revenue for the farmer, or even fed back to the fish.

Integrated multi-trophic aquaculture (IMTA) is a circular economy method that tries to combine the production of aquaculture species from various trophic levels while reducing energy losses and environmental degradation. Under IMTA production, Unused feed and waste from one species are gathered and turned into feed, fertilizers, and energy for another species. IMTA can help to ensure the long-term viability of aquaculture, which has environmental, economic, and social benefits. Nutrient cycle, higher economic resilience resulting from enhanced production efficiency, product variety, and possible price premiums can all help achieve this.

IMTA systems come in a variety of combinations, combining the production of vertebrate and invertebrate species as well as macroalgae. Cultivated organisms are fed aquatic species, like fish or shrimp, and species extracting the organic and inorganic matter from the water. Mussels, oysters, clams, sea urchins, and polychetes are some of the species that remove organic materials. Organic waste, such as uneaten food and excrement, is a food source for



FECPI

SOLUTION FOR SUSTAINABLE

AQUA CULTURE....

Our all Products are Registered with CAA as Antibiotic-free Product

Imported and Marketed by

FECPI India Pvt. Ltd.

Admin. Off. : D-Block, Ground Floor, Sripati Nilayam,
No.85, Vallalar Street (School Road), Keal Ayanambakkam,
Chennai - 600 095. Mob : +91 99449 88192, Ph : 044 49523456

visit us at : www.fecpi.in

these animals. Inorganic nutrient wastes are captured and used by species such as macroalgae (e.g., Ulva, Gracilaria, Saccharina, and Laminaria). Because wastes from fish/ shrimp production are viewed as a resource rather than a burden or pollution, IMTA enables for the construction of more sustainable production methods. This helps in environmental sustainability and more effective resource utilisation, while also supporting economic diversification (product variety, risk reduction, and social acceptability) (best management practices).

This approach differs from finfish "polyculture," in which the fish share the same biological and chemical processes, potentially causing ecological shifts. The term "multi-trophic" refers to a system that contains organisms from several trophic levels. IMTA integrates multi-trophic sub-systems, which refers to the more intense cultivation of diverse species in close proximity to one another, connected through fertiliser and energy transfer through water.

Species selection

Because environmental sustainability is a primary factor in IMTA, the criteria for selecting species is to mimic a natural ecosystem. Feed, such as pellets or trash fish, nourishes fed species such as carnivorous fish and shrimp. Extractive creatures get their food from their surroundings. Bivalves and seaweed are two commercially important cultivated groupings that belong under this category.

Fed-aquaculture species sub-system in IMTA

Finfish are the only fed component of most IMTA systems, and hence constitute the only human-supplied source of nutritional energy. Fish offer dissolved and particulate nutrients, as well as oxidation reduction potential reducing chemicals to the other component species and money to the industry, as part of their role in an IMTA system. The amount and form of these nutrients depends on a variety of parameters, including species, size, and feed formulation.

Inorganic extractive sub-system in IMTA

Aquatic plant biofiltration is assimilative, which means it adds to the environment's nutrient assimilation capability. Plants photosynthesize new biomass using solar energy and surplus nutrients (especially C, N, and P). The procedure creates a mini-ecosystem in the culture system, in which plant autotrophy, if properly balanced, counteracts fish and microbial heterotrophy, not only in terms of nutrients, but also in terms of oxygen, pH, and CO_2. Plant bio-filters can thereby lower the overall environmental impact of fish farming and stabilise the culture environment in a single step.

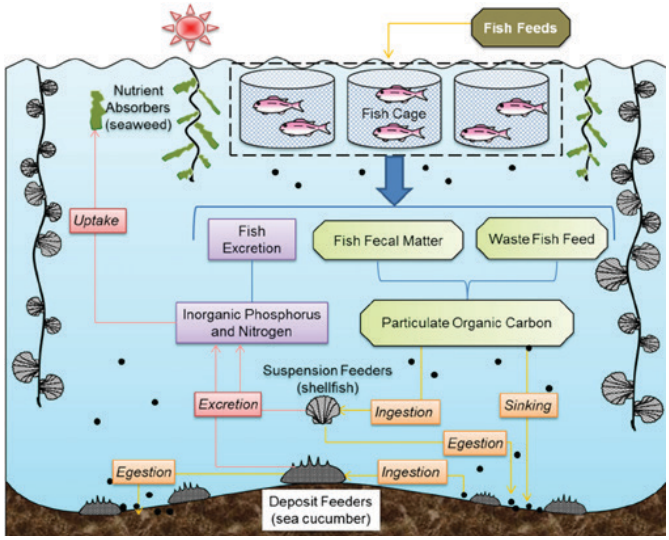
Seaweeds are ideal for bio-filtration since they are perhaps the most productive of all plants and can be farmed affordably. As phycocolloids, feed additives, agrichemicals, nutraceuticals, and medications, seaweeds have a substantial market for human use.

Organic extractive species sub-system in IMTA

Filter-feeding bivalves are cultured adjacent to meshed fish cages in a conceptual open-water integrated culture system, reducing nutrient loadings by filtering and assimilating particulate wastes (fish feed and faeces) as well as any phytoplankton production stimulated by introduced dissolved nutrient wastes. Rather than being lost to the surrounding environment as in typical monoculture, waste nutrients are collected when the cultivated bivalves are harvested. There is also the possibility of increasing bivalve development and production above what is generally expected in local waters with an improved food supply within a fish farm. As a result, integrated culture has the potential to improve a fish farm's efficiency and output while lowering waste loads and decreasing environmental consequences.

IMTA system designs

To capture both particulate and dissolved waste materials created by fish farms, a good IMTA operation necessitates the selection, arrangement, and positioning of several components or species. The chosen species and system architecture should be engineered to maximise waste product recapture. Deposit feeders, such as sea cucumbers and sea urchins, ingest bigger organic particles that descend below the cage system, such as uneaten feed and faeces. Filter-feeding animals such as mussels, oysters, and scallops filter small suspended particles out of the water column at the same time.



Conceptual diagram of Integrated Multi- Trophic Aquaculture system

Benefits of IMTA:

1. Effluent bio-mitigation
2. Increased profits through diversification
3. Improving local economy
4. Form of 'natural' crop insurance
5. Disease control
6. Increased profits through obtaining premium prices

Challenges to be faced:

1. Higher investment
2. If multiple operators (for example, independent fish farmers and mussel farmers) collaborated, coordination of management and production activities is difficult.
3. Increase requirement of farming area
4. Implementation challenges without open water leasing policies

Global Leaders in Aqua Nutrition

SKRETTING
a Nutreco company

Skretting's Grower Shrimp Feed Range

SKRETTING INDIA
Unit No. L4 04, SLN Terminus, Survey No. 133, Besides Botanical Gardens
Gachibowli, Hyderabad - 500032, Telangana I contact.india@skretting.com
www.skretting.in | Skretting-India | Skretting India

Connect with us

Potential of Omega 3 Fatty Acids Producing Marine Microalgae from Indian Coastal Waters for Industrial Application

Email: rani@tnfu.ac.in

Rani V., Thamarai Selvi M. J. and Abarna K.
Department of Aquatic Environment Management,
Fisheries College and Research Institute, Tamil Nadu Dr. J. Jayalalitha Fisheries University,
Thoothukudi, Tamilnadu – 628 008

Introduction

Microalgae are the unicellular photosynthetic organisms with wide range of diversity estimated around 200,000 to 800,000 (Saharan et al. 2013). Microalgae produce variety of primary and secondary metabolites. These metabolites show numerous activities including immune-modulating, anti-inflammatory, anti-cancer, antimicrobial, antioxidative activity, with potential use in the production of pharmaceuticals, nutraceuticals and cosmetic industry. The antimicrobial, antioxidative, anti-inflammatory, and anti-cancerous properties of microalgal derivatives contribute towards their varied industrial applications. Among these Omega-3 fatty acids like eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) provide important health benefits which led to an increased consumption aws dietary supplements for both humans and animals. Omega-3 unsaturated fatty acids EPA and DHA are found in animals, plants, fungi and many other microorganisms but it was typically derived from fatty fish, creating extra pressures on worldwide fish stocks. Many marine microalgae contain EPA (C20:5) and DHA (C22:6) and present a promising source of omega-3 fatty acids. Certain microalgal species are cultivated at industrial scale to extract fatty acids for human & animal consumption, cosmetics and pharmaceutical industry. Decreased fish population and ocean contamination of heavy metals (lead, cadmium, mercury,etc.) urge as to explore the other alternative source PUFA. Microalgae are considered as a potential alternative source for PUFA.

The estimated market price of omega 3 from algal oil is about USD 140/Kg (Leema et al.2021). Being devoid of heavy metal contaminants and vegetable source of oil for vegans, microalgal fattyacid has advantage over other source of fattyacid extraction. Due to this reason microalgal industry is expected to undergo a market boom in the upcoming decade. Microalgal supplements (power based and extracts) as well as microalgal fuels are expected to show a significant increase in market value. Microalgae are an under-utilized source of high-value products, so bioprospecting of the indian Sea to isolate marine microalgae, including heterotrophic and phototrophic to explore potential commercial applications.

Recommended intake of fatty acids

International organizations like WHO, EFSA, The Academy of Nutrition and Dietetics recommended an intake of at least 250 mg/day for adults and above 500 mg/day for pregnant/lactating women.

Fattyacid composition of indian marine microalgae

- *S. costatum* contain the maximum level of poly unsaturated fatty acids such as 20:5, 18:3, and 18:2 reported in the percentages of 20.07, 20.0 and 18.2 respectively(Rekha et al.2012).
- *Pavlova sp.* is a unicellular brown/golden mircoalga, which contain high amount of both EPA(18.0 mg g/DW) and DHA(13.2 mg g/DW)(Thiyagarajan et al.2020).
- Both n-3 and n-6 fatty acid produced by *Phaeodactylum tricornutum*

Deepak NEXGEN™
Nutrition Empowered

AFT
Aqua-Food Technologies, Inc.
USA

iFEED™
THE TRUE VANNAMEI FEED

CERTIFIED ISO 9001:2008 COMPANY
Q-02140822

DEEPAK NEXGEN FOODS & FEEDS PVT. LTD.
Factory: #53/1, Koyyur Road, Bommuluru, Krishna Dist. - 521 105,
Ph: 08656 - 203399 | ifeed@nexgenfeeds.in | www.nexgenfeeds.in

- *C. marina* contain high level of poly unsaturated fatty acids such as 18:2 with 20% and 18:3 with 19.4% (Thiyagarajan et al.2020).
- *Nannochloropsis oculata* shown that Lauric acid (C12:0), palmitic acid (C16:0), stearic acid (C18:0), oleic acid (C18:1), linoleic acid (C18:2) and arachidic acid (C20:0). The presence of these acid were the reasons for the antimicrobial activity. (Surendhiran et al. 2014)
- *Navicula phyllepta* MACC8 was rich in fatty acids mainly of C16:0, C16:1 and C18:0
- The fatty acids which were predominant in the *C. vulgaris* biomass were palmitic acid (C16:0; 26.84 %), palmitoleic acid (C16:1; 6.40 %) stearic acid (C18:0; 3.90 %), oleic acid (C18:1; 8.51 %), linoleic acid (C18:2; 31.25 %) and eicosatrienoic acid (C20:3; 16.02 %). The saturated fatty acids (SFA) contributed 37.82 %, monounsaturated fatty acids (MUFA) accounted 14.90 %, and polyunsaturated fatty acids (PUFA) comprised 47.27 % (Leema et al.2021).
- Marine microalgae such as *Isochrysis sp. and Pavlova sp.* are the predominant source of polyunsaturated fatty acids (PUFAs) such as eicosapentaenoic acid (EPA, 20:5n–3) and docosahexaenoic acid (DHA, 22:6n–3) (Pereira et al. 2014).
- Signifiacnt producer of PUFAs in the aquatic system include *Pavlova sp, Isochrysis sp, and Nannochloropsis sp.*
- Microalgae such as *Dunaliella salina and Nannochloropsis sp.* contain fattyacids such as palmitic acid (16:0), oleic acid (18:1) and linolenic acid (18:3).
- *Chlorella sp., Planophila sp., and N. oculata* has showed that relative content of α-linolenic acid (ALA) as a percentage of total fatty acids reached a maximum of 50, 36, and 50%, respectively(Jain et al.2022).

Lipid categories extracted from microalgal species (Luca et al. 2021)

Lipid Categories	Microalgae Species
Triacylglycerols	Chlorella sp., Nannochloropsis sp., Scenedesmus sp., Dunaliella sp., Chlamydomonas sp.
Polyunsaturated fatty acids	Nannochloropsis sp., Dunaliella sp., Schizochytrium sp., Isochrysis sp., Tetraselmis sp.
Sterols	Diacronema lutheri, tetraselmis., Nannochloropsis sp.
Waxes	Euglena gracilis, Isochrysis sp.

Nutraceutical Industry:

Omega-3 LC-PUFA supplementation in both children and adult has showed numerous beneficial effects on reducing obesity, T2DM (diabetes mellitus type 2) and CVD by decreasing adipocyte differentiation, increasing adipocyte apoptosis, promoting lipolysis, improving endothelial function, lowering blood pressure, decreasing inflammation, improving glucose tolerance and decreasing BMI. Moreover, omega-3 LC-PUFAs reduce obesity symptoms. Also it improve vascular health in adults and the elderly (Arnoldussen and Kiliaan, 2014).

Both DHA and EPA have attracted recently a tremendous scientific interest due to their

- Reducing the risk of cardiovascular disease (CVD), cancer, obesity, diabetes
- Owing to their crucial role in the brain, ω-3 LC-PUFAs have been treated as a healthy nutritional supplement for a long time
- DHA supplementation during pregnancy and lactation improves healthy brain and for the visual development of the newborn.
- Docosahexaenoic acid (DHA) is the principal constituent of a variety of cells, it plays important role in fetal brain development, development of motor skills, and visual acuity in infants, lipid metabolism, and cognitive support.
- Eicosapentaenoic acid (EPA) it plays important role in preventing atherosclerosis, dementia, rheumatoid arthritis, Alzheimer's disease etc.,

Owing to the important neutraceutical benefits, the global omega-3 market has incresed sales volume of about 2.99 billion euros at 2018 and it has been estimated it will rise up to 8.91 billion euros at 2025. EPA/DHA market value is correlated to 18% with microalgae as natural source, 79% derives from fish oil (anchovy and sardines combined constitute >75%feedstock share for oil extraction) and 3% from krill oil (Molino et al. 2020).

Food and feed Industry:

Although most of the research focuses on microalgae lipids for biofuel production, many other sectors can explore it for food and feed fields. The most commonly used fattyacids in these sectors are omega-3 and omega-6 lipids. Long-chain omega-3 polyunsaturated fatty acids (n-3 LC-PUFAs) are most important constituents in healthy diets because it cannot be produced by the body. So external intake of PUFA in our diet helps in maintaining proper neurodevelopment and reduces the risk of heart disease.

Both hydrophobic compounds and fattyacids were produced at the same time, while hydrophilic compounds(proteins and sugars) can be extracted from the defatted biomass. Both the defatted biomass and fattyacids has numerous nutraceutical values which makes it valuable for food industries. EPA is normally esterified to form complex lipid molecules inside the cell and plays a critical role in higher animals and humans as the precursor of a group of eicosanoids, hormone-like substances such as prostaglandins, thromboxanes and leucotrienes that are crucial in regulating developmental and regulatory physiology (Cardozo *et al.,* 2007).

The oil derived from the microalgae contains more polyunsaturated fatty acids, than palm oil which can help reducing "bad" cholesterol levels in blood and lowers the risk of heart disease and stroke. The microalgae-produced oil developed in collaboration with scientists from the University of Malaya, Malaysia aiming to produce algal oil from microalgae. Also many focused research efforts can be carried out to achieve economically sustainable production of microalgae rich in EPA and DHA for use in aqua feed in the near future.

Team Agrotech

YOUR STEPPING STONES IN SUCCESS!!

Country Representative
CPM ASIA

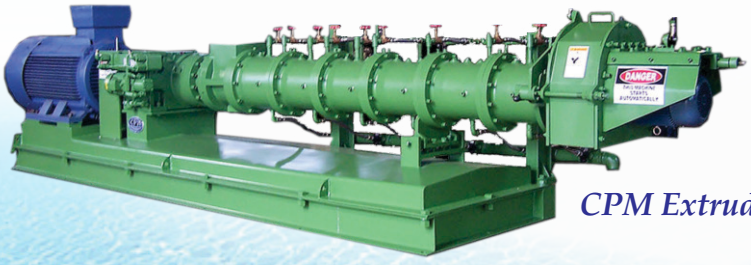
Your Single Stop Source for

Complete Project management of Turnkey Solutions in the following areas:

1. Integrated Feed plants for Poultry, Floating Fish, Sinking Fish, Shrimps, Cattle etc.
2. Balance of plant eqpuipments for Pre/Post processing
3. Complete Plant Automation Solution, on **GATE In to GATE Out concept.**
4. In-house design and manufacturing of Pre Fabricated steel structures for Plants, Warehouses etc.

CPM Dryer

CPM Pellet Mill



CPM Extruder

Contact Today

Team Agrotech Pvt. Ltd.

1- 4, 249, Hill Road, Gandhi Nagar, Nagpur-10 , Maharashtra, India.
M. : +91 9422803386, +91 9650559095
Ph. : +91 712 2222142
e-mail : teamagrotech@yahoo.com
Website : www.teamagrotech.com

For Queries Contact

Scan me

Cosmetic Industry:

The cosmetic industry is growing each year due to the trend of modern lifestyle. Due to rise in consumer concern about the use of synthetic products, cosmetic industry shifting towards the use of natural bioactive components. In terms of land use, waste disposal, and bioactive compound contents, microalgae are considered to be a suitable alternative.

Skin aging is directly related to ultraviolet (UV) radiation which stimulates matrix metalloproteinase (MMP) expression. EPA is known for its inflammatory benefits as well as inhibiting MMP expressions induced by UV radiation. To product our skin from UV, cosmetic industry use PUFA and antioxidants in their products that are not synthesized in the human body or deficient. Microalgal omega 3 fatty acids are the best alternative not only in eco-friendly nature but also based on its significant health benefits. Microalgae has the ability to accumulate large amount of lipids and fatty acids and also contain many bioactive substances which accelerate the healing process and maintain skin moisture. The moisturizing capacity of fattyacid from microalgae found it as an important ingredient in cosmetics. Wageningen University and Research (The Netherlands) find a novel cell-milking system was applied to continuously produce microalgal-based emulsifiers, gels, colorants, oils, fragrances and antioxidants using low-intensity electric fields and a new generation of natural deep eutectic solvents. Microalgae used in cosmetics is an interesting strategy to increment searching for new natural ingredients from environmentally sustainable biomass.

Properties and lipid molecules most common in cosmetic products (Luca et al. 2021)

Properties	Lipids
Moisturizing and softening properties	Hydrocarbons, fatty acids, fatty alcohols, triacylglycerols, waxes, phospholipids, sterols
Surfactant and emulsifier agents	Phospholipids, glycolipids, lipopeptides, fattyacids
Texturizer agents	
Colour carriers	Isoprenoids
Fragrance carriers	Essential oils, triacylglycerols
Preservative agents	Glycerolipids, sphingolipids,
Active ingredients	Glycerolipids, sphingolipids, sterols, isoprenoids, flavonoids
Molecule delivery	Phospholipids

The above table describes the potential of lipids and fatty acids in cosmetic industry. The rising demand of naturally produced cosmetic products, microalgae derived products will dominate the future cosmetic market.

Major industries based on microalgae across the world:

The oil produced from terrestial plants leads to massive deforestation, decreased fish stocks, vegans preference etc., leads to exploration of suitable alternative, based on the above preference microalgal based industries is considered to reach market boom in next few decades .

- The major companies dealing in the Europe microalgae market are Cellana Inc., DSM, BIOPROCESS ALGAE, LLC., Cyanotech Corporation, Henry Lamotte Oils GmbH, Algaecytes, Algatech LTD, Lyxia, BASF SE, Corbion, ALGISYS LLC, AlgaEnergy, AstaReal AB among others(THE FISH SITE).
- ProVeg International aims to accelerate the development of mushroom and microalgae-based seafood ingredients in its latest alternative (alt) protein 'incubator' programme.
- Global microalgae-based Aquafeed market from 2022 to 28 . The market's major corporations are listed below: DSM, Cellana Inc, Cargill, Alga technologies ltd., Corbion, CP Kelco.

Conclusion:

Microalgae contain many bioactive compounds and fatty acids that are not only useful in the cosmetic sector, but also in biofuel production, wastewater treatment, CO_2 sequestration, pharmaceutical, food and feed industry and oxygen release into the atmosphere, which has advantage of reducing the greenhouse effect. So microalgae are considered as an interesting source of fatty acids with potential industrial applications.

AVAILABLE FROM OUR READY STOCKS

AVAILABLE FROM OUR READY STOCKS:

- *SPIRULINA POWDER SPRAY DRIED, CHOLESTROL*
- *YUCCA SCHIDEGERA - 80% & 30%*
- *SODIUM PERBORATE MONO, SODIUM PER CARBONATE, CALCIUM, PEROXIDE, TRIPLE SALT, HYDROGEN PEROXIDE, etc.*
- *BKC - 50%, GLUTRALDEHYDE - 50%, FORMAL DEHYDE - 37%, CETRAMIDE SOLUTION, PROPIONIC ACID etc.*
- *IODINE, POTASSIUM IODIDE, EMULSIFIER*
- *FERROUS SULPHATE, MANGANESE SULPHATE, MAGNESIUM, SULPHATE, ZINC SULPHATE, COPPER SULPHATE, COBALT SULPHATE, ZINC OXIDE, MAGNESIUM OXIDE, SODIUM SELENATE, AMMONIUM, MOLYBDATE, CHROMIUM etc. FLAVOURS, COLOURS, VITAMINS*
- *PROBIOTICS & ENZYMES*
- *PEPTONE, BEEF, BILE, MALT, PROTEIN, LIVER & YEAST EXTRACTS*
- *STARCH, DEXTROSE, DCP, TALC, KAOLIN, TSP, CALCIUM & OTHER BASE MATERIALS*
- *CHARCOAL, VITAMIN C, CALCIUM PROPIONATE, EDTA, CMC, GELATIN, GENTION VIOLET, MALCHITE GREEN.*

Kindly contact for any requirements in Aqua Culture, Veterinary and Poultry Industry.

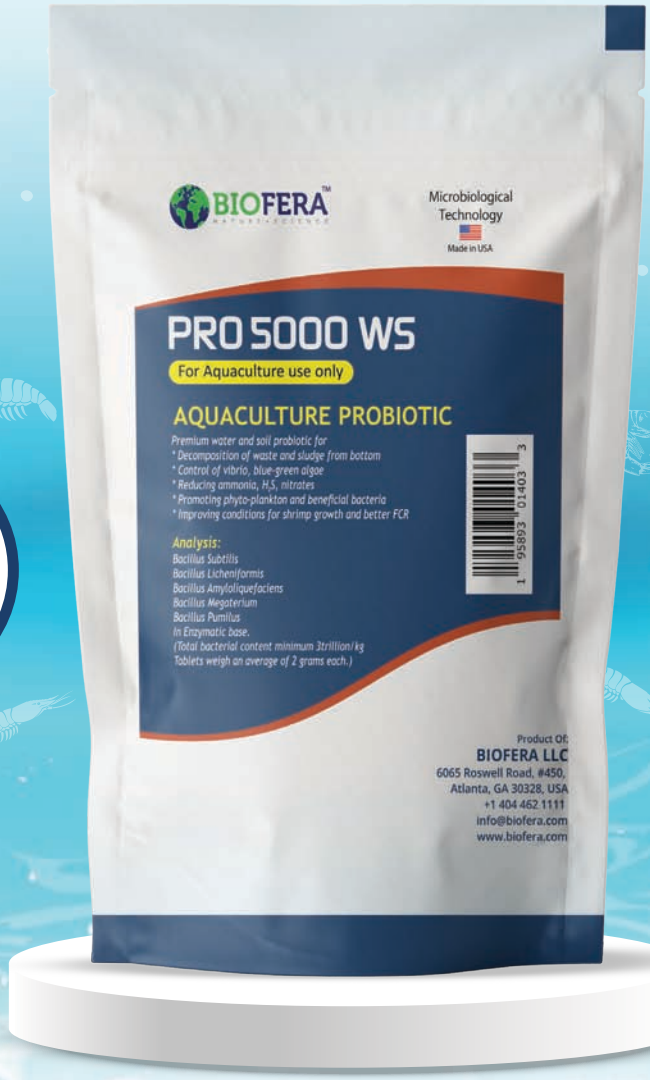
NIHAL TRADERS PVT LTD

3-3-66, Flat no. 103, Sikhara Heights, Besides Manjira Hotel,
Chappal Bazar, Hyderabad - 27 (A.P)
Ph: 040-24656968, 24746534, 24650253
Tele Fax: 040-24658097; Mobile: 9848040025
Email : nihaltraders@yahoo.com; www.nihaltraders. com

Made in USA

PRO 5000 WS

BIOLOGICAL WATER/SOIL QUALITY IMPROVEMENT

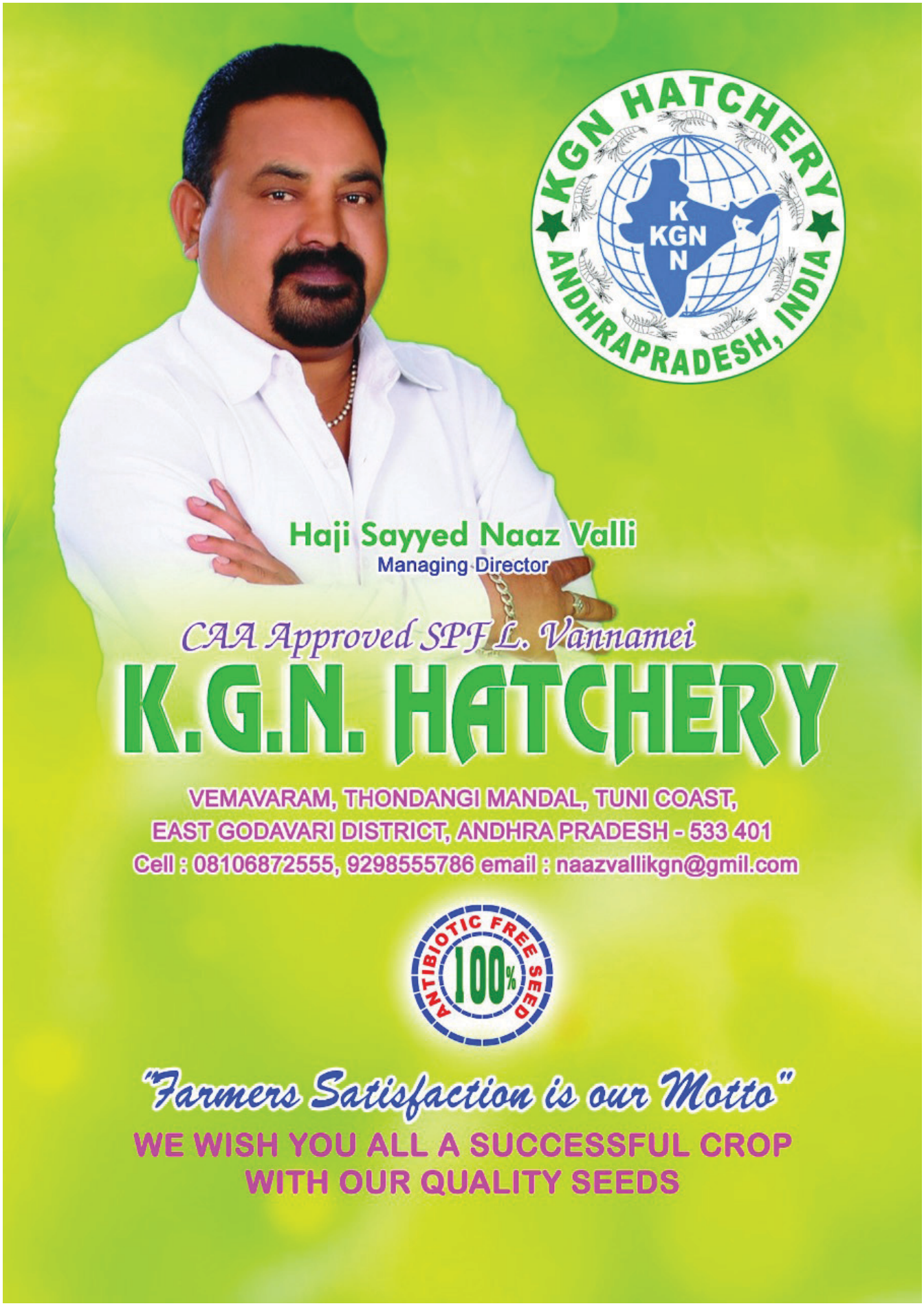


FOR ENQUIRIES CONTACT
+ 91-8985279999

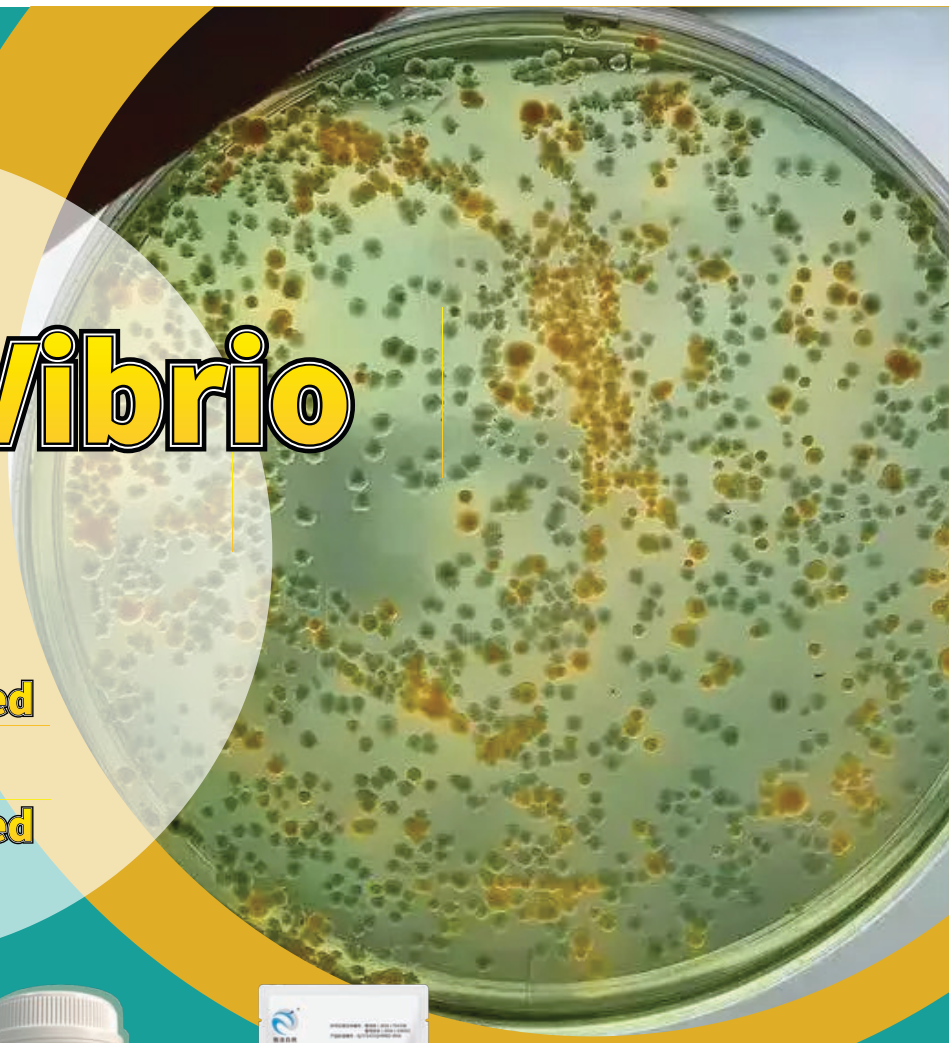
WORLD CLASS AQUACULTURE PROBIOTIC

BIOFERA™
NATURE + SCIENCE

PRODUCT OF BIOFERA LLC, ATLANTA , USA,


KGN HATCHERY
ANDHRAPRADESH, INDIA
K
KGN
N
Haji Sayyed Naaz Valli
Managing Director
CAA Approved SPF L. Vannamei
K.G.N. HATCHERY
VEMAVARAM, THONDANGI MANDAL, TUNI COAST,
EAST GODAVARI DISTRICT, ANDHRA PRADESH - 533 401
Cell : 08106872555, 9298555786 email : naazvallikgn@gmil.com
ANTIBIOTIC FREE SEED
100%
"Farmers Satisfaction is our Motto"
WE WISH YOU ALL A SUCCESSFUL CROP
WITH OUR QUALITY SEEDS

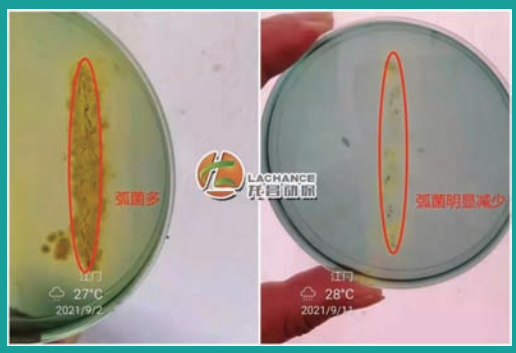
Anti-Vibrio Solution



Eucabiotics
2-3g/kg shrimp feed

Calfort
5-8g/kg shrimp feed

Eucabiotics Calfort



LACHANCE

www.sdlachance.com

WhatsApp: 0086 13156134913

Postal Regn. No. HD/1068/2021-2023
Published on 7 May 2022

FUBON
Angel Animal Nutrition

YeaMOS

Natural source of Beta-Glucan & MOS

- Relieve stress such as high density, water quality fluctuation(low oxygen, pH and temperature change) etc.
- Enhance non-specific immunity and reduce mortality.
- Regulate intestinal flora, reduce the risk of pathogens infection.

Andy Xiao (Mr.) Mobile/WhatsApp: +86 135 1727 2877 xiaoxt@angelyeast.com
168 Chendong Auenue, Yichang, Hubei, P.R. China +86-717-6306097 en.angelyeast.com

Angel