CRITERION-III

Sree Konaseema Bhanoji Ramars College

Amalapuram

Department of Zoology

MoU WITH

HI-TECH VET PHARMA ™

MEMORANDUM OF UNDERSTANDING (MoU)

BETWEEN

Department of Zoology, S.K.B.R College, Amalapuram

AND

Pharmaceutical Company

This MoU is entered in to on the 14th day of July 2014 between the Department of Zoology, **S.K.B.R College, Amalapuram** represented by its Principal Capt.N.Lakshmana Rao (here in after referred to as COLLEGE) on the one part and Sri.N.V Ramana Reddy, CEO of **M/S. Hi-Tech Vet Pharma, Pothireddypalem, Kovur, Nellore (Dt.)** (here in after referred to as the COMPANY) on the other part ***for the development of innovative products for shrimp health management.***

Objectives of MoU

The objectives of MoU are:

1. To promote research and consultancy between College and Company
2. To provide job opportunities to the college students
3. To extend consultancy services to Company for developing new products with R&D
4. Sharing of knowledge and expertise of shrimp pathology between College and Company
5. To give training to technicians of the Company on Aquatic Animal Health Management

Proposed Modes of Collaboration

College and Company propose to collaborate in the following:

1. Cooperation and promotion of research and training in areas of shrimp pathology
2. To conduct field level experiments with innovative products to control emerging disease problems in vannamei shrimp culture
3. Providing job opportunities to college students in Company
4. Basic training to technicians of the Company in shrimp disease diagnosis

Terms and Conditions

1. The cost of development of research activity and new products should be borne by Company
2. The travel and other expenses of College faculty members shall be borne by Company

3. This MoU may be amended, renewed and terminated by mutual written agreement of two parties at any time
4. Either party shall have the right to terminate this MoU upon 60 days prior written notice to the other party

Duration of MoU:

This MoU, unless extended by mutual written consent of the two parties, shall expire in TWO years after the effective date specified in the opening paragraph. However, on review, the MoU shall be extended by mutual consent basing on the need of the research programme.

Coordinators:

Both the College and Company will designate persons who will have responsibility for co-ordination and implementation of this agreement.

Signed in Duplicate:

This MoU is executed in duplicate with each copy being an official version and having equal legal validity. By signing below, the College and Company, acting by their duly authorized members, have caused this Memorandum of Understanding to be executed, effective as of the day and year first above written.

Contact Information:

Principal
S.K.B.R College, Amalapuram
E.G District
Andhra Pradesh
Mobile: 9491852666
Email: skbrcamp@yahoo.co.in

Sri.N.V Ramana Reddy
CEO
Hi-Tech Vet Pharma
Nellore, Andhra Pradesh
Mobile: 9000022555
Email: htprr@yahoo.com

On behalf of
Dept. of Zoology,
S.K.B.R College, Amalapuram

PRINCIPAL
(Capt.N.Lakshmana Rao)

LIC of Zoology
(Dr.P.V.B.K.R.L Saibaba)

HEAD OF THE
ZOOLOGY DEPARTMENT
S. K. B. R. COLLEGE
AMALAPURAM

On behalf of
Hi-Tech Vet Pharma ,
Nellore

CEO
(Sri.N.V Ramana Reddy)
Hi-Tech Vet Pharma

HI-TECH VET PHARMA
4/4-1, Pothireddypalam (v)
Kovur (M), NELLORE-524 137.

MoU with Hi-Tech Vet Pharma™, Nellore

Aqua Pharmaceutical Company

Purpose of MoU: Development of innovative products for shrimp health management through in-house R & D

This MoU is entered in to on the **14th day of July 2014** between the Department of Zoology, S.K.B.R College, Amalapuram represented by its Principal Capt.N.Lakshmana Rao on the one part and Sri.N.V Ramana Reddy, CEO of High-Tech Vet Pharma™ (Innovative Bio-Solutions), An ISO 9001:2008 Certified Company Nellore on the other part ***for the development of innovative products for shrimp health management.***

Hi-Tech Vet Pharma™ is an ISO certified Aqua Pharmaceutical company located in Nellore, Andhra Pradesh. It is involved in the development and production of innovative products for Aquatic Animal Health through in-house R&D facility.

Work done under MoU

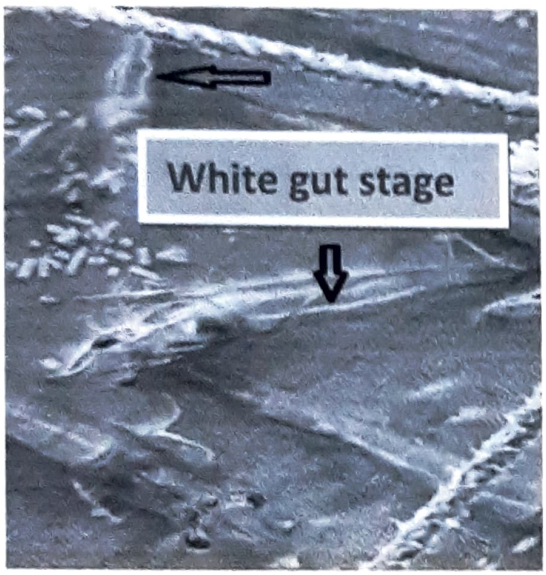
As a part of MoU we have carried out our research work on **"White Gut/White Feces Disease"** in vannamei shrimp, a silent disease causing substantial financial loss to shrimp farmers in Andhra Pradesh. Our research findings indicate that the disease is primarily caused by toxins released by toxic blue green algae followed by secondary infection of vibrio bacteria. Basing on our research results we have developed a product-**"Gut Stim"** with one of the herbal ingredient imported from Japan. The product is highly effective in treating the WGD/WFD in vannamei shrimp farming.

White Gut/White Feces Disease in pond cultured vannamei shrimp

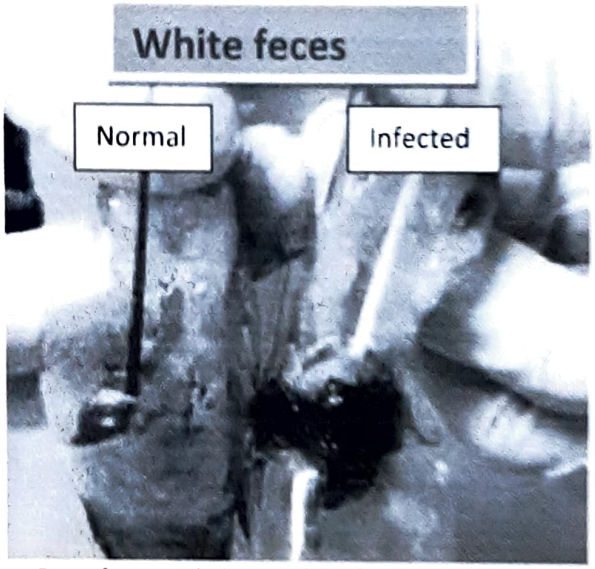
A silent disease which has an impact in shrimp farms in most parts of India is the white faeces disease or WFD. It becomes apparent when the digestive system of the shrimp malfunctions and the faeces turns from the normal brownish colour to pale white. The hepatopancreas becomes whitish and soft. The white faeces appear to be more buoyant than normal faeces and float on the water surface, appearing like faecal strings. In addition to the white faeces, infected shrimp show a loose exoskeleton and are also infested by epibiotic protozoa that cause a dark discolouration of the gills. Shrimp infected by WFD exhibit marked reduction in feed intake and a severe infection of WFD may result in up to 20-30 % mortality.

The White gut and White feces disease are the two different problems in shrimp culture ponds that can possibly lead to Loose shell syndrome. In general, the White gut is caused by the necrosis of epithelial mucosa and hepatocytes of hepatopancreas. And usually, the White fecal matter is caused because of the damage to the hepatopancreas and sloughing of hepatocytes. The sloughed cells are released in to the gut and the gut looks white in colour. In general, the fecal matter contains undigested feed particles and sinks to the pond bottom but in case of white feces disease the fecal float on water surface due to presence of fat globules in the dead hepatocytes.

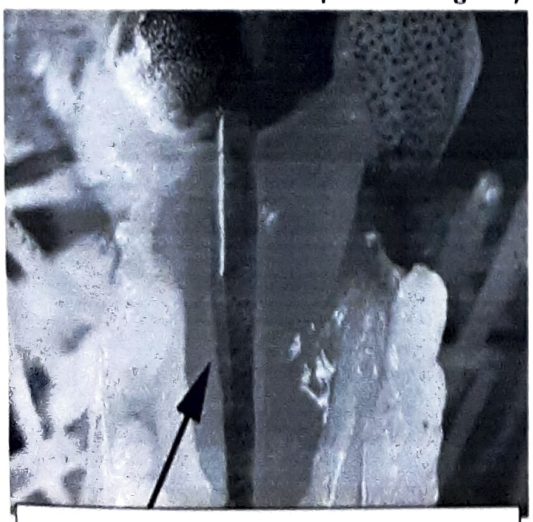
Further studies on WGD/WFD in *P.vannamei* are continued in association with Prof.I.S Bright Singh, Department of Micribiology, Cochin University of Science and Technology, Cochin.



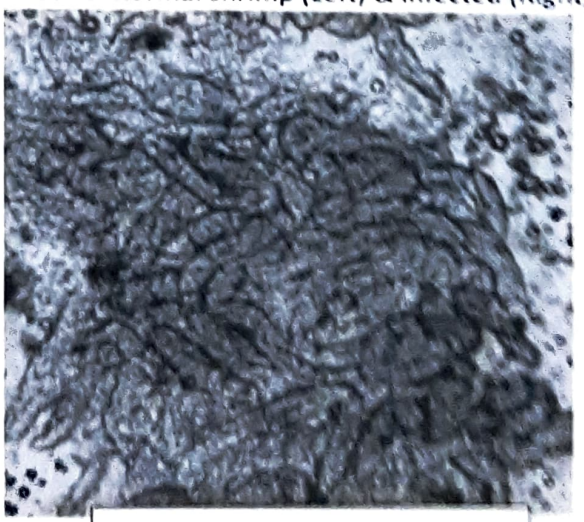
White Gut infected shrimp in feeding tray



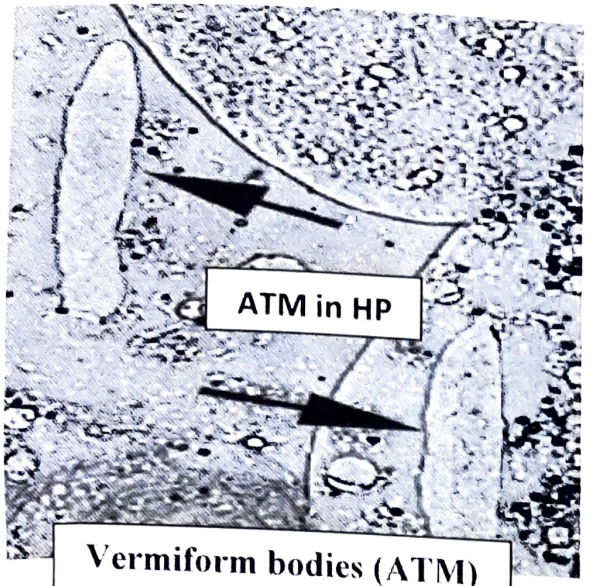
Gut of normal shrimp (Left) & infected (Right)



Swollen mid gut filled with fluid

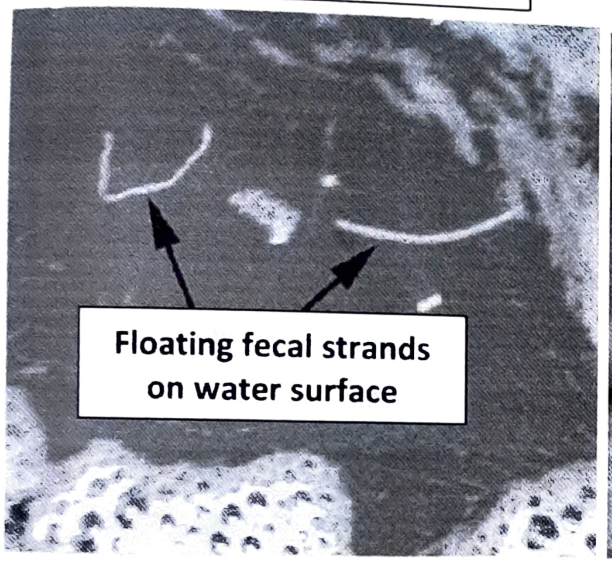


Squash mount of white feces

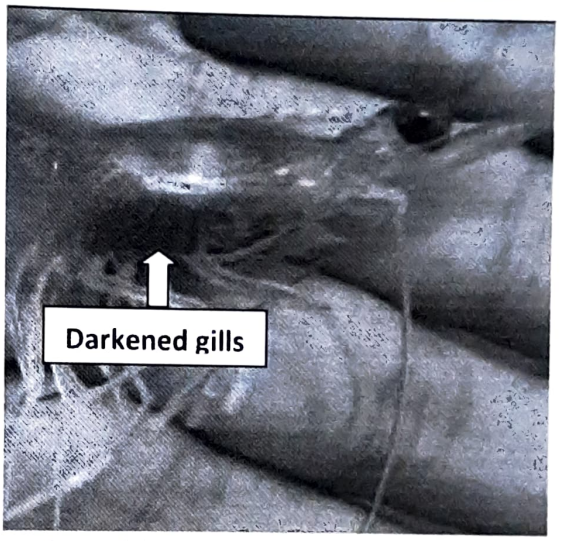


Vermiform bodies (ATM) in HP tissue

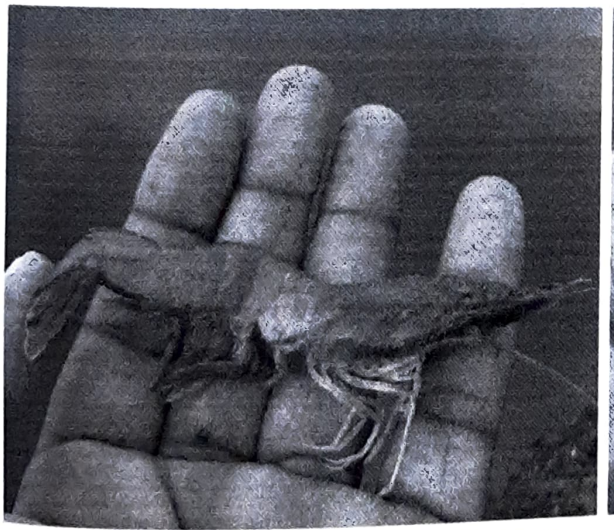
White fecal strands in check tray



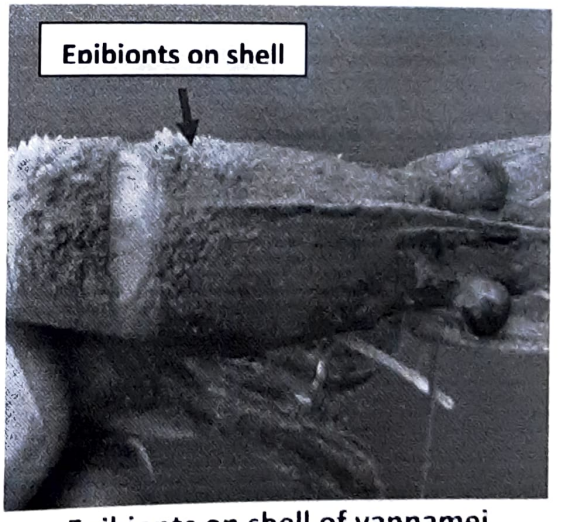
White fecal strands floating on water



Infected shrimp showing darkened gills



Vannamei shrimp in loose shell stage



Epibionts on shell of vannamei

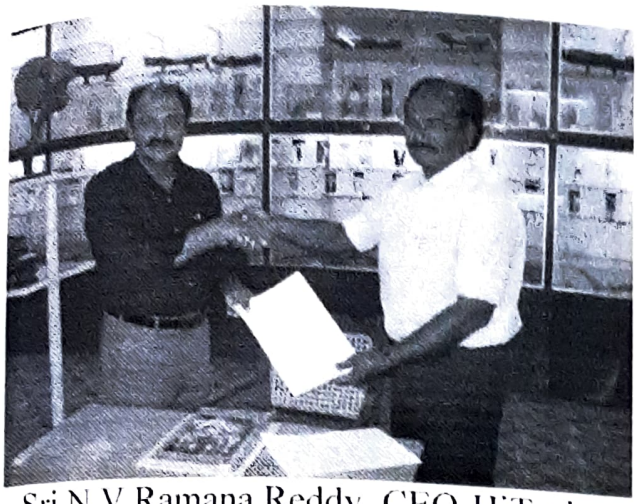
Work in progress

In another study we are working on another economically important disease **"Moulting Mortality Syndrome"** in vannamei shrimp culture especially in low saline culture ponds.

Chronic or continued mortality of vannamei shrimp during hot summer is a common problem in low salinity ponds. It is **caused by osmoregulatory imbalances and shortage of energy reserves under the conditions of low salinity and high temperature.** Keeping in view these problems, a product is being developed to improve osmoregulatory capacity in shrimp and to facilitate storage of energy reserves in hepatopancreas to avoid molt associated mortalities.

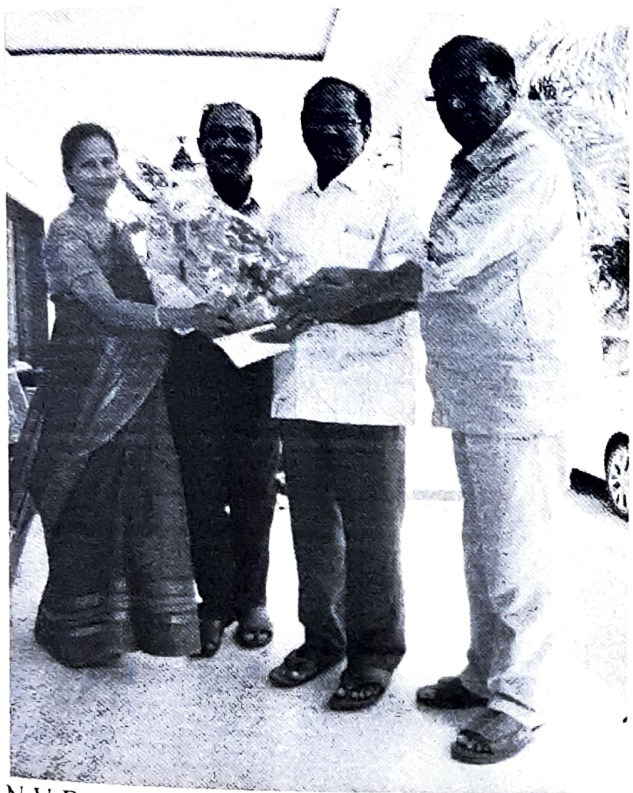
As a euryhaline warm water species, *Penaeus vannamei* is being cultured in inland areas of Andhra Pradesh because of its adaptability to low salinity and high temperatures, especially during the late post larval and juvenile stages. However, the osmoregulatory capability of this species declines naturally when the animals reach sub adult or adult stages. The salinity of well water used for shrimp farming in inland areas ranges1-10 ppt. **The ion compositions of the saline water are typically low in magnesium and potassium compared with diluted seawater at the same salinity.** Consequently, an economically important disease "Moulting Mortality Syndrome" is emerged in inland low saline vannamei culture and serious mass mortality episodes associated with molting often occur when shrimp reach 18-20g, especially in the hot summer, when water temperatures reach their seasonal peaks of up to 35° C. It has been a great challenge for farmers to raise larger shrimp to increase profitability under such conditions. To avoid losses, a common strategy was to harvest the shrimp as they reached the critical size and before heavy mortality began to occur with molting. We have attempted to address this problem by improving osmoregulatory capacity through dietary modifications.

PHOTOS OF MoU WITH HI-TECH VET PHARMA™, NELLORE

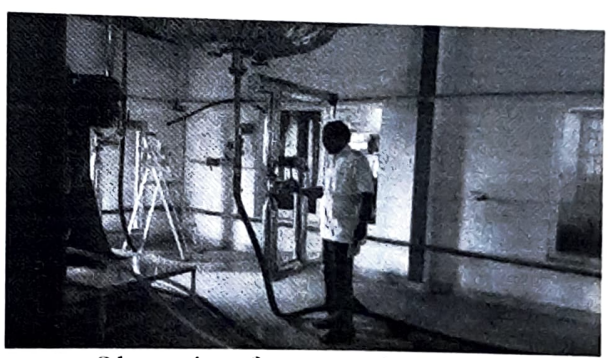


Sri.N.V Ramana Reddy, CEO-HiTech Vet Pharma and Dr.P.Saibaba signed MoU

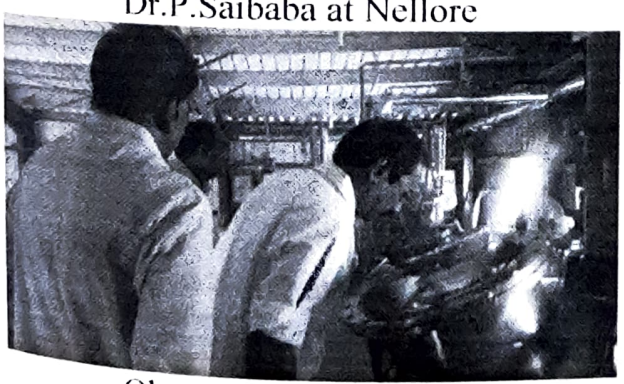
Dr.P.Saibaba with Technical Team of HI-TECH Vet Pharma in Zoology Museum



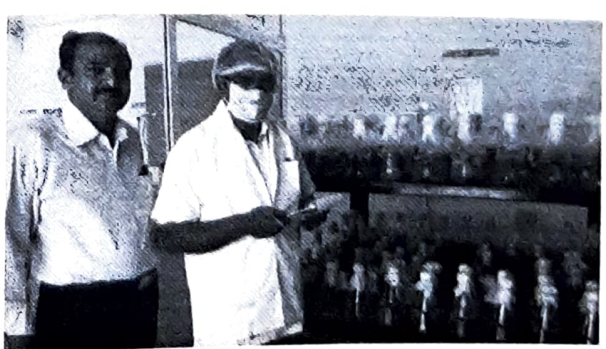
N.V Ramana Reddy & family welcoming Dr.P.Saibaba at Nellore



Observing fermentation tanks



Observing fermenters



Dr.P.Saibaba in Microbiology lab

Hi-Tech PHARMA
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e-mail : info@hitechpharma.co
website : www.hitechpharma.co

Date.....

10/12/2015,
Nellore.

TO WHOM IT MAY CONCERN

We are happy to declare that we have developed a product to control white gut/white feces disease in vannamei shrimp culture with the brand name " Gut – Stim" under the technical guidance of Dr.P.Saibaba, HOD of Zoology, S.K.B.R College, Amalapuram with our in-house R&D facility and farm trial experiments conducted at Nellore and Amalapuram. The preliminary results are encouraging and the product is highly effective against white gut disease in vannamei. We appreciate the services rendered by Dr. P.Saibaba in our R & D programme. We are highly thankful to him for his participation and sharing his ideas and expertise.

N.V.Ramana Reddy

N.V.Ramana Reddy
C.E.O
Hi-Tech Pharma,
Nellore.

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Date .....

To,

Dr.Pindi Saibaba.
HOD of Zoology.
S.K.B.R College,
Amalapuram

Date: 2-1-2016

Respected Sir,

Sub: Offer letter for the position of **Honorary Technical Advisor**

It is my pleasure to offer you the position of **Honorary Technical Advisor** in our Aquaculture division of HI-TECH VET PHARMA.

You will be collaborating with our scientists working in R&D programmes of Aquaculture to develop innovative products for aquaculture animals. It is expected that during your stay you will enlighten our staff with the latest knowledge in the field of Aquaculture Medicine.

It is my understanding that you will have complete financial support for your travel and staying expenses in visiting our company. I will provide the support for your research activity in our laboratory for this collaboration.

Thanking you sir,

Sincerely,

N.V. Ramana Reddy

(N.V Ramana Reddy)
CEO
Hi-Tech Vet Pharma