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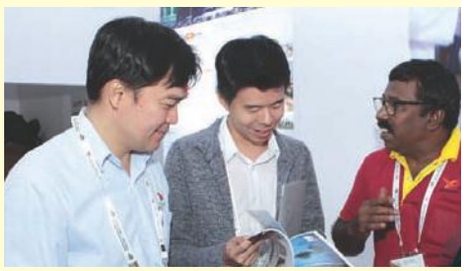
Inside...



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CONTENTS

ADVERTISERS' INDEX

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Aqua Farmers and Business persons interaction meet ...

Dear Readers,

The August 2019 issue of *Aqua International* is in your hands.

In the News section, you may find news about ICAR-CIBA celebrating 'National Fish Farmers Day' on 10 July 2019 amidst fishers and fish farmers at Thargas village, Sirkazhi Taluk, Nagapattinam District, Tamil Nadu to commemorate the epoch-making innovation in the field of induced breeding of Indian major carps by the renowned scientists Dr K.H. Alikunhi and Dr H.L Chaudhury on this day in 1957. The participants were sensitized about the cost-effective, sustainable fish farming models of CIBA for the livelihood security of coastal fishers. Further, the participants were briefed about the activities being implemented by CIBA as part of the "Mera Gaon, Mera Gaurav" (MGMG) programme in linking the fishers and villagers with development departments and facilitating to adopt the technologies for doubling the income of fish farmers and fishers in the village.

A general feature on 'How much Protein does one need' may be seen which is quite useful.

An awareness programme on marine fisheries and mariculture was conducted for school students on 6 July 2019 at Mandapam Regional Centre of Central Marine Fisheries Research Institute.

A total of 140 school students and 40 teaching & non-teaching staff under Southern Railway Women Welfare Organization, Madurai got benefitted through this programme.

An interactive workshop on "Open water fisheries management in Nagaland" was held at ICAR-NRC on Mithun, Medziphema on July 19 and the workshop was organised by ICAR-Central Inland Fisheries Research Institute, Barrackpore, Kolkata in collaboration with Department of Fisheries and Aquatic Resources, Government of Nagaland, Kohima & ICAR-NRC on Mithun, Medziphema, Nagaland.

Additional Director, of DFAR Nagaland, gave a brief account and status of open water fisheries in Nagaland.

The zoology department of Siddhartha Mahila Kalasala organised an interaction between aqua farmers and aqua businessmen to mark the National Aqua Farmers Day on the college premises recently. Speakers of the occasion opined that there is an acute shortage of skilled professionals in aqua field in the state.

Biomed Techno Ventures has launched a product Peptigrow which the company claims to be first if its kind formulation with a rich source of Marine Bioactive peptides in collaboration with a french company, Diana Aqua.

In the Article Section, article titled "Fishery Waste: Challenges and Outlook" by Deepa Madathil, Sushri S. Behera and S.M. Zofair discussed about Fish Processing sector involves stunning, grading, slime removal, de-heading, washing, scaling, gutting, cutting of fins, meat bone separation and steaks and fillets. During these steps enormous amount of waste is generated which can be utilized as fish silage, fishmeal and fish sauce. It is an attempt to bring into notice the potential uses of fishery waste in valorised food industrial and pharmaceutical sector.

There is a Special Feature published on Uni-President Vietnam which is is working to expand its current products and services in the feed business. They also want to bring new technologies and products. In the process, the company is going to launch Probiotics and Healthcare products for aquaculture. Uni-President believes that India is the star of Asia in future. Uni-President which is selling 40,000 tones of shrimp feed hopes to keep up with the trend of the new era.

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 industry. Keep reading the magazine regularly and update yourself. Wish you all fruitful results in your efforts.

M.A.Nazeer
Editor & Publisher
Aqua International

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.

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CIBA celebrates National Fish Farmers Day on July 10, with the Costal Fishers of Tamil Nadu and West Bengal

A viewe of National Fish Farmers Day Celebration

Chennai: The ICAR-CIBA celebrated the 'National Fish Farmers Day' on 10 July 2019 amidst fishers and fish farmers at Thargas village Sirkazhi Taluk, Nagapattinam District, Tamil Nadu to commemorate the epoch-making innovation in the field of induced breeding of Indian major carps by the renowned scientists Dr K. H. Alikunhi and Dr H. L Chaudhury on this day in 1957. About 90 fishers including women, rural youth, local panchayat leaders participated in the programme and discussions. The participants were sensitized about the cost-effective, sustainable fish farming models of CIBA for the livelihood security of coastal fishers. Further, the participants were briefed about the activities being implemented by CIBA as part of the Mera Gaon Mera Gaurav (MGMG) programme in linking the fishers and villagers with development departments and facilitating to adopt the technologies for doubling the income of fish farmers and fishers in the village.

The unemployed youth of the community were urged them to take up suitable sustainable aquaculture activities in tune with the brackishwater resources available in their villages. Mr Bhaskaran and Mr Angazhagan local Panchayat leaders from Thargas village shared their experiences about the fishing activities in their village and appreciated the efforts of CIBA in promoting brackishwater aquaculture technologies as an alternative livelihood activity for the fishers. Dr C. V. Sairam, Principal Scientist and Scientist-In-Charge, Social Sciences Division, Dr D. Deboral Vimala, and Dr P. Mahalakshmi, Principal Scientists, Social Sciences Division of CIBA, coordinated the programme.

Kakdwip Research Centre (KRC) of ICAR-CIBA also observed the National Fish Farmers' Day on 10th July 2019 with the tribal fish farmers at village Mundapara, Manmathapur, Sundarban. Integrated farming of fish farming with livestock and horticulture was highlighted in the discussion with tribal farmers which is environment friendly and generate additional revenue. Tribal Women shared their experiences with integrated poultry and pig-cum- fish farming and desired to expand the culture interventions in coming days with the technical support of ICAR-CIBA. Adoption of brackishwater ornamental fish nursery rearing was proposed by scientists of KRC in underutilized homestead ponds to provide livelihood support to women groups. Mr Pintu Sardar, Gram Panchayat Member of the village was present during the programme and expressed gratefulness for the extension works carried out to uplift the livelihood of the tribal farmers residing in a disadvantageous area by KRC-CIBA. CIBA hatchery produced juveniles of pearlspot and milkfish were released in brackishwater ponds of beneficiary tribal farmers to initiate the culture activities.Dr T. K. Ghoshal, Principal Scientist and Officer-in-Charge and other scientists of KRC-CIBA coordinated the programme in Sunderban.

How much Protein does One need?

If you aren't into big buff muscle making a normal balanced diet with nuts, seeds, cereal, sattu and pulse combinations can make up for enough protein intake.

Protein is the new buzzword. High protein diet, protein supplement, low carb-high protein – these are some of the popular trends these days. But how much protein does one really need? Well, there is no magic number. Protein is an important macronutrient, and while everyone needs it in their daily diet, its quantity varies from individual to individual. As most believe age is not the only differentiating factor. Protein requirement and the capacity to digest it varies based on a lot of factors. Hence, it is extremely important to customise and personalise an individual's protein intake based on lifestyle, gut health activity levels, kidney health, age.

GUT HEALTH: Protein is heavier on our system to digest. It may be a challenge for a case of sensitive gut to digest and break down protein in just one meal, leave alone adding it to all meals. Plus, excess protein can worsen a case of acidity. Hence, it becomes very important to choose the right quantity and quality of protein and space it out well in such cases. Protein-heavy meals or non-vegetarian food may not be well-tolerated here.

Even in cases of compromised pancreatic function, we must be careful while planning their nutrition and make sure that protein is spaced out over a span of 8 hours to avoid overwhelming the digestive system.

ACTIVITY LEVELS: Perhaps the most important…. Workout more, eat more. Workout less, eat less. This model works best because it honours our body's dynamic needs. If you are into heavy training, lifting weights, running a marathon, then your body and muscles need to be fed well. Similarly, if you are not as active and are indulging in light walks or yoga, your body's protein requirements can be met through a balanced diet itself.

GOOD QUALITY PROTEIN: Apart from a compromised gut health, cases of chronic kidney disease, high uric acid levels, chronic acidity also plays a role in determining your total protein intake, as excess could cause or aggravate an existing condition. Also, what matters is quality of protein. There is 30 gram protein in a scoop of whey protein which is not even qualitative and does not have a complete amino acid profile. But there's 7-8 gm protein in 2-3 tbsp of pumpkin seeds that have all the amino acids and will give your body what it exactly needs. So, it's not about quantity, but quality. The human body can absorb 9-12gm proteins at each sitting, which means consuming 30gm protein per meal is too much protein for some people as the body cannot absorb all of it. Excess protein gets converted into fats and deposited as abdominal fat. Bottomline-Customise. Plan your protein in-take according to your lifestyle, health condition, activity levels, the kind of protein that you are able to digest easily.

Aqua field faces shortage of skilled staff

Vijayawada 12 July: The zoology department of Siddhartha Mahila Kalasala organised an interaction between aqua farmers and aqua businessmen to mark the National Aqua Farmers Day on the college premises recently. The chief guest of the programme was Mr U. Vishwanatha Raju, chairman and managing director Ananda Group, Bhimavaram. Speaking on the occasion, he said that there is an acute shortage of skilled professionals in aqua field in the state and people from neighbouring states are getting employment here in aqua field.

He said that the college has introduced a three years bachelor degree course in aquaculture. Students who join in the course can get a chance to pursue course in China, Japan and Burma. Delta Fish Farmers Association president Mr V. Ramchadra Raju said aqua field is a good employment source for females. Hatchery, processing units, laboratory and feed industries gives employment for females with all facility and security. National Fish Farmers Association state president and advisor Dr A. Nagesh Babu also spoke on the occasion. The college director Dr T. Vijayalakshmi, principal Dr M. Nalini, Ms Sara Banu, students of aquaculture and others were present.

Techfish 2019 - Seminar held at Veraval Centre of CIFT

Inauguration of Techfish 2019 by Ajay Prakash, IAS, Collector & District Magistrate, Gir-Somnath

As part of implementation and promotion of official language, a one day National Scientific Hindi Seminar-Techfish 2019 on 'Technological Advancements in Fisheries Sector with special reference to Gujarat' was conducted by Veraval Research Centre of ICAR-CIFT recently.

The Chief Guest, Mr Ajay Prakash, IAS, Collector & District Magistrate, Gir-Somnath applauded the effort taken by CIFT for conducting a national level scientific seminar in Hindi for promoting the official language and disseminating the research information to the stake holders, who are conversant in Hindi.

He also acknowledged the contributions of Veraval RC of CIFT in enhancing the livelihood of fisherfolk by transferring improved technologies in fish harvest and post harvest sectors. He was delivering his inaugural address at the National Scientific Hindi Seminar-Techfish 2019 hosted by Veraval RC of CIFT at Hotel Grand Daksh, Veraval. During his speech, he underlined the importance of fisheries and aquaculture sector in India, which supports over 14 million fishermen and several million others involved in the value chain. He pointed out that having the longest coastline in the country and with marine, brackish water and freshwater resources, the state of Gujarat has shown a continuous and sustained increment in fish production and has huge potential to further increase the production with the adoption of modern technologies in the sector, which will enhance employment and revenue of the country. The chief guest also released the abstract book and other publications.

Release of abstract book of Techfish 2019

Dr Ashish Kumar Jha, Scientist, Veraval RC of CIFT offered welcome address. In his welcome speech, he highlighted the R&D (Research & Development) efforts in the area of fisheries. He added that Techfish 2019, the National Scientific Hindi Seminar was intended to bring together the views, ideas and possible solutions to some of the challenges in the fisheries sector with special reference to Gujarat.

In his presidential address, Dr Toms C. Joseph, Scientist In-Charge, Veraval Research Centre of CIFT & Organizing Secretary of Techfish 2019, said 'the seminar will provide a forum for scientists, academicians, researchers, policy makers and concerned stakeholders in the sector to deliberate on the problems and prospects of fisheries and allied areas and arrive at meaningful conclusions and recommendations'. He also briefed about the activities of Veraval Research Centre of CIFT and stated that CIFT has always taken lead in the development of advanced technologies required in fish harvest and post harvest sectors for safe and quality fish production.

Speaking on the occasion, the Guest of Honour, Mr Piyush Bhai Fofandi, President, Seafood Exporters Association, Gujarat Chapter, lauded CIFT for organizing the

Evaluation of the poster presentations

Prize distribution to the winners

seminar and also reminded the participants to use this platform in an efficient manner. He thankfully remembered the services of CIFT in transferring the developed technologies through manuals and pamphlets in regional language, Gujarati and training programmes, also on-site demonstrations in many cases.

In her felicitation speech, Dr J. Renuka, Deputy Director (OL) stressed on the importance of disseminating science in official language to make it reach to the common people. She said the common practice of publication of research outputs in English will restrict its access to only a few in the society and urged the participants to publish their research work in Rajbhasha Hindi and other regional languages. Mrs Nimmy S. Kumar, Hindi Translator, CIFT, Veraval RC, proposed vote of thanks.

Address of the chief guest, Mr Ajay Prakash during the inaugural session of Techfish 2019

The inaugural ceremony was followed by two technical sessions, Fish and Fisheries Science & Fish Processing Technology. There were 13 oral presentations and 19 poster presentations in the field of Fish & Fishery Science and 11 oral presentations and 11 poster presentations in Fish processing Technology. Around 100 delegates including scientists, academicians and students representing various organizations participated in the seminar.

The seminar culminated with the valedictory session andaward ceremony meant to recognize the contributions of the outstanding performers. Two best papers and posters were awarded with memento and certificate. The prizes weregiven away byMr Piyush Bhai Fofandi, President, Seafood Exporters Association, Gujarat Chapter. Dr Remya S., Scientist, VRC of ICAR-CIFT & Shri Ganesh Temkar, Research Scholar, College of Fisheries, Junagadh Agriculture University, Veraval received the best oral presentation awards. Dr Remya S., Scientist, VRC of ICAR-CIFT & Mrs Renuka V, Scientist, VRC of ICAR-CIFT bagged the best poster presentation awards.

Awareness programme for school students at Mandapam Regional Centre

An awareness programme on marine fisheries and mariculture was conducted for school students on 6th July 2019 at Mandapam Regional Centre of ICAR-Central Marine Fisheries Research Institute (CMFRI). programme and briefed the research activities of ICAR-CMFRI. Later, he answered queries of school students. The students also visited the aquarium, museum, hatchery and other facilities at the Centre. Awareness

A total of 140 school students and 40 teaching & non-teaching staff under Southern Railway Women Welfare Organization, Madurai benefitted through this programme. Dr R. Jayakumar, Scientist-in-Charge, inaugurated the on marine resource conservation, biodiversity issues and mariculture activities was also provided to the students through video shows. Dr Johnson, B., Scientist, coordinated the programme.

Workshop held on 'open water fisheries management in Nagaland'

Commissioner and Secretary Fisheries & Aquatic Resources, Senti Ao, speaking at the Interactive Workshop on July 19.

An interactive workshop on "Open water fisheries management in Nagaland" was held at the conference hall of ICAR-NRC on Mithun, Medziphema on July 19.

According to DIPR, the workshop was organised by ICAR-Central Inland Fisheries Research Institute, Barrackpore, Kolkata in collaboration with Department of Fisheries and Aquatic Resources, Government of Nagaland, Kohima & ICAR-NRC on Mithun, Medziphema, Nagaland.

Additional Director, Department of Fisheries & Aquatic Resources, Rongsennungba in his opening remark gave a brief account and status of open water fisheries in Nagaland.

Director, CIFRI, Barrackpore, Dr B. K. Das explained the role of CIFRI in development of open water fisheries resources of India.

Dr B. K. Bhattacharya, HRC-CIFRI, Regional Centre, Guwahati also spoke on the strategies for scientific fishery management of open water fisheries resources of Nagaland.

Commissioner and Secretary department of Fisheries & Aquatic Resources, Senti Ao as a special invitee, thanked the ICAR, Barrackpore for their initiative in organising the workshop.

He urged all the district Fisheries Officers to utilise such workshops to extract knowledge in fishery development in the state.

He also emphasized the importance of rich natural resources which could provide immense potential for aquaculture development and produce and generate employment and double the income of the people.

Dignitaries from different organisations, scientists, DFOs, progressive farmers and anglers participated in the workshop. A documentary was also released during the workshop.

The programme was chaired by Dr Abhijit Mitra and vote of thanks was given by Mr Simanku Borah, Scientist ICAR-CIFRI Regional Centre, Guwahati which was followed by interactive session.

Earlier, the programme started with lightning of lamp by Commissioner and Secretary, Department of Fisheries & Aquatic Resources, Senti Ao.

Global meet on shark fisheries

KOCHI: Researchers and experts from across the globe and representatives from the Food and Agriculture Organisation of the United Nations will attend a four-day panel discussion on the priorities in monitoring shark and ray fisheries, trade and market chain assessment at the Central Marine Fisheries Research Institute (CMFRI) here from Wednesday.

Collaborative project

The meet is jointly organised by the CMFRI and the FAO under a collaborative research project of the two entities on sharks and rays non-fin commodities.

The meet, first of iats kind in India, will set up a platform for researchers to share their experience in the field.

Panel discussion

The panel discussion aims to bring together scientific community in the spectrum to describe various methodologies being transpired and adopted in research works and to develop a set of common guidelines for all the shark fishing countries, said CMFRI director Mr A. Gopalakrishnan.

Refining strategies

The meet will play a major role in refining strategies to promote sustainable fishing and trade on this vulnerable marine resource group, he added.

Budget 2019:
Nirmala Sitharaman announces 'Matsya Sampada Yojana' as Blue Revolution gathers pace

The government intends to promote aquaculture through easy access to credit.

Finance Minister Nirmala Sitharaman on July 5,2019 announced plans to launch to a 'Matsya Sampada Yojana' aimed to turn India into a hotspot for fish and aquatic products through appropriate policy, marketing and infrastructure support.

The government intends to promote aquaculture through easy access to credit.

The government also intends to bring all fishermen under the ambit of all farmer welfare programmes and social security schemes with expanded coverage for accident insurance.

The Modi government has made it clear that it is committed towards 'Blue Revolution' or `Neeli Kranti' and has the potential to attain the first place in the world in fish production.

A separate Department has been constituted for integrated development of fisheries. A special fund has been created to develop infrastructure related to the fishing industry.

Last year, the Modi-Cabinet had set up Rs 7,522 crore special Fisheries and Aquaculture Infrastructure Development Fund (FIDF).

The fund will be used for creation of fisheries infrastructure facilities both in marine and inland fisheries sectors.

The government has set a target to augment fish production to achieve its target of 15 million tonne by 2020 under the Blue Revolution, and raise it thereafter about 20 million tonnes by 2022-23.

The fund will be used to attract private investment in creation and management of fisheries infrastructure facilities, besides acquisition of state-of-the-art technologies.

FIDF provides concessional finance to state governments, cooperatives, individuals and entrepreneurs for taking up of the identified investment activities of fisheries development.

Under FIDF, loan lending will be over a period of five years from 2018-19 to 2022-23 and maximum repayment will be over a period of 12 years inclusive of moratorium of two years on repayment of principal.

Biomed Techno Launches : Peptigrow

P V Krishnam Raju lighting the lamp to mark the Launch of Peptigrow at Bhimavaram recently

The problems in the Shrimp culture in India have long been revolving around 2 major diseases of White Faeces and E.H.P, resulting in eventualities like low feed intake and stunted Growths. Biomed Techno Ventures a renouned name in the Aqua Healthcare and service industry for the past 15 years , has come out with an innovative and sustainable solution after an extensive research for 3 years.

Biomed Techno ventures has organized a massive product launch of "PEPTIGROW" on 28th May 2019 in Bhimavaram

P V Krishnam Raju

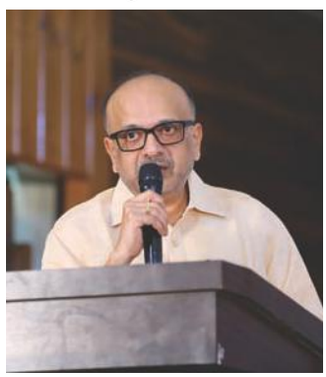
attended by most of the industry experts , Technicians and Farmers.

The launch was hosted by Mr P V Krishnam Raju (Managing Director , Biomed), Mr A Durga Prasad (Director,Technical), Mr P Karthik (Director,Marketing and Administration) and the West Godavari Sales and Marketing Workforce of Biomed.

A Durga Prasad

Dr S. Santhana Krishnan , present as the chief guest addressed the massive attendance of 500 technicians and farmers , explained about the importance and role played by Bioactive peptides in the growth of the shrimps and how this product could be a game changer for the contemporary problems faced by farmers.

Sri P. Krishnam raju Garu (Director , Biomed Techno Ventures) addressed the huge gathering with an insight into the roots of establishing the Organization and how Biomed Techno Ventures which started with few employees has evolved into one of the Leading Aqua Healthcare companies with a Marketing Sales force of around 60 technically competent employees .He stressed upon the fact that Biomed has always been a front runner in forecasting the challenges and bringing about new , innovative and Sustainable solution to the Aqua Farmers.



Dr S. Santhana Krishnan

Speaking at the event, Mr A Durga prasad (Technical Director , Biomed Techno Ventures) gave a thorough briefing of the Product and the concept of Marine Bioactive peptides in general and how this could bring about a revolution in the shrimp culture.

In a brief address at the event , Mr P. Karthik (Director, Marketing and Administration) said that it was indeed a proud moment for the company to reach this stage after such moderate beginning. It was only because of the support of all the dealers , Technicians and Farmers that we have been able to show gradual growths all along the journey. This product "PEPTIGROW" in particular is result of almost a year of continuous research and 6 months of live trials.

P. Karthik

The product PEPTIGROW , is a first if its kind formulation with a rich source of Marine Bioactive peptides in collaboration with a french company (Diana Aqua).

Peptides being small chains of Aminoacids (Di and Tri peptides) are very easy to assimilate resulting in a healthy Gut and much higher growths.

Staying True to its TAGLINE "WHEN THE GROWING GETS TOUGH , THE TOUGH GETS GROWING"

The product has been extensively tested across different aqua geographies in India , and the FEED INTAKE and GROWTHS have been nothing but extraordinary.

Launching of product

An Online Platform for Fish Sales, Marketing to be Developed Soon

24 July, 2019: The Central Marine Fisheries Research Institute (CMFRI), with the aim to help the fishermen community, consumers and processors has launched a new venture to develop an online platform for fish marketing in India.

The project aims to create an information system for fish marketing, pricing & to facilitate an e-auctioning system for the commercially vital fish species. Around 1,500 fish markets that include landing centres, retail markets, wholesale markets and aquaculture markets all over the country will be included in the system.

The National Fisheries Development Board (NFDB), Hyderabad is funding the project. In the initial phase, information about 500 fish markets from 7 coastal states will be collected.

The Central Marine Fisheries Research Institute will gather all required information and report the weekly fish prices via electronic tabs & will develop an online database. Entire dimensions of the markets like the geographic location, size, timing, access to transport, species traded, infrastructure facility, arrival & distribution and average realised minimum & maximum rate of around 150 fishes will be available on the websites of CMFRI (www.cmfri.org.in) and NFDB (www.nfdb.gov.in) from October 2019. A separate website will be developed later on. In addition, 50 markets will be covered in Kerala in the opening stage.

An orientation session was held to teach representatives from selected fish markets across Kerala at CMFRI this Monday. Mr Shyam S. Salim, Principal Scientist at the Socio-Economic Division of Central Marine Fisheries Research Institute is the Principal Investigator of the research project.

nothing to worry about over the discovery of these animals in their household wells," he said.

According to Mr Rahul, the discovery of fish, as well as crustaceans and other life forms, from subterranean waters is a reminder of the vast diversity of life which still remains to be discovered, studied and understood. "The presence of fish and crustaceans in groundwater is usually an indicator of good water quality which can sustain life and residents have nothing to worry about over the discovery of these animals in their household wells," he said.

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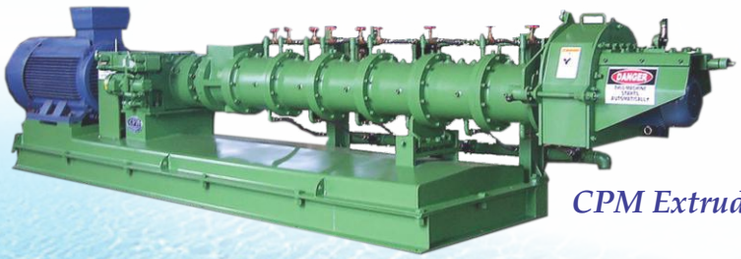

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Uni-President sells 40,000 metric tons feed in India annually

Uni-President soon Launching Probiotics and Healthcare Products

Comparing with all in the market, we are still a small player in Volume. For the Quality value, we hope we have much bigger share in the farmers' mind

Uni-President Vietnam is working to expand its current products and services in the feed business. They also want to bring new technologies and products. In the process, the company is going to launch Probiotics and Healthcare products for aquaculture. Uni-President believes that India is the star of Asian in future. We hope to keep up with the trend of the new era, said Mr Tai Wei Chung, Director & Head of Uni-President Vietnam Aqua Export Department, Mr William Chueh, Manager of UPVN Trading Company and Mr Arivasu, Director Marketing, India Operations in an interview by M.A Nazeer, Editor, *Aqua International* recently in Chennai. Excerpts:

***Tai Wei Chung,** Director & Head, Uni-President Vietnam Aqua Export Department*

Aqua International Editor M. A. Nazeer interacting with Mr Tai Wei Chung, Director & Head of Uni-President Vietnam Aqua Export Department, Mr William Chueh, Manager of UPVN Trading Company and Mr Arivasu, Director Marketing, India Operations at chennai recently.

About Uni-President and its Promoters

Uni-President Enterprise Co Ltd, was set up in 1967 in Tainan, Taiwan initially to produce flour and feed. Today, it has been expanded into various food and logistics industries.

Uni-President Vietnam was established in 1999. It has three factories and a hatchery in Vietnam.

Uni-President Vietnam specialize in the development of good quality aquatic feed, animal feed and flour and food business.

Head Quarters of Uni-President Enterprises Corp. is located in Tainan, Taiwan. In addition, we have localized business centers in China, Vietnam, the Philippines and Thailand. We are also actively developing food-related businesses in Northeast Asia and South Korea.

Global Deployment:

In recent years, we have been focusing on high-quality aquatic feed and related products in India.

At present, feed is

Uni-President India team

Arivasu, Director - Aquatic Feed Division, Indian operations

being imported from Uni-President Vietnam. Currently, our total feed sales in India is about 40,000 tons, and business is growing stably each year.

Category of feeds being marketed in India

The well-known Vannamei feed (Uni Vana and Uni Pearl series) and Monodon feed is marketed in India.

R&D facilities

Our production center in Vietnam has scientific laboratories. In addition to continuously strengthening the quality of our products, we also focus on food hygiene and safety. We have a cooperative relationship and a credible testing center to ensure safety of our products. Stand with the consumer and think of them is in our priority.

Acceptance and satisfaction level of customers

The acceptance and satisfaction level of customers for our is quite well, as we always keep the quality and customers' satisfaction in priority.

Since how long in India

We have been doing business in India for many years. With the establishment of our brand and image, we are keeping to provide the quality feeds and service to our customers. We aim at helping the famers to get better result first. Farmers' satisfaction is our goal.

Priorities to established Uni-President in India

Opportunity is there. Still the most important thing is to keep providing quality feeds to farmers. This is the fundamental thing we need to think first. As long as farmers can get happy results and keep doing well, that is more meaningful for us.

Prospects for Feed & Nutrition segment in aquaculture

Aquaculture has flourished in India in the past years. India is recognized as one of the largest aquaculture countries in the world.

Feed business in volume and in value in India

As we mentioned earlier, our current sales volume is 40,000 metric tons of feed per year in India. Comparing with all market volumes, we are still a small player in volume. For the quality value, we hope we have much bigger share in the farmers' mind.

Positive and best aspects for customers and the industry

As we have leading R&D centers among Asia countries, we will keep doing the best effort to upgrade products and services, to satisfy the increasing requirements of farmers and customers. As the change of environment year after year, it will be more and more important and as our mission to complete.

Best practices being implemented in Uni-President

As mentioned earlier, we have strong R&D support and will keep focusing on the quality products development.

What changes you have planned for Uni-President Feeds for India market ?

Contd on Page 34

Uni-President (Vietnam) company sponsor silver in APA' 19

A view of well designed and decorated Umi-Preesident Booth in APA 19 as Chennai, India

Uni-President (Vietnam) company took active part in 19th Asian Pacific Aquaculture 2019 Exhibition and conference in Chennai, India with Uni-President (Vietnam) company participated in the conference as a silver sponsor and showed their trade in the Indian market.

In the three-day exhibition meeting, in our well-designed venue, we approached India and other trading partners around the world. We discussed the business of aquafeeds together. We also exchanged information of the situation in Indian aquaculture market. Our staff participants introduced our high-quality feed. Our feed reach the growth needs of all aquatic animals. It allows the cultured organisms to grow faster and stay the health High-efficiency feed performance is also the biggest factor in profitability. In addition, we also promote the newest aquatic medicine and various probiotic products. Providing top-quality feed quality, we also provide a variety of problem solving methods. Many participants are highly interested in cooperation with us informed a note from the company. In our professional activities "Emerging Challenges in Indian shrimp aquaculture", we invited four professional speakers.

Huai Huang

Dr Manimaran Baskaran

1. Mr Huai Huang - The current application of commercial probiotic in aquaculture.

2. Dr Manimaran Baskaran - Emerging challenges in Indian shrimp aquaculture.

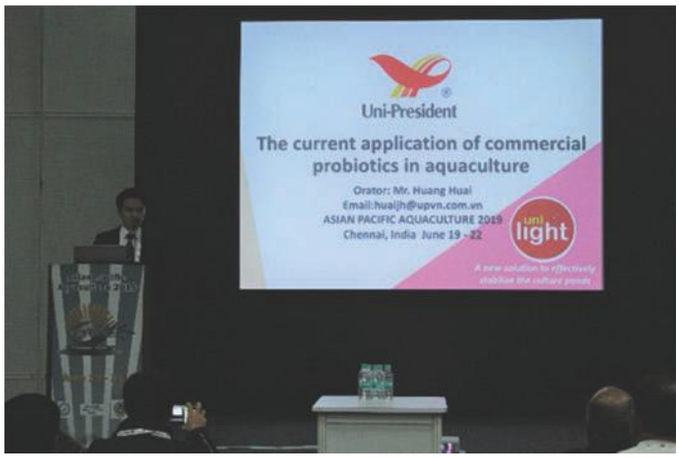
Dr Ramarj Dhamodaraswaamy

3. Dr Ramarj Dhamodaraswaamy - Current disease scenario and its impact on shrimp farming in India.

4. Dr Elancheran - The importance of nursery phase with shrimp.

They gave a very insightful view of the current situation in the aquaculture industry in India. At the same time, they brought new concepts to many trading partners, farmers and people on the spot.

One of the most attractive parts is the Uni-President new product-Uni Light PSB. Probiotics have been used in aquaculture for more than 30 years. They were used to increase the growth rate of organisms in the early stage. Nowadays, they were developed into environmental control and improvement. The probiotic products had been progressed into



multiple application models. This product has many advantages, including purifying water, inhibiting pathogens, and enhancing health. Many participants had a thorough discussion on this topic.

The conference was quite informative and there were many questions and answers on the spot. The two sides discussed quite a lot of knowledge about aquaculture in India. This event was successful and there were many positive comments from participants.

According to a spokesperson for the Uni-President (Vietnam) company. In order to fully launch the blueprint for the development of the Asian business strategy, the Asian brand service axis will be constructed on the "Longitude", supplemented by the "latitude" four strategies, including production R&D , retail experience, international trade, alliance M&A for the Asian market.

The Uni-President (Vietnam) company celebrates its 20th anniversary this year. To thank customers for their supports, we will continue to focus on developing new products and technical services. We hope to develop the Indian market in the future. We will continue to pull out all the stops in Indian market.

A view of participants in Uni-President sponsored conference held during APA 19 recently in Chennai

Uni-President sells 40,000 metric tons feed in India annually

Contn from Page 30

We are just stably expanding our products line, from aqua feeds to probiotic products and functional feeds, which are important to help farmer to better the culture efficiency. These new products have been proved good performance in other countries such as Vietnam and Malaysia, now we are working with our customers together, to introduce these good quality products to farmers.

The most important is satisfaction of farmers. We will keep focusing on our quality mission first.

On comments that feed millers are using harmful chemicals and antibiotics in the feed

I think now India needs to provide the good quality material and keep increasing the exporting business, which are good for aqua industry as well. We need to help and protect on this exporting business and do the best effort to help India exporting more materials. The good quality feeds can help exporting business more, and learning now government is also seriously monitoring the harmful / antibiotics products and tracking the sources.

Future plans and targets in India

We hope to expand our current products and services in the feed business. We will bring new technologies and products. Based on good performance, we also hope to bring the success of other countries in India. We believe that India is the star of Asian in future. We hope to keep up with the trend of the new era.

Advise to professionals, farming community

In our past experience, aquaculture in India is bound to face problems currently encountered in other countries.

How to get the first opportunity and respond to the market environment is a subject that must be accepted. Experience and technology are the basics of the market, but only the positive acceptance of the challenge and continuous self-improvement is the only way to stand firm in the market.

Uni-President Enterprises Corp.

Uni-President (Thailand) Ltd.

Uni-President China Holdings Ltd.

Uni-President (Vietnam) Co., Ltd.

Uni-President (Philippines) Corp.

PEPTIDES - A Contemporary solution to the Age old Problems

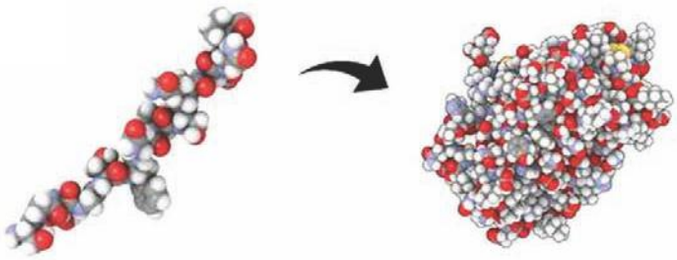
Mr A.V. Durga Prasad, Technical Director, Biomed Techno Ventures, Vijayawada

Shrimp culture in India is affected by numerous diseases. Majority of them being related to White Feaces and E.H.P. Farmers constantly come across the problems of loose shell and shunted growth as a result, eventually leading to huge losses in shrimp culture. E.H.P/Vibrio infection causes shrimp to spend lot of energy to overcome the stress/infection resulting in poor growth. Bioactive peptides along with an optimum formulation of chelated minerals fortified with probiotics are yielding tremendous results in this front.

PEPTIDES: A Peptide is a compound consisting of two or more amino acids linked in a chain.

The carboxyl group of each acid joined to the amine group of next, by a bond type -OC-NH-, called peptide bond (covalent bond).

Peptides are distinguished from proteins on the basis of size. The shortest peptides are dipeptides consisting of two amino acid joined by a single peptide bond, followed by tripeptides, tetrapeptides and polypeptides

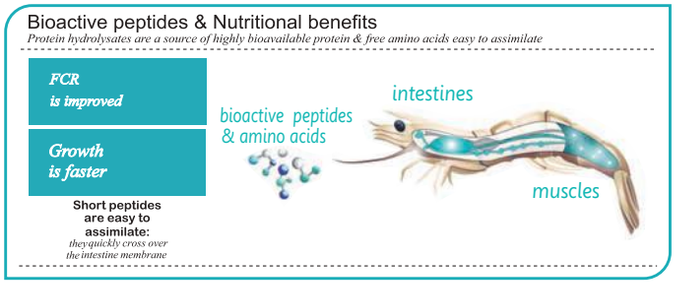


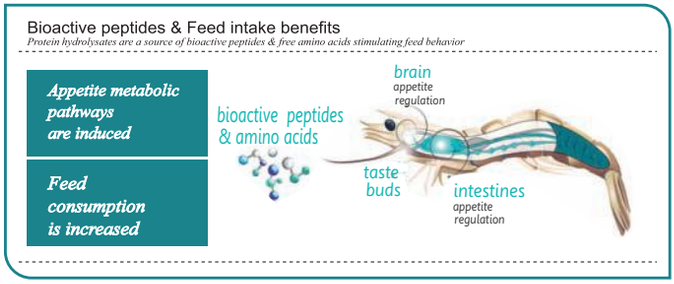
Peptide Protein

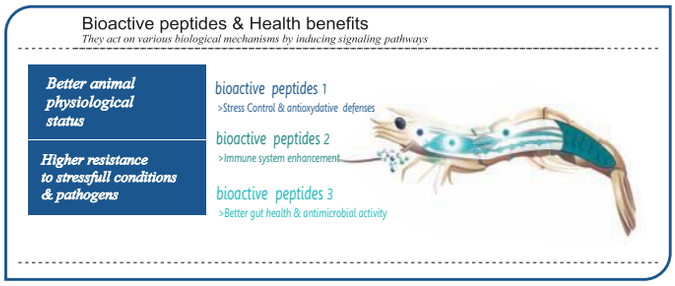
Key benefits of Peptides

- Appetite regulation
- Osmoregulation
- Growth and development
- Protein synthesis
- Energy and hemeostasis
- Immunity and survival
- Antioxidative & Antimicrobial defenses
- Meat quality
- Stress and Behaviour
- Reproduction
- Metamorphosis and Moulting
- Ammonia excretion

Benefits







Protocol for PeptiGrow Trial

1. Trial period	: 5 weeks
2. Trial ponds	: 4 Ponds
3. Control ponds	: 4 Ponds
4. Stocking density	: 25pcs / M2
5. PeptiGrow dosage	: 20gms / kg of feed.
6. A.B.W at the time of trial	: 7gms to 11 gms.
7. Farm name and area	: PK aqua farms, parna sa,krishna dt.

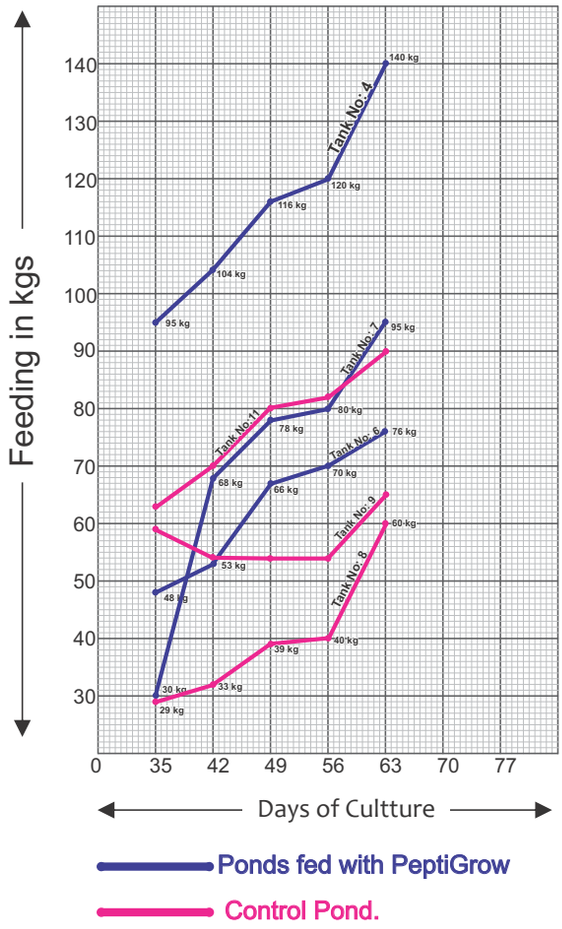
PeptiGrow is a nutritional product for shrimp as a feed additive. It is a combination of marine bioactive peptides, chelated minerals fortified with probiotic bacteria. Thorough Trials have been conducted diligently for 5 weeks in active shrimp farms and the results have been encouraging.

Trial Results for PeptiGrow

8. Aim of the trial	: 1. To Assess the feed intake 2. To Assess Health and growth of the shrimp 3. To Assess the Survival rate

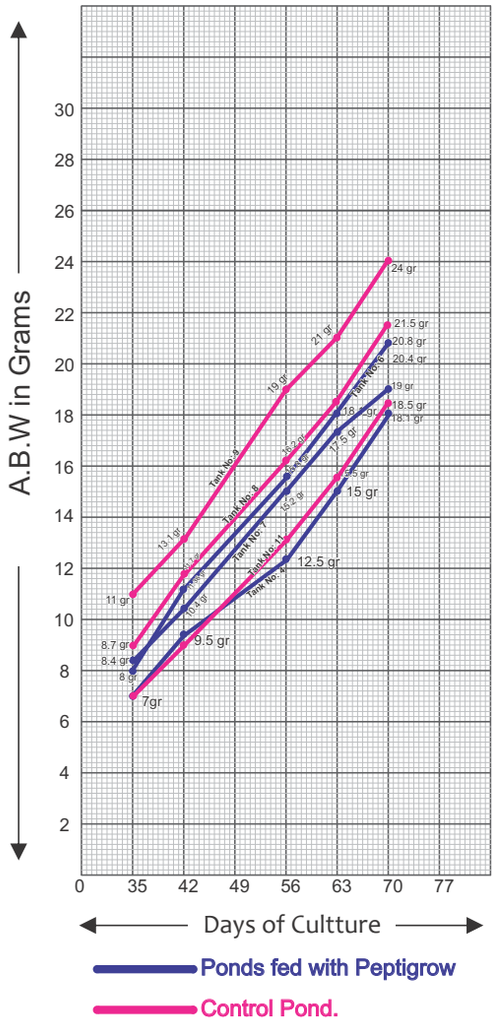
PeptiGrow was mixed with the feed in proportions of 20 gms/ kg of feed for two meals a day for 35 days. Controlled ponds were fed with normal shrimp feed without any additives. The following are the results,

Data showing feeding with PeptiGrow and control pond



Trail Remarks : There is a remarkable increase in feed intake fed with PeptiGrow This Experiment shows that PeptiGrow is a Very good feed Attractant

Data showing growth with PeptiGrow and control pond



Trail Remarks : Yes there is notable change in growth fed with PeptiGrow

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9	Skretting China	18	Skretting India

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www.skretting.com

Prawn and Crab Fisheries in Tapti River - apeninsular river of India

Thangjam Nirupada Chanu[1], Satish Kumar Koushlesh[1], Vettath Vadukootil Raghavan Suresh[1], Wakambam Anand Meetei[3], Pranab Gogoi[2], Raju Baitha[1], Sanjay Kumar Das[2] and Basanta Kumar Das[1],

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Introduction

Freshwater prawn and crabs are important crustacean fisheries resources in inland open water which is often neglected by the researchers and policy makers unlike similar attention given towards marine and estuarine counter parts. It is reported that 118 species of prawns belonging to 14 genera and 2 families are recorded in freshwater bodies of India (Valarmathi, 2017). Freshwater prawns are dominated by genus Macrobrachium (Family:Palaemonidae) and Caridina (Family: Atyidae). India is the third largest producer of freshwater prawn in the world, with over 24200mt in 2001 (FAO, 2001) and ranked 8th among prawn producing nations (FAO, 1999).

Freshwater crabs belong to the infra-order Brachyura of the order Decapoda in the class Malacostraca of phylum Arthropoda. Endemism in inland freshwater crabs is relatively high as a result of their habitat requirement and limited dispersal ability. Crabs of family Gecarcunicidae are found in almost all freshwater habitats such as river and streams, shallow and deep pools, floodplain wetlands, inundated crop fields and swamps, etc. Despite its occurrence in different type of habitat their population in wild is vulnerable to many anthropogenic activities such as habitat conversion, deforestation, pollution and unsustainable agricultural practices (Pati and Sharma, 2012).Freshwater crabs are an important and cheap source of protein particularly for tribal communities and lower income group. Besides small crabs are also serving as a food source for turtles, birds and mammals. Currently, there are 121valid freshwater crab species described from India(Pati and Thackeray, 2018; Mitra et al. 2018) with majority of the species belonging to families Gecarcinucidae and Potamidae.

River Tapti is one of the two major west flowing rivers in peninsular India. A rainfed river, it has its origin in Multai Taluka, situated in central highland terrainof Betul district, Madhya Pradesh. The river flows down south westerly through Satpura ranges receiving much of its catchment drains from numerous small streams along its course. These sources serve as a major source of instream wetted area of main Tapti channel throughout its longitudinal extent in Madhya Pradesh after which it flows as a boundary line between states of Maharashtra and Madhya Pradesh for a length of 54km; altogether covering a distance of 724 km from its origin before joining Gulf of Cambay at Dumas near Surat in Gujarat (Jain et al. 2012). The river harbours a rich diversity of fish and shell fish diversity. Although fishes form the major resource being exploited, crustaceans like prawn and crabs are exploited in many stretches of rivers. However, their importance is ill-recognized as far as sustainable fishery development is concerned, despite being a significant contributor to nutritional and livelihood security, particularly of poor fishers dwelling along the riparian areas. These resources are fished by itinerant as well as regular fishers in Tapti throughout its course from origin to sea-mouth. There has not been any comprehensive attempt in the past to document these resources and their fishery, which has driven our focus to survey this aspect of fisheries of river Tapti.

Highlight Points

- IRiver Tapti is one of the two major west flowing rivers in peninsular India.
- Prawn and crab important crustacean fisheries resources in inland open water which is often neglected by the researchers and policy makers.
- This article provides information on the macro-habitats of freshwater prawn and crab along Tapti River.
- Freshwater crabs are an important and cheap source of protein particularly for tribal communities and lower income group.
- Lesser freshwater prawn could also be used in aquarium industry as it has high ornamental val.

Mainstream macro-habitat distribution

Macrohabitat refers to habitat types with presence of substantial variation in environment, varied ecological niches, and support a large and usually complex flora and fauna (Merriam-Webster dictionary, 2019). The river stretch in Madhya Pradesh and Maharashtra has been characterized by rocky substrate which transforms to different types of macrohabitats viz., pool, riffles, rapids, runs and glides owing to constant changes in instream flow, varying channel slopes,

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Probiotic Strains (Bacteria)

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- *Bacillus megaterium*
- *Bacillus licheniformis*
- *Bacillus pumilus*
- *Bacillus polymyxa*
- *Bacillus clausii*
- *Bacillus macerans*
- *Bacillus coagulans*
- *Bacillus mesentericus*
- *Bacillus Sp.*
- *Pseudomonas denitrificans*
- *Pseudomonas putida*
- *Pseudomonas Sp.*
- *Rhodococcus erythropolis*
- *Rhodobacter Sp.*
- *Acidithiobacillus ferrooxidans*
- *Thiobacillus thiooxidans*
- *Lactobacillus acidophilus*
- *Lactobacillus brevis*
- *Lactobacillus reuteri*
- *Lactobacillus rhamnosus*
- *Lactobacillus sporogenes*
- *Lactobacillus plantarum*
- *Lactobacillus fermentum*
- *Acetobacter aceti*
- *Citrobacter freundii*
- *Nitrobacter Sp.*
- *Nitrococcus Sp.*
- *Bifidobacterium infantis*
- *Paracoccus pantotrophus*
- *Bifidobacterium longum*
- *Pediococcus acidilactici*
- *Pediococcus pentosaceus*
- *Cellulomonas Sp.*
- *Bifidobacterium bifidum*
- *Lactococcus lactis*
- *Lactobacillus casei*
- *Pediococcus cerevisiae*
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and dominant substrate present in the reach throughout its length. The details of macrohabitat distribution along upper and middle stretches of Tapti River are quantified as shown in table 1. The prawn fishing activity is limited to the marginal areas in case of pools and run. The occurrence has always been associated with the significant instream vegetation cover.

The onset and intensity of monsoon rains serves as supply to seasonal streams and inter plays with the seasonal dynamics of macrohabitats. Subsequently, the river turns southwards in Jalgaon District, Maharashtra where it meets with its first major tributary, Purna. The length of river upstream of this confluence point covering Burhanpurin Madhya Pradesh and downwards till Sarang kheda is categorized as middle stretch. For a major part, this stretch is characterized by the presence of natural and artificial deep pools (reservoirs) as well as run, with series of fragmented pools and riffles occurring at intervals downstream of anthropogenic structures (dams and barrages) on main channel. The lower stretch of the river is characterized by dominance of perennial sections of deep runs and pools present almost entirely in western border of Maharashtra and whole of Gujarat.

Fisheries

There is limited information available about fish and fisheries of this river; the only comprehensive information available covering the entire stretch is based on a survey conducted by Central Inland Fisheries Research Institute during 1959-60. Based on the survey, Tapti Riversupported 52 fin fish species. Major contributors to catch were T*or tor, Labeofimbriatus, L. calbasu, L. bata, L. boggut, Sperataaor, S. seenghala* and *Wallago attu* (Karamchandani & Pisolkar, 1967). Indian shad hilsa, (*Tenualosailisha*) formed a lucrative fishery in lower reaches of Tapti especially during monsoon season in the vicinity of Surat (Karamchandani & Pisolkar, 1967).

Fishing season in the river starts during September and continue till the onset of monsoon season. Fishing ban/ closed season as management control during monsoon season starts from 15 June to 31 July and is being complied by the fishers in upper stretch and middle stretch in the Madhya Pradesh stretch of the river. Besides finfishes, prawns and crabs too contribute to fishery, although on a subsistence level. In general, crustacean fishery is the most neglected fishery in inland open waters especially in rivers, streams and wetlands in the sense that it has not been exploited judiciously thus hasn't been able to garner the due attention by managers and stakeholder to develop as an organized fishery in most of the streams across India.

Prawn fisheries

Prawn fishery along Tapti River is mostly subsistence level in nature and occurs as a seasonal activity, mainly during pre-monsoon and in early monsoon season along some stretches; the latter being only associated to stretches receiving delayed and low intensity rains. In pre-monsoon the prawn fishing stretch is characterized by stagnant pools and glides with relatively high water transparency (Transparency >50 cm).

Prawn are distributed along the entire stretch of the river , however they are highly abundant in the middle stretches (Dedtalai to Bhusawal) where pools are abundant and aquatic vegetation contributes to provide as shelter.

Unlike finfishes, which are exploited using a variety of gears both active and passive in operation, prawn resources of river Tapti is exploited mainly using push nets locally known as *Pelni* in this region. The push net is designed in triangular shape with a rigid frame made of bamboo that is pushed along the bottom in instream macrophyte logged shallow waters and is used for taking prawns and small macrophyte associated finfishes. *Pelni* fishing is one of the fishing activities employed by the tribal population inhabiting along the north and south banks of river Tapti in Madhya Pradesh and northern Maharashtra. The only significant market scale prawn fishery exists along middle stretch of river near *Changdev* in Maharashtra. These prawn fishers are itinerant type as they travel from one village to another village in search to good prawn fishing ground and to market the catches in weekly village markets. The CPUE ranged from 0.5 to 1.25 Kg/hr/fisher. The fishermen regularly camped at Tapti-Purna confluence in groups, each group consisting of 2-3 fishers during pre-monsoon and late post-monsoon seasons. The catches are composed of small sized palaemonid prawns of genus *Macrobrachiumand* Caridean prawn under genus *Caridina* along with small quantities of other small sized fin fishes. Among these catches landed by fishers, the larger sized prawns were of 4 to 5 cm total length range. The fishers have high dependence on the local population as more than 90% of the catch is marketed dried in the nearby daily as well as weekly markets at the rate of Rs. 150 to 200 per kg.

Besides some of the tribal fishers in upper stretch near Dedtalai also use stitched nylon or cotton cloth as a seine to catch prawns during early monsoon in the month of July which may due to availability of instream macrophyte vegetation cover. This kind of prawn fishing is mostly done by women through seining with an average CPUE of 0.3 Kg/ hr/fisher.

Crab fisheries

Unlike marine blue swimming crab (*Portunuspelagicus*) and mangrove mud crab (Scylla spp.), there is no organized fishery and documentation of freshwater crab available in the country. The crab fishing forms a subsistence level fishery, which is mainly focused towards meeting the demand in local markets. However due to its perceived medicinal value (Soundarapandian et al. 2013) year round demand on a smaller scale is constant feature of the local weekly markets. Only one species of crab, *Barytelphusa* sp. belonging to family Gecarcinucidae was recorded so far from all the stretches of the river. There isn't any commercial scale crab fishery in river Tapti, however its demand among local populace for the perceived medicinal value, drives its continuous but low scale exploitation at all the stations throughout river.

Crab is caught mainly by baited line and hand picking. In addition, accidental entangling of crabs in monofilament gill nets of varying mesh sizes in fragmented pool systems situated downstream of check dams, anicuts and reservoir connected with a web of narrow trenches over bed rock

also contributed to the daily crab catches around these sites. The popular bait used in fishing crabs are small prawns and smallindigenous fishes like *Salmostoma* spp., and *Puntius* spp. etc. The daily catch per day per crab fisher in post monsoon ranges from 1 to 4 kg (December- January) which gradually reduces to 0.5 to 1.5 kg during the pre-monsoon (April-May). The market price of these crabs varies from Rs. 50 to Rs. 100 per pair based on the size where larger crab specimens weighing more than 250 gm fetch higher market price.

Conclusion

Freshwater prawns and crabs are the two important crustacean resources which receive very less attention and often neglected by the researchers and policy makers in the country. However, these resources significantly contribute to nutritional and livelihood security of thousands of fishers in the country and also are integral components of the inland aquatic ecosystem. Similarly, in Tapti River hundreds of fishermen rely their livelihood on fisheries of these two crustacean resources.

It is needed to take up focused research on assessment of these resources including biodiversity and habitat characterization, extensive or semi-intensive aquaculture practices to improve the stock of freshwater prawns and crabs in order to meet market demand and maintain the depleting wild population. Lesser freshwater prawn could also be used in aquarium industry as it has high ornamental value. Since these resources contributes to nutritional security to the masses inhabiting interior geographical area under upper and middle stretch of this river, nutrient profiling of these resources may be attempted in order to add value to its fisheries.

Acknowledgement

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Fig. 1. Catch of craba *Fig. 2. Catch of prawn* *Fig. 3. Pelni (Push net)*

Fig. 4. A representative view of fragmented sections of river Tapti downstream obstruction

Table 1: Variation in macrohabitat distributional ranges observed between post-monsoon and pre-monsoon season in the selected stations along upper and middle stretches of river Tapti

Macrohabitat area	Multai	Betul	Dedtalai	Nepanagar	Burhanpur	Changdev	Bhusawal	Savkheda
Pool area (%)	50-100	20-25	15-100	20	90	80 - 90	65-85	20-95
Run area/Glide (%)	0-50	50-60	0-85	60-65	10	10 -20	10-25	5-80
Rapid/ Riffles area (%)	0	20-25	0	15-20	0	0	5-10	0

Fishery Waste: Challenges and Outlook

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Introduction

Fish processing operation generates wastes in the form of head, viscera, skin, bones, scales and entrails. It is estimated that industrial fish processing yields only 40% edible portions and remaining 60% is considered as waste which cannot be directly used for human consumption; the waste generated in the factory is seldom attended and creates environmental pollution problems like, off-smell, proliferation of insets and pests and other microbes. Moreover, it results in loss of huge quantity of nutrients. Annual discards from world fisheries including by-products is approximately 30 million tons (25%) per year. In India, the industrial fish processing generate 3, 02,750 tons of waste. Among the maritime states, maximum waste generation was observed in Gujarat (30.51%) followed by Maharashtra (23%) and Kerala (17.5%). An important waste reduction strategy for the industry is the recovery of marketable by-products from fish wastes. An important waste reduction strategy for the industry is the recovery of marketable by products from fish wastes. The three most common methods for utilization of aquatic waste (either from aquaculture or wild stock) are the manufacture of fishmeal/oil, the production of silage and the use of waste in the manufacture of organic fertilizer. High value end products for pharmaceutical and nutraceutical applications can be derived from fishery waste. Different products like chitin, chitosan, glucosamine hydrochloride, fish maws/ isinglass, squalene, fish calcium, collagen and its derivatives are being produced for various applications. The utilization of by products can potentially generate additional revenue as well as reduce disposal costs for these materials.

Trash Fish As Waste Fish

The term 'trash' fish has been used to denote fish, usually non-targeted, that are caught as bycatch, and normally command no price in the market. Ecologists have long objected to this notion because in the natural system no creature is trash. It is demonstrated that even from the economic perspective, the term 'trash' fish is problematic, as what is considered trash in a given place and/or time may actually be treasure in another place and/or time. In earlier days the some of the fishes are discarded during catches saying it as a trash fish having no value is now a days proved as a valued fish by many utilization. E.g. these types of whole fishes are used for making feed for culture fishes, fertilizer, and fish meal.

Volumes and value of fish wastes

Fish wastes have a huge unexploited potential for value adding. Every year 18 – 30 million tons of waste is dumped around the world. Solid wastes include skin, viscera, fish heads and carcasses (fish bones). Solid waste can be recycled in fish meal plants or it can be treated as municipal waste. Liquid wastes include blood water and brine from drained storage tanks, and water discharges from washing and cleaning. This waste may need holding temporarily, and should be disposed of without damage to the environment. By-products from fisheries, included fish farming, consist of viscera, heads, backbones, cuts and rejected fish from processing. The by-products are generated when the fish is gutted, headed and further processed - either on-board in fishing vessels or in processing plants on shore. The fisheries produce more than 550,000 tons of by-products annually, which is more than 20 % of all the fish caught and farmed. Today most of the by-products are used as raw materials for feed production; such as fishmeal, silage and feed for fur animals. About 150.000 tons are still dumped into the sea. The total value adding represents 1, 25 billion. If we succeed to utilize more of the by-products as food for humans and as ingredients in foodstuff, health foods, pharmacy, cosmetics etc., the value adding may increase by 4-5 fold. Less than 10% of volume represents 50% of the added value.

Utilization of fish wastes:

The traditional utilization pattern of fish waste which is commonly practiced everywhere i.e. fish oil,fish meal,fish flour,fish silage,fish soluble,fish roes,fish soluble,isinglass and fish leather etc.Some marine bio ingredients from fisheries waste are DNA salt, amino acid,taurine, peptides ,concentrated omega 3 oil ,enzymes phospholipids ,mineral, Pepsin ,glucosamine, gelatine, Chitosan and nucleotides etc.So far,

Highlight Points

Fish processing sector involves stunning, grading, slime removal, de-heading, washing, scaling, gutting, cutting of fins, meat bone separation and steaks and fillets. During these steps enormous amount of waste is generated which can be utilized as fish silage, fishmeal and fish sauce. Here, this is an attempt to bring into notice the potential uses of fishery waste in valorised food industrial and pharmaceutical sector.

fish wastes such as whole body, heads, viscera, chitinous materials from fish with shells, and also fish wastewater which are rich in specific growth factors and amino acids are used as substrates for enzyme production.However, each of the above said substrates is processed by different ways into a suitable form that could make up for the medium. Most of the time, the fish wastes including head and viscera were first cooked, pressed to remove excess water, minced thoroughly and dried at different conditions and finally made into a powder, in case it is needed in solid form .

Challenges and opportunities

The average composition of fish waste consists of head (21%), gut (7%), liver (5%), roe (4%), backbone (14%), fins and lungs (10%). These wastes are rich in organic contents such as protein, bioactive peptides, collagen, calcium, gelatin, oil and enzymes which make this disposal complicated and more expensive. Improper discarding by incineration and sea dumping can lead to pollution and other environmental issues. Almost 75% of the worldwide fish production is utilized for human consumption and the rest 25% is considered as fish waste. Fish wastes have been used conventionally to produce high protein rich animal feed by fermentation and also for composting purposes. However, recent advances in industrial biotechnological processes have paved way for economical and highly beneficial utilization of these wastes for mankind. Fish oil, which is rich in polyunsaturated fatty acids, is considered to be a healthy food product that has been produced from fish waste. Fish skin or, cartilage provides excellent raw materials for the production of gelatin, which is used in food and pharmaceutical industries. Fish hydrolyzes with high biological properties can be used in several fields ranging from medicine to aquaculture.

Fish waste consists of 58% protein, 19% fat and trace amounts of minerals, mainly copper, phosphorus, magnesium, sodium, potassium, calcium, iron, zinc and manganese. Commercially used substrates for protease production are casein, meat, gelatin and soy. These expensive substrates are the reason for the high production cost of the enzyme and therefore, finding a suitable low cost medium and optimization strategies would economically benefit the production process on a large scale.

Conclusion

Processing of fish involves stunning, grading, slime removal, de-heading, washing, scaling, gutting, cutting of fins, meat bone separation and steaks and fillets. During these steps significant amount of waste is generated which can be utilized as fish silage, fishmeal and fish sauce. Fish waste can also be used for production of various value added products such as proteins, oil, amino acids, minerals, enzymes, bioactive peptides, collagen and gelatin. These fish proteins can be used as a functional ingredient in many food items because of their properties (water holding capacity, oil absorption, gelling activity, foaming capacity and emulsifying properties). They can also be used as milk replacers, bakery substitutes, soups and infant formulas. The amino acids are the building blocks of protein. The amino acids present in the fish can be utilized in animal feed in the form of fishmeal and sauce or can be used in the production of various pharmaceuticals.

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The Importance and Perspective of Squalene in Human Health

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Introduction

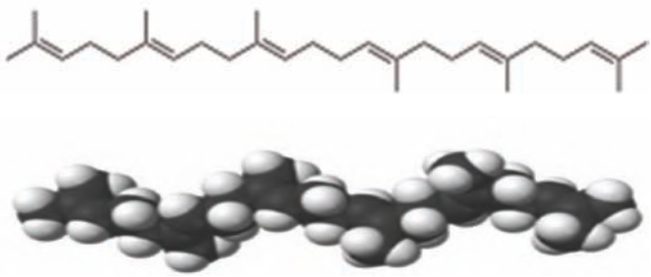
Squalene is a highly unsaturated isoprenoid hydrocarbon primarily from shark liver oil and originally obtained for commercial purposes. It is a low-density compound often stored in the bodies of sharks, which lack a swim bladder, therefore, reduce their body density with fats and oils mainly for buoyancy. Squalene is lighter than water with a specific gravity of 0.855. Being ahigh-density lipid (HDL), it is recommended as 'good cholesterol' because it is polyunsaturated fat, and it has many other health-giving properties. Squalene is structurally similar to beta-carotene, which is an intermediate metabolite in the synthesis of cholesterol. About 60% of the dietary squalene is absorbed in humans. It is transported inassociation withvery low-density lipoproteins and is distributed in human tissues, especially in the skin, where it is one of the major components of surface skin lipids. Squalene is not susceptible to peroxidation and appears to function in the skin as a quencher of singlet oxygen, and it protects human skin from lipid peroxidation due to exposure in UV and other sources of ionizing radiation. Squalene supplemented diet in mice has resulted in marked increases in non-specific and cellular immune functions in a dose-dependent manner. It may also act as a "sink" for highly lipophilic xenobiotics. It has a higher affinity for unionized drugs due to its nonpolar nature. In animals, squalene supplemented diets can reduce cholesterol and triglyceride levels. In humans, squalene supplemented diets might be a useful addition to potentiate the effects of some cholesterol-lowering drugs. The primary therapeutic use of squalene currentlyin human is as adjunctive therapy in a variety of cancers. Squalene and its derivative squalane can be used asan ingredient in cosmetic products, ranging from anti-aging cream to lip gloss.

History

Squalene is a triterpene with the formula of C30H50, an intermediate product in the biosynthesis of phytosterol/ cholesterol in plants, animals and humans and it is widespread in animal and vegetal kingdom. Squalene was first discovered in 1906 by the Japanese Researcher Dr. MitsumaruTsujimoto, an expert in extraction oils and fats at Tokio Industrial Testing Station. Then, he separated the unsaponifiable fraction from the shark liver oil called ``kuroko-zame'' and discovered the existence of a highly unsaturated hydrocarbon. Although he did not isolate the substance at that time, he obtained the bromine addition compound, as a white powder, which decomposed at 1550C and had the following composition: 26.93% C, 3.94% H, and 69.28% Br. He proposed the formula for this compound as C10H18Br4. Ten years later, Tsujimoto succeeded to obtain "Squalene" by fractional vacuum distillation of the oil from the liver of two deep-sea shark species, an unsaturated hydrocarbon, with the composition C30H50, which is named as "Squalene." The name comes from the denomination of the sharks' family, Squalidae. Almost in the same period, independently, Chapman also separated an unsaturated hydrocarbon with the composition 87.75% C, 12.25% H and the molecular weight of 375, from the liver of two sharks (Centrophorusgrunulosus and Scymnuslichia) from Portugal. Chapman proposed for this compound the name of "spinacene," as both sharks were from the family Spinacidae or Squalidae. This remained even today one of the medical labels of the compound, together with "supraene," or the Latin name of "squalene exogeno oleum."

Chemical structure of squalene

Subsequent research confirmed the mentioned chemical formula proposed by Tsujimoto, squalene having the following structural formula:



Systematic IUPAC name

(6*E*,10*E*,14*E*,18*E*)-2,6,10,15,19,23-Hexamethyltetracosa-2,6,10,14,18,22-hexaene

Sources of Squalene

The richest source of squalene is abyssal shark livers even though shallow sharks' livers had lower squalene content than cod livers. New Zealander shark livers contain about 50% by weight squalene. Past decades' studies were focused on shark livers and its squalene content. Some of these species are listed in Table 1.

Highlight Points

- **Squalene can be used as a natural antioxidant.**
- **In humans, it might be a useful addition to potentiate the effects of some cholesterol-lowering drugs.**
- **Squalene can also be used as anti-aging product.**

Table 1. Squalene content in different shark liver oil

Shark species	Squalene content (%)
Centroscymnuscrepidater	35.7-59.4
Centroscymnusowstoni	37.1-53.1
Centroscymnuscoelolepis	31.1-47.1
Deaniacalcea	43.4-66.1
Etmopterusbaxteri	14.3-51.5
Etmopterussp.nov.	20.8
Dalatiaslicha	43.4
Centrophorussquamosus	<0.01
Centroscymnusplunketi	0.9*
Etmopterusgranulosus	50.3-60.5*
Deaniacalcea	69.6*
Centroscymnuscrepidater	73*
New Zelander shark	50-55*
Centrophorussquamosus	65.5
Cuban sharks	0.03

The greatest concentration of squalene in the world is met in the liver of certain species of fish, especially sharks living in the sea at depth under 400 m. The liver is the main organ for lipid storage as well as an energy source and means for adjusting the buoyancy in deep-sea sharks. In their case, the unsaponifiable matter represents 50 –80% of the liver, the great majority thereof being squalene.Shark liver oil represents the richest natural source of squalene. A limitation in the use of this natural source for squalene is represented by the presence of different persistent organic pollutants (POPs), like PCB (polychlorinated biphenyl), PBDE (Polybrominated Diphenyl Ether), organochlorine pesticides, polycyclic aromatic hydrocarbons, dioxin, heavy metals, which can still be found in the purified squalene, together with the concern for the preservation of marine life. Recent studies show that the POP level in the Atlantic Ocean grown salmon is under the limit established by the WHO and the European Authority for Food Safety.Anyway, the squalene extracted from the fish liver oil cannot be used in cosmetic or pharmaceutical applications because, despite the deodorization treatment, it still has a persistent unpleasant smell and even, undesired impurities. The pharmaceutical industry has very rigorous manufacturing standards which cannot be easily accomplished by the squalene of shark origin. Sharks may be infected by pathogens that are also infectious for humans or which may produce substances dangerous for humans.For a long period, shark liver oil was considered the only industrial-scale source for squalene. Shark liver oil remained the most important source for squalene and its hydrogenated derivative, squalane, for the following economic reasons: the production of squalene from shark liver oil is less complex and cheaper than from olive oil. Anyway, the intensive fishing of these sharks put in danger the existence of these species, many of them close to extinction, as their reproductive cycle is quite long and the growth is slow. That is why Europe drastically reduced the fishing quotas for these shark species lately. In the human body, squalene is synthesized by the liver and is secreted in large quantities by the sebaceous glands. It is associated with the very low-density lipoproteins then transported in the blood. It is interesting to notice that squalene alone represents 12% of the lipids secreted by the sebaceousglands. The squalene concentration in human skin lipids is of about 500 µg/g, and in the adipose tissue, 300 µg/g.

Applications

Squalene comes into the attention of the scientific world due to the finding that the beneficial effects of some natural products on the health and the wellbeing of humans are due to its action. It is now known that squalene is the main component of shark liver oil. From ancient times, fishers all over the world, benefited the important properties of the oil, extracted from the sharksliver,which are living beneath 1,000 m from the sea level. It was used to improve or to cure a wide range of conditions. In Sweden and Norway, fishers traditionallyused this oil to cure wounds or the various conditions of the respiratory tract. On the other hand, the other major natural source for squalene is the olive oil, andit came into the attention of the scientific community due to the healthy properties of an olive oil-based diet. The epidemiological evidence of certain cancers and a lower incidence of Cardiovascular Heart Disease in the Mediterranean area stimulated researches on the potentially protective action of the olive oil's minor constituents. Physical and chemical properties of squalene and in the same time, the more profound understanding of it is in vivoactions ensure multiple fields of applications in different sectors of human activity: food, cosmetics, pharmaceutics, medical prevention and treatment.

a. Food

A squalene daily dose (up to 85% absorption) from food has been related to many health benefits. Today there are on the market several squalene formulations as nutraceuticals. Technological properties of squalenehave been widely appreciated in fields beyond human consumption. Moreover, squalene (SQ) formsstable nanoemulsions and is found in several conformations; it forms SQ-drug conjugates with improved properties potentially can be used as a major bioactive ingredient carrier. As far as human food applications are concerned, its thermal stability and contribution in the stability of frying oils are well established. All the above properties increased both food and non-food squalene applications so that its current demand in food, pharmaceuticals and cosmeticsis getting higher.

b. Cosmetics

Squalane and Squalene act as a lubricant on the skin surface, which gives the skin a soft and smooth appearance and also act as hair conditioning agents. In the 1950's it was discovered that squalene isan important component of human sebum, the fact that justifies its role in the skin physiology. It was demonstrated its role in skin hydration, repairing the damaged skin, rejuvenating the aging skin. As a common lipid produced by sebaceous glands, squalene has a role in topical skin lubrication and protection. Toxicology studies indicate that the concentrations used in cosmetics, squalene has low acute toxicity, and is not a significant contact irritant or allergen. The hydration and emollient properties of squalene and also its biocompatibility with the skin make squalene an important component in cosmetical formulations (makeup, lipstick, moisturizing creams, nail

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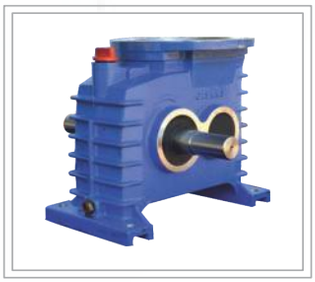

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and hair products). It is considered as one of the greatest natural emollients, being rapidly and efficiently absorbed into theskin, restoring its natural suppleness and flexibility, without back oily residues. To its wide application in cosmetics also contribute its odorless and colorless, high spreadability, light consistency, non-greasy texture, rapid transdermal absorption, antibacterial properties. All these characteristics make squalene is an excellent skin protector, being used in healing eczema, damaged hair, anti-aging and wrinkle protection. Squalene appears to play an essential role in protecting the skin from free radical oxidative damage. Squalene is not very susceptible to peroxidation so, it acts at the skin level as a quencher of singlet oxygen, protected by this mechanism the skin surface from lipid peroxidation due to exposure to UV light. Kohno et al. (1995) showed in their studies that the rate constant of quenching of singlet oxygen by squalene is much higher than those of other lipids in human skin and is comparable to that of 3,5-di-t-butyl-4-hydroxytoluene (BHT). They alsostated that it seems to be unlikely to appear the chain reaction of lipid peroxidation in human skin when proper levels of squalene are present

Due to its antibacterial properties, squalene in admixture is used for preparing a cooling formulation for the local treatment of burns. Squalene has a melting point low enough to allow the cooling composition to remain liquid, even at temperatures between -10oC and -60oC, unlike the conventional oily topical drugs.

c. Pharmaceutics

Squalene is frequently used in the preparation of stable emulsions as either the main ingredient or the secondary oil. An important application of squalene emulsion is as an adjuvant for vaccine delivery. An immunological adjuvant is a substance employed to increase or to modulate the immune response against an antigen. An ideal adjuvant would increase the potency of the immune response while remaining non-toxic and safe for the host.The first used as adjuvants in human vaccines were aluminum hydroxide and aluminum phosphate, but they did not show sufficient activity when used with various antigens as typhoid vaccine, influenza virus hemagglutinin. Various reports showed that mineral adjuvants were not safe, causing a variety of pathologies. Squalene-in-water emulsions stabilized with polysorbate 80 proved to be a solution to these problems. Squalene was used as an adjuvant in vaccines, stimulating the immune response and increasing the patient's response to the vaccine. An adjuvant using squalene is Seqirus' proprietary MF59, which is added to influenza vaccines to help stimulate the human body's immune response through production of CD4 memory cells. It is added to lipid emulsions as a drug carrier in vaccine applications. Lipid emulsions are interesting as drug delivery systems because they easily incorporate drugs with poor solubility in the dispersal phase. By using lipid emulsions as drug carriers, it is avoided the direct contactbetween the active substance and human body fluid or tissue and by this avoiding the possible side effects. The experiments conducted by Kim et al.(2003) on a mouse model demonstrated that a squalene emulsion has the most potent transfection activity and provedthe least cytotoxicity after the intravenous administration. An influenza vaccine (FLUAD, Chiron, Italy) using a squalene emulsion (10 mg/ dose) was approved in Europe in 1997. Several patents revealed that by adding different substances (squalene 10%, lecithin 1%and Tween 80) to vaccine formulations, they become more effective in inducing high antibody titers than squalene emulsions stabilized only with polysorbate 80.

Nowadays, the most used adjuvants including squalene MF59 which belongs to Novartis, as a patented compound. It comprises squalene together with two surfactants Tween 80 and Span 85, as an oil-in-water microemulsion. It is used as an adjuvant in several vaccines against hepatitis B and C, herpes simplexvirus, influenza virus. It was demonstrated that the use of MF59 for the vaccine delivery is safe as no anti-squalene antibodies were produced and no enhancement of pre-existing anti-squalene antibodies titers were observed. Furthermore,suggests that MF59, after injection, increases the immune response causing a significant influx of phagocytic cells into the vaccination site. It is the first oil-in-water influenza vaccine commercially used. Data published by the World Health Organization in 2008 showed that squalene was present in over 22 million flu vaccines distributed to patients in Europe since 1997 and no adverse effects were reported.

A 2009 meta-analysis assessed data from 64 clinical trials of influenza vaccines with the squalene-containing adjuvant MF59 and compared them to the effects of vaccines with no adjuvant. The analysis reported that the adjuvanted vaccines were associated with slightly lower risks of chronic diseases, but that neither type of vaccines altered the rate of autoimmune diseases; the authors concluded that their data "support the good safety profile associated with MF59-adjuvanted influenza vaccines and suggests there may be a clinical benefit over non-MF59-containing vaccines".

d. Medical prevention and treatment

Squalene, a natural isoprenoid compound, has a similar structure to β-carotene and it is an intermediate metabolite in the cholesterol synthesis in humans. About 60% of the dietary squalene is absorbed and then transported from the small intestine in serum in association with chylomicrons (the largest and the least dense of the lipoproteins). The combination of squalene with low-density lipoproteins are distributed by blood in human tissues, the majority of the absorbed squalene being found in the skin, asthe major component of the skin surface lipids.

e. Antioxidant activity of squalene

Squalene is a highly unsaturated isoprenoid hydrocarbon, containing six double bonds. Due to this double bond structure, this isoprenoid action as a strong anti-oxidant and natural antibiotic. Also, as a consequence of its biochemical structure, it is extremely reactive and transforms into the oxidized form. The unsaturated carbons of squalene bind hydrogen ions from water and release three unbound oxygen molecules, providing the saturated form squalane, according to the reaction:

$$C_{30}H_{50} + 6\ H_{2O}\ C_{30}H_{62} + 3O_2$$

Due to this reaction, the oxygen reaches the cells, the cellular metabolism is intensified, and the function of certain organs like the liver and kidney is enhanced. Squalene is not particularly susceptible to peroxidation and it is stable against peroxide radical's attack,that is why a protective

effect of skin exposed to UV radiation is obtained when appropriate levels of squalene are present in the skin. From experiments of Psomiadou and Tsimidou, a concentration-dependent moderate antioxidant activity of squalene when stored at 40 and 620C in the dark – was evident, which was stronger than the case of olive oil compared to that found for sunflower oil and lard. The authors concluded that the weak antioxidant efficacy of squalene in olive oil might be explained by competitive oxidation of the various lipids present, which leads to a reduction in the rate of oxidation. In summary, squalene is a hydrophilic natural antioxidant. Its antiradical and antioxidant properties depend on the model system employed for the study.

f. Squalene versushypercholesterolemia and Coronary Heart Disease (CHD)

The incidence of CHD is very high today due to the modern lifestyle. The studies performed in the Mediterranean area suggested that a diet reach in squalene reduces the incidence of CHD and cholesterol conditions.

Only a few reports are available regarding the effects of a diet containing squalene administrated to humans. The results of a clinical trial, conducted on elderly patients suffering from hypercholesteremia showed, by the contrary, a decrease in total cholesterol, LDL cholesterol and TAG (triacylglycerol) levels and an increase of HDL cholesterol. Other reports showed that an amaranth oil diet, knownfor its high concentrations of squalene, produced health benefits by decreasing headaches, weakness and fatigue. An issue still in dispute today is the fact that a daily diet containing amaranth oil reduces the serum cholesterol due to the function of squalene, the important constituent of amaranth oil. Shin et al. (2004) performed some experiments on rats with amaranth grain, oil and squalene in order to study their hypocholesterolemic effect. They observed a different effect of squalene from amaranth source versussqualene from shark origin: the vegetal squalene proved a hypolipidemic action in blood and liver and an increase of cholesterol excretion in feces, effects that were not observed when shark squalene was administrated.According to these reports, following supplementation of squalene of about 850-900 mg to the daily diet, no higher levels of cholesterol in serum were reported, although the concentration of squalene in serum raised to about 17 times. The proposed explanation was the important growth of cholesterol elimination in feces which compensates the increased rate of cholesterol biosynthesis. Experiments on animals suggested the protective effect of squalene against CHD, explained by its effect to inhibit the isoprenaline-induced lipid peroxidation.

g. The anticancer and cytoprotective activity of squalene

It is already known in the scientific medical community that cancer chemotherapy damages the normal healthy tissues, leading even to organ toxicity and by these, limiting the anticancer drug's dosage and worse, the treatment failure. In many of the cases, drug medication and radiation therapy also produce free radicals responsive to the mentioned toxic effects. Squalene already proved to be effective as an antioxidant. The common antioxidantsused today in cancer therapy seem to have serious side effects a reason for which the natural antioxidant squalene to be experimentally tested and it proved to be a well-tolerated, non-toxic, important cytoprotective agent.The primary application of squalene in cancer therapy seems to be as a potentiating agent for the chemotherapic drugs. There are reports about the good results obtained by testing on animal models of the squalene in combination with anti-tumor agents as ACNU (3-(4-amino-2-methyl-5-FARMACIA, 2014, Vol. 62, 5855pyrimidinyl) methyl]-1-(2-chloroethyl)-1-nitrosourea) against lymphocytic leukemia, or as bleomycin. So far, no experimental trials on humans have been reported in order to confirm data obtained on animal models. Experimental data existing up to now could indicate that squalene is implicated on the biochemical way by which anti-cancer drugs action. It seems that squalene may stop the tumor cells' development, or to prevent some forms of chemically-induced cancer and even to produce regression of existing tumors in some cases. The suggested mechanisms by which squalene could inhibit tumor formation imply either its inhibitory effect on the catalytic activity of β-hydroxy-β-methylglutaryl-CoA (HMG CoA) reductaseand subsequent inhibition of farnesylation of Rasoncoproteins or modulationof the biosynthesis and functional activity of the enzymes implicated in xenobiotic metabolism or its action as a free radical scavenger.

Impacts of squalene

Recently it has become a trend to hunt sharks to process their livers to make squalene health capsules. Environmental and other concerns over shark hunting have motivated its extraction from vegetable source or biosynthetic processes instead. Many of these sharks are slow-growing and mature late in life, making it difficult to recover from exploitation. Alimitation reason in the use of this natural source for squalene is represented by the presence in the environmental sea of different persistent organic pollutants (POPs), like PCB (polychlorinated biphenyl), PBDE (polybrominated diphenylether), organochlorine pesticides, polycyclic aromatic hydrocarbons, dioxin, heavy metals, which can still be found in the purified squalene, together with the concern for the preservation of marine life. Anyway, the intensive fishing of these sharks put in danger the existence of these species, many of them close to extinction, as their reproductive cycle is quite long and the growth is slow. That is why Europe drastically reduced the fishing quotas for these shark species lately.

Conclusion

Squalene is a natural substance belonging to the terpenoid family, widespread in nature, with various applications in many human living areas. Due to its unique properties, squalene has diverse applications, especially in nutrition, health and cosmetics.This shows the squalene is a definite product which has many nutritional properties to human.

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More reference can be provided on request.

Bile Acids - Control of WFS on Shrimp

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White feces(WFS) is the biggest headache problem to shrimp farming, the basic reason of WFS is the hepatopancreas problems, pathological tissue observation WFS is not food digestion after the feces. It is ductal epithelium, intestinal mucosal epithelium and proliferative cells. RUNEON bile acids can prevent WFS and improve the survival rate of shrimp, the addition of bile acids can promote the digestion and absorption of fat, improve the utilization of cholesterol and polyunsaturated fatty acids in shrimp, thus reducing the burden of hepatopancreas and ensure the health of hepatopancreas.

1.The symptom of WFS

In case of white feces, most of the excrement floats on the surface of the water. The excrement is white and slender (like cotton thread), which is viscous and easy to observe. However, it is not easy to handle and a large number of stinks are distributed. The shrimps with white feces, their hepatopancreas and instestine are swollen, vibrio infected when bacterial isolation. The shrimp feed normal at the initial stag, but with the aggravating illness, shrimps eat slow or not eat or thin bodied (shell meat separation), and accompanied by swimming and EMS.

2. RUNEON bile acids for shrimp white feces (WFS) control

- The addition of bile acids can promote the digestion and absorption of fat, improve the utilization of cholesterol and polyunsaturated fatty acids in shrimp, thus reducing the burden of hepatopancreas and ensure the health of hepatopancreas.

- Deoxycholic acid and ursodeoxycholic acid in bile acids can promote the secretion of large amounts of thin bile in liver cells, and discharge other harmful substances such as mycotoxins, heavy metals and drugs to the hepatopancreas with bile to reduce the damage of toxic substances to hepatopancreas. In addition, Bile acids can bind or decompose endotoxin in the intestine to prevent endotoxin from entering the liver via the intestinal mucosal barrier via the portal vein, reducing intestinal absorption of endotoxin and increasing the barrier function of the intestine, preventing endotoxin from affecting the intestine, hepatopancreas and even the whole Shrimp body harm.
- On the other hand, bile acids inhibit the excessive proliferation of intestinal bacteria and maintain the intestinal microflora as an effective bactericide. Because of the surface activity of bile acids, deoxycholic acid can destroy the bacterial cell membrane and make the cell integrity affected by Damage, thereby inhibiting the growth of bacteria, and even cause bacterial cell death. Exogenous bile acid supplementation increased bile secretion, so that the capacity of the bile pool in the intestine and liver circulation increased, liver bile acid secretion rate returned to normal levels, so that the intestine with increased concentration of bile acids, combined with bile acid in the intestine of small intestine Bacterial inhibition enhanced, thereby inhibiting intestinal bacterial overgrowth and reduce the incidence of bacterial translocation and endotoxemia;
- In short, the external environment led to shrimp internal liver, intestinal and other digestive organs lesions, is the main reason for white feces. Therefore, to improve water quality, sediment, hepatopancreas, gut health is the fundamental measure to solve the white feces.

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