

# TECHNOLOGY RELEASED

By

TAMILNADU VETERINARY AND ANIMAL SCIENCES UNIVERSITY



**ENTER**



**Directorate of Extension Education,  
CHENNAI**





## C. Product and Technologies

1. Mineral Mixture for cattle
2. Enriched paddy straw block
3. Fish Noodles
4. Ready to eat expanded snack food
5. Gelatinized fish product
6. Electric Stimulator
7. Touch Screen Information Kiosk
8. Information Retrieval Package
9. Dietetic Shrikand with symbiotic properties
10. Milk protein enriched noodles
11. Restructured meat
12. Whey-based gruel preparation technology
13. Vaccum pack cook-chill technology for fish products : Fish cutlets
14. Poly-Herbal product for the production of disease resistant tiger shrimp *Penaeus Monodon*
15. Lobster fattening using floating FRP cages
16. Raceway technology
17. Cost effective new technology for the production of live fish food white worm, *Enchytraeus albidus*
18. Optimized chilled process technology fresh fish with dry ice and wet ice for export by air



- **Breeds and Strains**

## 1. **NANDANAM TURKEY - 1**

Nandanam Turkey – 1 variety is a genepool developed by cross breeding between the black desi variety and exotic Beltsville small white variety.



### **Advantages**

- ❖ Livability is 20% more than Beltsville small white.
- ❖ Adult turkeys body weight gain is more than 1680 gms and is higher than desi black variety.
- ❖ Hatching performance is 10% more than the other varieties.
- ❖ Egg production is comparatively higher.
- ❖ Carcass is more tender and tastier.
- ❖ Suited for Tamil Nadu climatic conditions
- ❖ Plumage colour is black and white.





- **Breeds and Strains**

## 2. **NANDANAM QUAIL - 3**

Nandanam quail – 3 variety has been developed through continuous selective breeding to increase the performance of Nandanam quail 1 and 2 to meet out the demands of entrepreneurs and farmers. Eighteen generations of quails have been selectively bred for improving body weight gain, feed efficiency, hatchability and livability for stabilizing this flock.



### **Advantages**

- Ø Excellent livability of 95%
- Ø Excellent body weight gain
- Ø Better disease resistance
- Ø Improved feed efficiency
- Ø Tender and tastier meat quality
- Ø Well adapted to environment conditions of Tamil Nadu





- **Breeds and Strains**

### 3. KATTUPAKKAM WHITE PIG

- Developed by pure breeding of Large White Yorkshire Pig over a decade
- High growth rate, high weaning rate, early maturity, and good mothering ability are outstanding economic characters
- Weaning litter size 7.5; weaning weight 10 kg; 154 days weight- 55 kg. More popular among the pig farmers

#### Performance of Kattupakkam White Pig

Traits	Mean $\pm$ S.D.
Litter size at birth (No.)	10.18 $\pm$ 2.93 (11)
Litter size at weaning (No.)	7.55 $\pm$ 2.50 (11)
Birth weight (Kg)	1.13 $\pm$ 0.22 (83)
Weaning weight (Kg)	9.99 $\pm$ 3.42 (83)
Body weight at 154 days (Kg)	52.40 $\pm$ 5.12 (25)
Body weight at 210 days (Kg)	72.88 $\pm$ 7.52 (25)

#### How Kattupakkam White Pig will be best put to use

- As a sire to improve the growth rate and prolificacy
- The variety suits farmers



# • Breeds and Strains



## 4. KATTUPAKKAM RED SHEEP

A native of Madras and Chengai MGR districts of Tamil Nadu. One of the important meat breed in India, fast growing and easy to handle, the Kattupakkam Red is able to adapt to a wide range of conditions. The Kattupakkam Red is suitable for Southern tropical agroclimatic region with a comparative disease resistance ability and will suit farmers and business investors who want to take advantage of the growing domestic demand for quality sheep meat.

### Performance details

Kattupakkam Red typically produce 98 per cent weaned lambs with the following production figures.

Age	Body Weight (kg)
Birth	2.67
Six months	14.82
Nine months	20.35
Twelve months	21.57



The mature ram weighs-22 Kg. & mature ewe- 21.1 Kg. The Kattupakkam Red Sheep skins are preferred in tanning industry due to better grains in the finished leather over skins from fibre producing animals and goat skins.

### Marketing prospects

Mutton is preferred at par with chevon. Kattupakkam Red produce top quality meat and in their home territory they fail to satisfy local demand. In addition to meat, there is a strong market for Kattupakkam Red germplasm. The Kattupakkam Red rams are being distributed to the progressive farmers in the adjacent areas.

### Meat

The Kattupakkam Red produces finely textured, tender meat with a pleasant meaty odour and flavour and is preferred equal to that of goat meat.

### Recognized characteristics of the Kattupakkam Red

- Good mothering qualities
- Ability to thrive under a wide range of conditions ranging from arid to tropical
- With good management, lambing is possible every eight months
- Low fat meat
- High fecundity

Conformation – the Kattupakkam Red is well built, with sturdy legs making the animal a good walker – moving easily in rugged hilly areas and dense shrubbery. Comparative disease resistant.

### How Kattupakkam Red will be best put to use

As sires to improve the growth rates and conformation of existing flocks of the farmers.

As a new enterprise partner for mutton production.

For more efficient utilization of pasture and tree fodder.



- **Breeds and Strains**



## **5. SANDYNO SHEEP**

The breed was developed at Sheep Breeding Research Station, Sandynallah, The Nilgiris over a period of 17 years from 1973. More than 30 Scientists were involved in the development of the breed. The breed was released during the year 1990.

### **Technology / Breed composition**

The Sandyno breed was evolved by crossing Nilagiri ewes with Soviet Merino and Rambouillet rams. The breed has 3/8 inheritance of Nilagiri and 5/8 inheritance of Merino / Rambouillet breeds.

The breed has been field tested and found to adapt well under the conditions of the Nilgiris. The breed has also wide acceptance in the Karnataka State.

### **Performance details**

The Sandyno breed is a woolly type with average greasy fleece yield of 2.2 kg per annum with a fibre diameter of 22  $\mu$ .

### **Growth performance**

- a) Birth weight : 3.033  $\pm$  0.019 kg
- b) Six month weight : 15.704  $\pm$  0.120 kg
- c) Yearling weight : 22.741  $\pm$  0.168 kg

### **Reproductive performance**

- a) Ewes lambded/ewe joined : 84%
- b) Lambs born/ewe lambded : 1.08





# A) Breeds and Strains

## 6. NAMAKKAL QUAIL - 1

Namakkal Quail – 1 is a commercial hybrid produced by TANUVAS. This hybrid quail attains an average weight of 250 gm. at fifth week under ordinary farm condition with feed conversion ratio of 3.2, where as Japanese quail are usually marketed at the age of 42 days (6 weeks) with an average body weight of 165 gm with the feed conversion ration of 4.0.

### Usage

- Ø Meat type Japanese quail can be reared with lesser capital outlay and fetch quicker high returns. It has high marketing potential in major cities of Tamil Nadu and through out Kerala State.

### Advantages

- Ø Livability 98% (0 to 30 days)
- Ø Mean egg weight 14.9 gm.
- Ø Mean hatch weight – 9.99 gm.
- Ø Egg production (from 7 to 47 weeks of age) 81.5%
- Ø Mean fertility rate 86.3%
- Ø Mean total hatchability 79.5%
- Ø Adult male body weight 313.0 gm
- Ø Adult female body weight 346.8 gm

### Cost

- Ø Day old – Rs. 2/- per chick
- Ø Adult bird – Rs. 50/- per kg live weight.

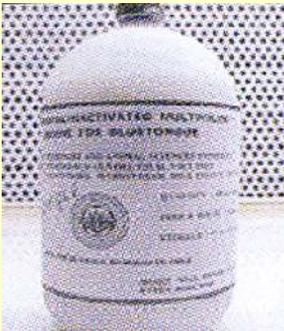




## B) Diagnostic kits and Vaccines

### 1. BLUE TONGUE VACCINE

Blue tongue is a major viral disease affecting sheep. The disease is prevalent throughout Tamil Nadu and the incidence is high during rainy season. The disease is transmitted through a mosquito *culicoides sp.* In severe cases the morbidity rate is as high as 80% with a mortality rate of about 20-30%. To prevent this disease, Tamil Nadu Veterinary and Animal Sciences University has developed an inactivated bluetongue vaccine. The vaccine contains BEI inactivated BHK21 adapted bluetongue virus (serotypes 1,2 and 23) from infected BHK 21 hydroxide gel.



#### Symptoms in affected Animals

- Ø The vaccine is meant for vaccinating sheep of all ages.
- Ø Pregnant animals can also be vaccinated.
- Ø The animals should be vaccinated atleast three months before the onset of monsoon.





## B) Diagnostic kits and Vaccines

### 2. EDS VIRUS ANTIBODY DETECTION KIT

Egg drop syndrome is one of the important disease affecting egg production in layers caused by adeno virus. EDS is prevalent in India at low levels and there is an urgent need for differential diagnosis from other diseases. The EDS virus antibody detection kit is designed to measure qualitatively the presence of absence of antibody to EDS virus in chicken serum.

This test is based on the principle “Flow through technology”. This technology is an extension of the dot-enzyme linked immunosorbent assay (ELISA), but is several fold more user friendly and rapid.



#### Advantages

- Ø Very simple and user-friendly.
- Ø Rapid results within 2-3 minutes
- Ø Diagnostic importance in flocks that are not vaccinated.



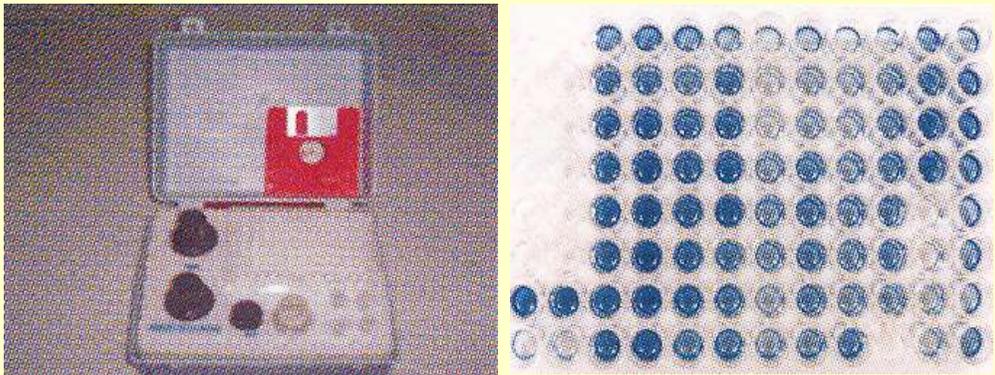


## B) Diagnostic kits and Vaccines

### 3. ELISA KIT FOR QUANTIFICATION OF ANTIBODIES AGAINST NEWCASTLE DISEASE VIRUS

Newcastle disease is one of the important viral disease affecting poultry. The ELISA kit developed is a simple and sensitive method of detecting antibodies to Newcastle disease virus in chicken serum. Microplates are supplied with a purified viral antigen coat. Diluted samples are incubated within the wells where any antibodies specific to NDV binds and forms a complex. The degree of colour developed is directly related to the amount to antibody to Newcastle Disease Virus present in the sample. The titres are predicated from OD values obtained in a single well.

Presentation : As a kit to check 80 samples



### 4. ELISA KIT FOR QUANTIFICATION OF ANTIBODIES AGAINST AVIAN INFECTIOUS BRONCHITIS VIRUS

Avian infectious bronchitis is a important disease affecting the respiratory tract of poultry. The diagnostic kit provides a simple method of detecting antibodies to infectious bronchitis virus in chicken serum. The titres are predicted from OD values obtained in a single well.

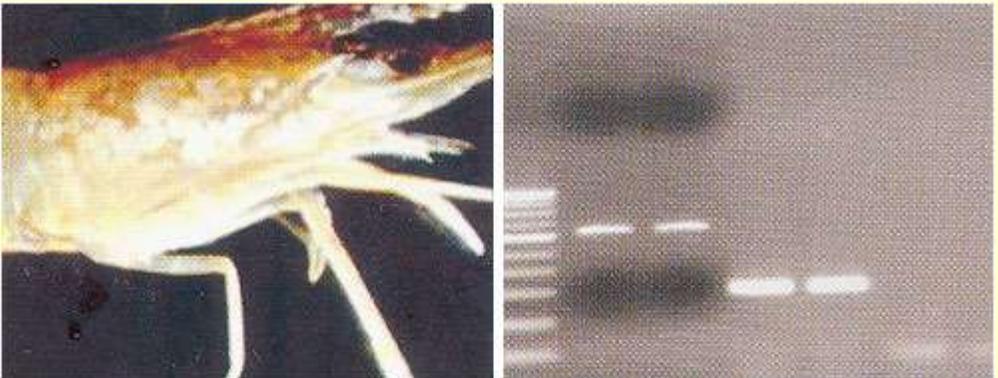


## B) Diagnostic kits and Vaccines



### 5. DIAGNOSTIC KIT FOR WHITE SPOT SYNDROME VIRUS (WSSV) IN SHRIMP

White spot Syndrome Virus (WSSV) causes white spot disease in cultured penaeid shrimp and results in severe production and economic losses in shrimp hatcheries and farms. In India the annual loss due to this disease is estimated to be around Rs. 700 – 800 crores. Screening of brood stocks, larvae and post larvae for WSSV in shrimp hatcheries and stocking disease free larvae in production ponds can help to avoid the disease outbreak.



Shrimp disease diagnosis laboratory of Tamil Nadu Veterinary and Animal Sciences University has developed a Nested Polymerase Chain Reaction (PCR) which helps in rapid and accurate detection of White spot Syndrome Virus in Shrimp even in earlier stages of infection.



## B) Diagnostic kits and Vaccines



### 6. TANUVAS INACTIVATED RANIKHET DISEASE VACCINE (RDV)

Inactivated RD vaccine is an improved cost effective vaccine for the control of Ranikhet Diseases in poultry which could be used in layers at point of lay and mid lay. By using this vaccine loss due to egg drop in poultry can be reduced.

#### Product Technology

- Ø Binary ethyleneimine inactivated montanide adjuvanted vaccine.

#### Usage

- Ø At 18th and 35th weeks of age vaccination to be carried out.
- Ø Meant for layers only.
- Ø 0.5 ml by subcutaneous route.

#### Advantages

- Ø Cost effective, potent vaccine with longer duration of immunity.
- Ø  $\log_2 10$  titre is achieved.
- Ø Easy to administer

#### Cost

- Ø Re.1.00/- per dose



## B) Diagnostic kits and Vaccines



### 7. TANUVAS INACTIVATED FOWL CHOLERA VACCINE

Fowl cholera is a bacterial disease affecting chicks. It can cause heavy mortality and economic loss to the poultry farmers. This disease occurs because of poor management. There is no effective treatment. This disease can be controlled by proper vaccination. Hence, the Inactivated Fowl Cholera Vaccine has been developed by TANUVAS.

#### Product Technology

- Ø Formalin inactivated aluminium hydroxide gel adsorbed vaccine.

#### Usage

- Ø Growers can be vaccinated at 12th and 16th week of age.
- Ø Dosage 0.5 ml by subcutaneous inoculation.

#### Advantages

- Ø Cost effective
- Ø Easy to administer
- Ø Stable for 6 months.

#### Cost

- Ø Rs.0.75/- per dose



## B) Diagnostic kits and Vaccines



### 1. LIVE ATTENUATED PESTE DES PETITS RUMINANTS (PPR) VIRUS VACCINE

Peste des petits ruminants (PPR) is an acute, highly contagious, infectious and fatal Rinderpest like disease of domestic and wild small ruminants with a high rate of mortality and morbidity.

#### Product Technology

It is a live attenuated vaccine developed by serial passage of a local PPRV isolate (AR 87) in Vero cells for 75 times. At passage level 75 the virus was found to be safe and potent. There was no reversion to virulence.

#### Usage

- Ø It is used as a prophylactic vaccination against PPR in sheep and goat.

#### Advantages

- Ø Freeze dried vaccine
- Ø Can be stored at 2°C - 8°C

#### Cost

- Ø Re.1.00/- per dose



## B) Diagnostic kits and Vaccines



### 9. VERO CELL ADAPTED RABIES VACCINE FOR ANIMALS

#### Product Technology

PV-11 fixed Rabies vaccine virus was adopted in vero cell. Bulk antigen was raised in roller culture bottles and Bench top 5 litre fermenter. The supernatant was concentrated by ultra filtration using Millipore Pellicon system. The concentrated antigen was inactivated with Beta Propio Lactone (BPL) and adjuvant with aluminum hydroxide gel. Liquid inactivated vero cell rabies vaccine is prepared and packed as 10 ml vials for animals.

#### Usage

- Ø This vaccine will prevent and control rabies in dogs.

#### Utility

- Ø The technical details for the production of vero cell line adopted rabies vaccine for animals are available for large scale production.

#### Advantages

- Ø Pre-exposure and post exposure use in cats and ruminants also



## B) Diagnostic kits and Vaccines



### 10. AN USER-FRIENDLY KIT FOR DETECTION OF PPRV ANTIGEN BASED ON FLOW THROUGH TECHNOLOGY

Peste des petits ruminants (PPR) is one of the economically important diseases affective sheep and goats in India. India is endemic to the disease and several outbreaks are reported from the various parts of out country. Flow through technology is based on the principle of vertical flow and its simplicity and rapidity offers itself to be sued as pen-side test for disease diagnosis. This technology is an extension of the dot-enzyme liked immunosorbent assay (ELISA) method but it is user-friendly and rapid.

#### Product Technology

Ø Based on the principle of Flow through technology for infectious disease diagnosis.

#### Usage

Ø Used for the detection of PPRV specific antigen in the ocular swabs of suspected sheep and goat within one hour.

#### Advantages

Ø Cost effective and accuracy in results

#### Cost

Ø Rs.20.00/- per test





## B) Diagnostic kits and Vaccines

### 11. LATEX AGGLUTINATION TEST KIT FOR MYCOPLASMA GALLISEPTICUM ANTIBODY DETECTION

This assay is designed to detect *Mycoplasma gallisepticum* (MG) antibodies from suspected sera samples. A latex agglutination based format has been developed in which the sonicated whole cell antigen of MG capable of detecting antibodies. The suspected serum samples is mixed with the sensitized beads on a glass slide and looked for agglutination of the beads. The intensity of agglutination may be related to the level of MG antibodies in the test samples. Store all reagents at 2°C to 4°C.

#### Product Technology

Ø The product provides the antigen coated latex beads that can be mixed with equal volume of serum samples from poultry to find out the presence of antibodies against the *Mycoplasma gallisepticum* based on agglutination reaction. The antibody levels can be assess by grading reaction as +1, +2, +3 and +4.

#### Usage

Ø Highly useful for rapid screening of large number of field sera samples for serosurveillance / eradication programme. This method is a semi quantitative method.

#### Advantages

Ø Cost effective

#### Cost

Ø Rs.10.00/- per sample





## B) Diagnostic kits and Vaccines

### 12. PPR CHECK – PPR VIRUS ANTIBODY TEST KIT

Peste des petits ruminants (PPR) is one of the economically important diseases affecting sheep and goats in India. India is endemic to the disease and several outbreaks are reported from the various parts of our country. This assay is designed to measure the relative level of antibody to peste des petits ruminants (PPR) virus in sheep or goat serum.

#### Product Technology

- Ø Based on the principle of single serum dilution ELISA and prediction of antibody titres using regression equation.

#### Usage

- Ø Used for the quantification of PPRV specific antibodies in sheep and goat sera against the recombinant nucleoprotein

#### Advantages

- Ø Cost effective and accuracy in results

#### Cost

- Ø Re.12.00 per test



## B) Diagnostic kits and Vaccines



### 13. HYDROPERICARDIUM SYNDROME (LEECHI DISEASE) AGID TEST KIT

Hydropericardium Syndrome (Leechi disease) is a highly contagious disease of younger broiler chicken which causes accumulation of straw coloured fluid in pericardial sac. Mortality is 20-30% but morbidity reaches 80-100%. The disease is caused by Fowl adenovirus type 4. Agar Gel Immunodiffusion Test (AGID) is a simple and efficient diagnostic tool, which can be used to detect HPS. Quantitative Agar Gel Immunodiffusion (QAGID) test is used to assess maternal antibody status so that vaccination programme can be planned.

#### Product Presentation

- Ø This kit contains positive and negative antigen and antiserum with the required chemicals and template, gel cutter and microscopic slides so that the test can be conducted in simple laboratories

#### Usage

- Ø To identify the HPS viral infection
- Ø To quantify the antibody in the serum.

#### Advantages

- Ø 125 liver specimens can be tested for HPS antigen detection per kit (or) 25 sera sample / kit can be tested.

#### Cost

- Ø Rs.500/- per kit



# B) Diagnostic kits and Vaccines



## 1. NESTED PCR DIAGNOSTIC KIT FOR DETECTION OF HEPATOPANCREATIC PARVOVIRUS (HPV)

Hepatopancreatic Parvovirus (HPV) is known to cause stunted growth in cultured shrimp resulting in production and economic losses in shrimp farming. This nested Polymerase Chain Reaction (PCR) based HPV diagnostic kit helps in rapid and accurate diagnosis of HPV in shrimp seeds before stocking in production ponds thereby helping to select HPV free seeds for stocking and increased production and profit in shrimp farming.

### Protocol for detecting HPV

- Ø Extract the DNA following the procedure in the kit manual
- Ø Mixing the extracted DNA with first step PCR premix
- Ø Load in PCR thermal cycler and run the programme as given in the kit manual
- Ø Mix an aliquot of first step PCR product to the second step PCR premix
- Ø Load in the PCR thermal cycler and run in the programme given in the kit
- Ø Load in the first and second step amplified products in the gel and separate the DNA
- Ø Observe the gel in an UV transilluminator
- Ø Interpret the result as shown in the kit manual

Note : always run the positive and negative controls parallel to the samples

### Advantages

- Ø This kit helps in rapid and accurate diagnosis of HPV in shrimp seeds before stocking in production ponds thereby helping to select HPV free seeds for stocking and increased production and profit in shrimp farming.



# B) Diagnostic kits and Vaccines



## 1. BIRD CAGE, MODIFIED EGG CANDLER AND CUSTOM HATCHING UNIT

For enhancing the poultry production by rural women, low cost and easily available materials could be used and equipment like bird case, egg handler and hatching unit could be fabricated for poultry rearing in rural areas.

### BIRD CAGE

- Ø Used for brooding and rearing the chicks up to 4 weeks of age.
- Ø Sufficient for brooding about 70 chicks
- Ø Sufficient for rearing 40 chicks up to 4 weeks
- Ø Easy to handle by rural women.
- Ø Cost of the product is Rs. 1600/- per unit

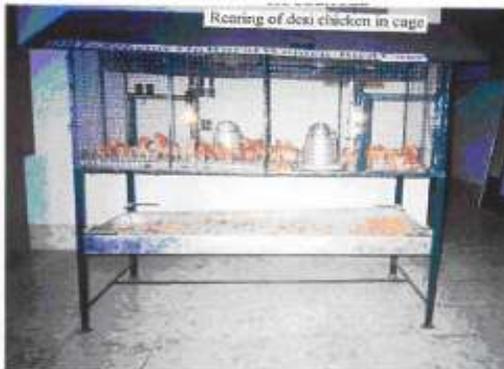
### MODIFIED EGG CANDLER

It is a modified torch with provision to candle eggs. It is operated with three dry cells.

- Ø To candle the embryonated eggs for livability of the chicken embryos.
- Ø Cost of the product is Rs. 250/- per egg candler

### CUSTOM HATCHING UNIT

- Ø Meant for hatching chicken eggs in rural households.
- Ø 100 chicks could be hatched every month.
- Ø Could be operated by Electricity / 12 volts battery.
- Ø Cost of the product is Rs. 8000/- per unit



## B) Diagnostic kits and Vaccines



### 16. INTERACTIVE CD-ROM ON REGIONAL DISSECTION OF OX AND E-ATLAS ON HISTOLOGY

It is an educational tool developed for the benefit of the students undergoing B.V.Sc. and M.V.Sc. degree course.

#### Product Presentation

- Ø This teaching aid covers the live video dissection of various regions of the body with the details of muscles, arteries and nerves. It includes animations showing the origin, insertion and action of various muscles. High quality photographs showing the different structures of the bone on mouse over control.
- Ø “e-Atlas on Histology” is an interactive computer aided teaching module comprising of images of the histological structure of all body systems with text description and questionnaire.

#### Usage

- Ø Both the Interactive CD-ROMs has user friendly Help menu button which will guide the users to browse and learn the subject.

#### Advantages

- Ø Both these interactive CD-ROMs serve as an important educational aid for veterinary graduates in learning the dissection of Ox with detailed description of Osteology, Myology, Angiology, Neurology and Surface anatomy.
- Ø “e-Atlas on Histology” is an interactive computer aided teaching module comprising of images of the histological structure of all body systems with text description and questionnaire for veterinary students learning Histology as per VCI syllabus.

#### Cost of the product

- Ø Rs.5000/- Interactive CD-ROM on “Regional dissection of OX” (Rs. 3000/- for students)
- Ø Rs. 70/- per Interactive CD-ROM on “e-Atlas on Histology”



# B) Diagnostic kits and Vaccines



## 17. RUSITEC – Rumen Simulation Technique

An alternative to animal experiments in animal nutrition research was developed indigenously. The technique is called as RUSITEC (Rumen simulation technique) that can replace cattle used in experiments. Since it was developed at Tamil Nadu veterinary And Animal Sciences University, it is named as TANUVAS – RUSITEC.

### Product presentation

Ø TANUVAS-RUSITEC consist of Water bath, Reaction vessel, Perforated cage, Effluent bottle, Gas bag, Saliva tank, Peristaltic pump, Water heater and Control panel. This simulates the digestive system of cattle.

### Usage

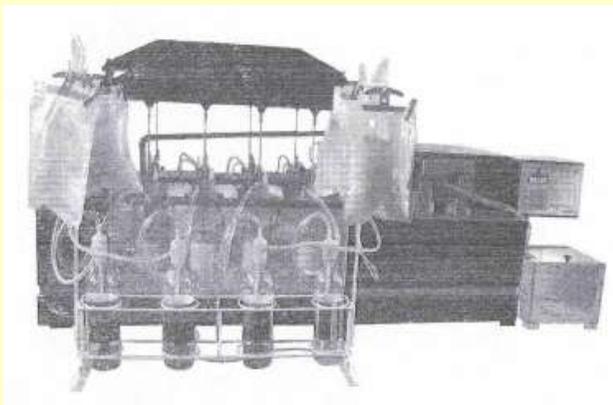
Ø Cater the needs of research laboratories involved in conducting nutritional research in ruminants, Pharmaceutical companies engaged in research and development, Analytical laboratories attached to feed industry

### Advantages

Ø Replacement of animal experiment in animal nutrition research  
Ø Compact and occupies less desk space

### Cost

Ø Rs. 2.5 lakhs per instrument





## B) Diagnostic kits and Vaccines

### 18. NIPPLE ASPIRATE FLUID CYTOLOGY FOR DIAGNOSIS OF CANINE MAMMARY TUMOUR

#### Procedure

Clean the nipple with surgical spirit to clear clogged ducts and for easy fluid flow. Gently squeeze the mammary gland downwards and towards the nipple until fluid appear at the nipple surface. Non-yielding gland – if the fluid does not appear at the nipple surface even after a minute of gentle massaging of the gland. If the fluid appears at the nipple surface in very minute quantities, then touch a slide directly to the nipple surface and make smears using another slide as blood smear technique. If the fluid appears in a considerably large quantity, then collect into a via or in capillary tubes. Make smears later either from the drop of fluid directly or sediment after centrifugation. If the quantity of fluid obtained is very large, make smears after initial stripping off. Either air-dry the smears or wet fix in 95% alcohol or methanol for 30 minutes. Dispatch the samples to The Central University Laboratory, Centre for Animal Health Studies, Madhavaram Milk Colony, Chennai-600 051 Ph. No. :044-25551581.

#### Usage

Ø This technique is for adoption by the line Departments / pet animal practitioners.

#### Advantages

Ø This is a new, simple, sensitive, quick and non-invasive technique standardised for early detection of canine mammary cancer even in non-lactating/ asymptomatic and suspected dogs

#### COST PER SAMPLE TEST

Ø Rs.2/- per sample



## B) Diagnostic kits and Vaccines



### 19. INSULATED BAG FOR TRANSPORT OF CATAMARAN SHRIMP CATCH

Insulation bag is designed for storage of shrimp while on catching. It will extend the keeping quality of shrimp so that the fishermen can earn more profit by way of selling good quality of shrimp.

#### Product Presentation

This insulated bag can be filled with ice and used for transportation of shrimp without contamination and spoilage. Ice retention capacity of the bag after 10 hours - 62%.

#### Product Details

- Ø Holding capacity – 24 kg. (10 kg of fresh shrimp + 10 kg of ice)
- Ø Fabrication cost Rs. 1000 to 1200 per bag.

#### Instruction for use

- Ø Before fishing, fill the insulated bag with crushed ice.
- Ø Fasten the bag on board the catamaran.
- Ø Segregate and store the prime size shrimps in bag. This would avoid the spoilage of the catch till it is landed.

#### Advantages

- Ø Contamination and spoilage of shrimps is reduced.
- Ø It will save the 10% of the total catch.



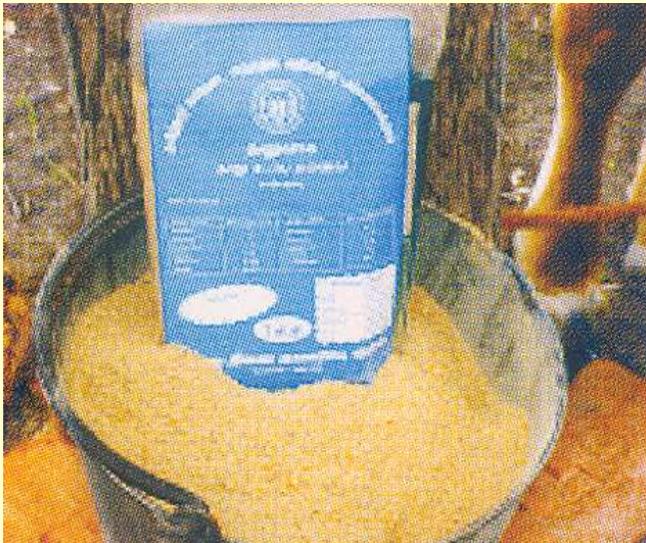


## C) Product and Technologies

### 1. MINERAL MIXTURE FOR CATTLE

#### Importance of Mineral Mixture

- Ø Health and well being of animals
- Ø Better disease resistance and immunomodulation
- Ø Efficient digestion and absorption of nutrient
- Ø Maintenance of production
- Ø Higher conception rate in dairy cattle
- Ø Increased milk production



The mineral mixture contains major minerals such as calcium, phosphorous, magnesium and potassium and trace elements such as zinc, copper, iron, manganese and iodine. It also contains ultra trace minerals namely cobalt and selenium.





## C) Product and Technologies

### 2. ENRICHED PADDY STRAW BLOCK

Paddy straw is enriched with fertilizer grade urea at 4 per cent level and kept stores airtight for 21 days. The enriched straw is then cut to a length of about 2 inches and blended with the following ingredients.

Enriched paddy straw	:	85.0
1% formaldehyde treated GNC	:	4.5
Binding material (maida)	:	7.5
Mineral mixture	:	2.0
Salt	:	1.0

The blend is then compressed into 30x10x10 cm blocks each weighing 1 kg.



#### Feeding of enriched blocks

Feeding trials revealed that the blocks were readily palatable when fed to low yielding cows. The average daily milk yield also increased by 15% and the composition of the milk was not affected.

By adopting this technology, the farmers could convert the ordinary paddy straw into enriched blocks for feeding cows at low cost with increased milk yield.





## C) Product and Technologies

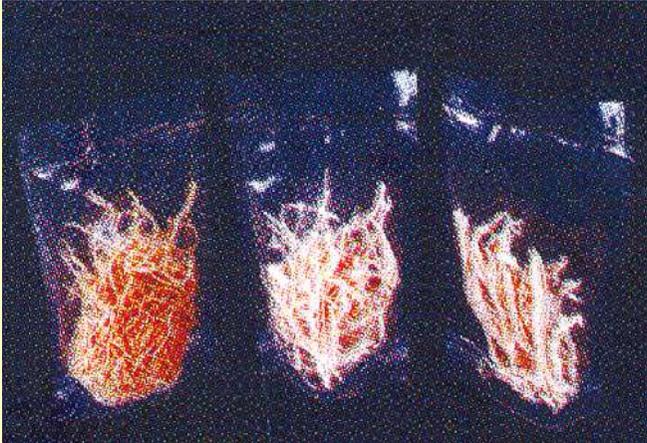
### 3. FISH NOODLES

#### Recipe

Maida flour	-	1000 g
Minced meat (fish)	-	100 g
Salt	-	20 g
Water	-	330 ml

#### Procedure

Mix maida flour with water, salt and fish mince thoroughly till the dough consistency is flexible. Cut into small pieces and fed into hand operated extruder. Noodle shaped product obtained is steam cooked for 30 min and dried in oven at 50-60°C for 3-4 hours. Dried noodles are packed in low-density polybag of 400-micron thickness. Noodles can be stored well in room temperature without any deterioration for 4 months.



#### Economics

For the production of 1kg of Noodles cost of production is Rs. 63/kg

Selling price = Rs. 100.00/kg

Profit = Rs. 27/kg

**Pattern of consumption:** Like other noodles, fish noodles can be prepared for consumption

#### Nutritional facts:

Protein	-	13.15
Fat	-	0.40
Ash	-	0.92
Moisture	-	7.93



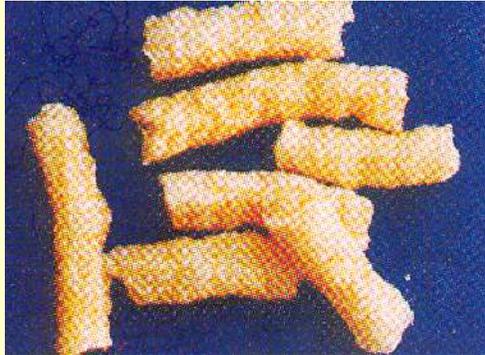
## C) Product and Technologies



### 4. READY TO EAT EXPANDED SNACK FOOD

#### Materials required

Rava	-	1 kg
Deodourised fish flour	-	100 g
Salt and spices	-	50 g
Water	-	100 ml



#### Method of preparation

Rava is mixed with fish flour, salt and spices. Add water slowly and mix thoroughly. Allow to get equilibrated at refrigerated temperature for over night. Extrude the materials at following condition

Temperature range	: 100; 120; 140; 150°C
Feeding rate	: 0.2 kg/min
Screw speed	: 120 rpm

After residing in the barrel for 160 sec, the products came out through the die (4mm – 6mm) and expand immediately after exposing to atmospheric pressure. Water content dissipates and dried well with in 5-min. products becomes soft and crispy. Cut into suitable size and pack in LD pouch (400 micron). Products are stored well at room temperature for 4 months.

#### Economics

Products can be prepared at Rs. 54/kg (including hire charges)

#### Nutritional facts

Moisture content	-	2.43%
Protein	-	36.50%



## C) Product and Technologies



### 5. GELATINIZED FISH PRODUCT

#### Materials required

Rice flour	-	1000 g
Minced fish meat	-	100 g
Salt	-	20 g
Spices	-	30 g
Water	-	150 ml



#### Procedure

Add the above ingredients one by one and thoroughly mix. Keep in refrigerated temperature for over night to get equilibrated. Extrude the mixture under following conditions.

Temperature range	:	80; 90; 100; 110°C
Feeding rate	:	0.2kg/min
Screw speed	:	85-90 rpm

Plasticised gel come out of the die (4mm to 6mm dia) develop air bubbles after exposure to atmospheric pressure. Product obtained is dried in oven at 60°C for 3-4 hours, and packed in LDP pouch (400-micron thickness). This product stored well in room temperature for 4 months. It should be oil fried before consuming.

#### Economic

Cost of production Rs. 45/kg (including instrument hire charges)

#### Nutritional facts

Protein	-	10.85
Fat	-	1.26
Ash	-	1.78
Moisture	-	10.11

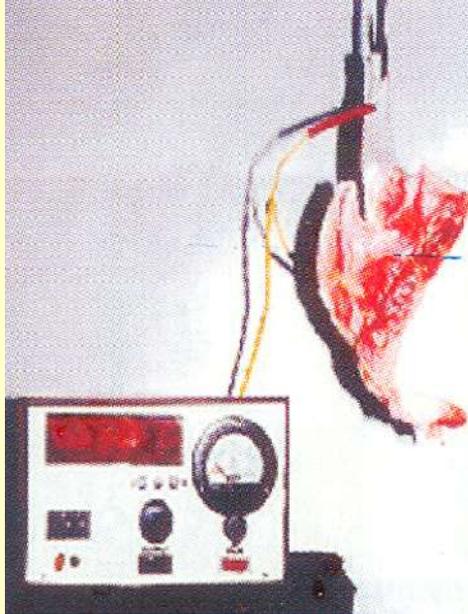


## C) Product and Technologies



### 6. ELECTRIC STIMULATOR

This equipment is suitable for electrical stimulation of spent chicken carcasses for improving the quality of meat. This equipment has the capacity to deliver power in two different voltages at 110 and 220 volts and capable of producing desired square wave pulses.



#### Advantages

- Ø It hastens the onset and resolution of rigor mortis in the stimulated chicken carcasses and can be directly frozen.
- Ø It prevents cold shortening of muscles.
- Ø It accelerates postmortem glycolysis leading to a low ultimate pH in meat.
- Ø It causes stretching and tearing of muscle leading to improvement in tenderness.
- Ø It improves the meat flavour and colour.
- Ø It helps in hot deboning and immediate sale of meat.
- Ø This equipment can be used in spent hens and aged food animals to bring about improvement in their meat quality.



## C) Product and Technologies



### 7. TOUCH SCREEN INFORMATION KIOSK

Touch Screen Information Kiosk provides information on various management and disease prevention practices of livestock on the touch of a finger. Tamil Nadu Veterinary and Animal Sciences University has established sixteen touch screen information kiosks located at Madras Veterinary College, Chennai, Veterinary College and Research Institute, Namakkal, Fisheries College and Research Institute, Thoothukudi, Agricultural Technology Information Centre, Kattupakkam and Veterinary University Training and Research Centres at Coimbatore, Erode, Tiruppur, Karur, Madurai, Nagercoil and Dharmapuri, Veterinary University Regional Research Centre, Pudukottai, Farmers Training Centre, Kancheepuram and Theni, Poultry Research Station, Nandanam, Chennai and at TANUVAS Headquarters, Madhavaram, Chennai.



The list of lessons installed in the touch screen kiosk are as follows:

- Ø Dairy farming
- Ø Goat rearing
- Ø Poultry farming
- Ø Japanese quail rearing
- Ø Marketing opportunities
- Ø Mastitis
- Ø Disease prevention in poultry



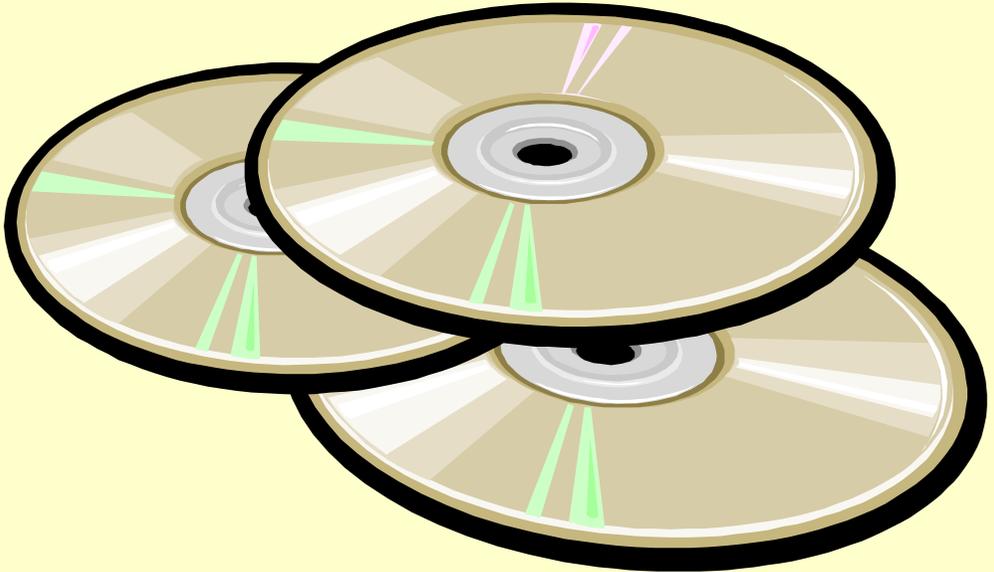
## C) Product and Technologies



### 8. INFORMATION RETRIEVAL PACKAGE

The Information Retrieval Package (IRP) is an application software/tool used to create database and search / retrieve documents from the database.

The IRP contains two modules. They are information entry module and information search module.



The information entry module is used to create databases (databases like abstract of researchers in college / university or abstracts of articles published in book / journal). The IRP entry module used to modify records easily by listing the record numbers and titles. Information search module also searches and retrieve documents based on users keyword. Information search module also contains advanced search option for searching authors, departments and titles. Advanced search option lists index of titles, departments, authors and year.



# C) Product and Technologies



## 9. DIETETIC SHRIKAND WITH SYMBIOTIC PROPERTIES

Shrikhand is an indigenous fermented milk product prepared using dhahi (chakka). It is sweet and sour in taste. The milk with reduced fat and modified protein composition is fermented with specific culture and the whey is removed. The chakka obtained is mixed with colouring and flavouring agents.

### Product Technology

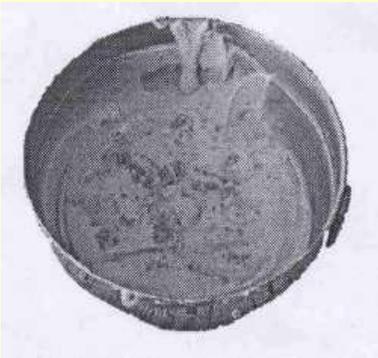
Standardization the milk to reduce fat content to 2%. Heat the milk to 72°C for 30 min and cool to 37°C. Modify the protein composition by adding casein and whey protein concentrate at 60 : 40. Inoculate with probiotic culture at 2 percent level. Incubate for 8 – 10 hours acidity reach as 0.9% as lactic acid. Remove the whey using muslin cloth / by modified technology using basket centrifuge with specially designed filter bag. Collect the chakka. Prepare the Shrikhand by addition of saffron (0.1%), cardamom (0.4%) and sugar (70%). Pack the Shrikhand and keep in cold storage.

### Advantages

- Ø Dietetic Shrikhand with Symbiotic properties is a fermented milk product. Symbiotic are mixture of probiotics and prebiotics. They allow the host to benefit from live bacteria implanted into the intestinal tract.

### Cost of the product

- Ø Rs. 54/- per Kg.



# C) Product and Technologies



## 10. MILK PROTEIN ENRICHED NOODLES

Noodles is a ready to use food commodity gaining popularity during the recent times because of its good nutritive value at a lower cost and easy acceptability by the consumers.

### Product Preparation

Take refined wheat flour and salt. Add skim milk powder and whey protein concentrate (1:1) @ 7.5% level. Addition of salt in water (2 g / 100 g flour) is required. Dough making with the required level of water. Pass the dough through the noodle extruder. The noodles at I stage 4 mm thickness and at II stage with 2 mm thickness is prepared in sheet form. The dough sheet is passed through Noodle cutting machine. Then dry the noodles in two stages i.e. Sun Drying for 12 hr. and Drying in oven at 55°C for 5 hr. Then pack the noodles as a value added enriched food.

### Usage

Ø Pre cook the noodles in boiling water. Add masala, salt and vegetables as required.

### Advantages

- Ø Good nutritive at lower cost.
- Ø Easily acceptable by consumers
- Ø Product technology can be transferred to Self Help Groups to encourage small scale enterprises.
- Ø Best for introduction in Children's Noon Meal scheme of Government of Tamil Nadu.
- Ø TANUVAS noodles contain 19% protein over the commercially available noodles (12% protein).

### Cost Of The Product

Ø Rs. 2.50/- per 100 gm pack.



# C) Product and Technologies



## 11. RESTRUCTURED MEAT

The concept of restructuring the meat is to utilize less expensive carcass parts to produce a product that provides satisfactory eating quality. Variety of meats like head meat, cheek meat, heart, tripe etc., are lower valued portions of the carcass which have less palatability attributes and thereby providing an economic constraint to the producers.

### Product Technology

The cheek meat from buffalo carcasses could be utilized for the preparation of restructured meat. Meat samples to be frozen at  $-20^{\circ}\text{C}$  for three days, cut into longitudinal strips, parallel to muscle fibres and tempered  $-5^{\circ}\text{C}$  for 8 hours. Muscle strips are sliced perpendicular to muscle fibres for a convenient thickness. Sliced meat is mixed with 0.32% sodium tripolyphosphate and 1.4% sodium chloride and stuffed into tubular polypropylene bags frozen overnight and again sliced into circular steaks of convenient thickness and refrigerated.

### Usage

- Ø Tough and low price meat such as buffalo cheek meat can be conveniently converted into value added restructured meat and marketed.
- Ø The prepared restructured meat can be stored upto 30 days at  $-20^{\circ}\text{C}$  without any quality deterioration.
- Ø The restructured meat can be consumed after frying and cooking and also can be used in the preparation of emulsion based meat products.

### Advantages

- Ø Value addition of low cost meat.
- Ø Satisfy the consumer demand of processed meat food

### Cost of the product

- Ø Rs. 70/- per Kg.



# C) Product and Technologies



## 1. WHEY-BASED GRUEL PREPARATION TECHNOLOGY

Whey a by-product of the Dairy Industry is left un utilized which can be effectively used as a food supplement by incorporating with rice gruel. This will be useful for infants as well as geriatric patients.

### Product Preparation

Skim milk was taken and heated to 90°C followed by cooling to 80°C. to bring about coagulation of milk protein, 1.5% solution of citric acid was slowly added till clear whey was obtained. The coagulum was allowed to settle for 5 minutes and the whey was drained out by filtering through a muslin cloth. The whey sample was held at 70°C for 30 minutes and ultrafiltered at 50°C and allowed to circulate through the membrane from the feed can until the desired concentration factor (2X) was reached. The permeate solution was collected in a vessel.

The concentration factor was calculated by the ratio of retentate collected in a constant time to that of the feed at the starting time of filtration. Then the rice gruel was substituted into whey at 5.0 percent. The 5 per cent level of substitution was found to be more suitable and hence 50 gms of rice gruel was added to 1 lit. of concentrated whey and boiled for 10 minutes. Lemon as the natural flavour and vanilla as the synthetic flavour were selected for flavour enrichment. 2000 IU of vitamin A was fortified in to 1 litre of whey based gruel and the sample was spray-dried with an inlet temperature of 180°C and an outlet temperature of 80°C to obtain a good quality whey based gruel powder.

### Usage

- Ø 5 gm packets of whey based gruel could be mixed with 100 ml of water with pinch of salt added for taste.

### Advantages

- Ø To increase hemoglobin level in humans.
- Ø Good supplement of protein for anaemic patients.
- Ø Simple, cheap and cost-effective.

### Cost of the product

- Ø Rs. 5/- per 100 gms.





## C) Product and Technologies

### 13. VACUUM PACK COOK-CHILL TECHNOLOGY FOR FISH PRODUCTS - FISH CUTLETS

This technology involves vacuum packing in high barrier heat stable bags, pasteurization or pre-cooking, quick immediate cooling and subsequent refrigerated storage (3° C).

#### PROCEDURE

##### Materials required

Minced fish (1000g), Potato (1000g), Green chillies (100g), Corn flour (200g), Chilli powder (5g), Turmeric powder (2g), Curry masala powder (5g), Garlic (100g), Ginger (100g), Onion (600g), Pepper (15g), Curry leaves (4g), Sunflower oil (200ml), Salt to taste.

##### Preparation

- Ø At 121°C, cook minced emperor bream fish (*Lethrinus* sp.) for 15 min and potatoes for 10 min. separately.
- Ø Season the curry leaves, chopped onion followed by ground ginger, garlic and green chillies in sunflower oil.
- Ø Add chilli, turmeric, pepper and curry masala.
- Ø Mash cooked potatoes and minced meat in a vessel with seasoned masala and corn four.
- Ø Shape this cutlet mix in a mould (35 g) and coat with breadcrumbs.

##### Vacuum packing procedure

- Ø Pack the cutlets in 200 x 150 mm Cryovac 3-ply (PE-Nylon-PE) laminates.
- Ø Vacuum pack in vacuum packaging machine at 5 mmHg.
- Ø Cook the vacuum packed cutlets in a boiling water bath (100°C) for 20 min
- Ø Immediately chilled in crushed ice (0°C) for 1 hr.
- Ø Store the chilled cutlets in chill cabinet set at 3-4°C.

##### Advantages

- Ø Moisture loss is prevented so the product stays tender and fresh.
- Ø This packaging increases shelf life (more than 16 weeks in refrigerated storage).
- Ø Prevents spoilage
- Ø Restores original flavour / texture and nutritional qualities.

##### Income

- Ø Net profit of Rs. 55/- per kg of fish



# C) Product and Technologies



## 1. POLY-HERBAL PRODUCT FOR THE PRODUCTION OF DISEASE RESISTANT TIGER SHRIMP *PENAEUS MONODON*

The use of antibiotics and other chemotherapeutics has several shortcomings such as generation of resistant pathogens, drug residues in the treated fish, and environmental pollution.

### HERBAL COMPOSITION

<i>Aloe vera</i>	:	10%
<i>Ocimum sanctum</i>	:	10%
<i>Curcuma longa</i>	:	20%
<i>Withania somnifera</i>	:	20%
<i>Embilica officinalis</i>	:	20%
<i>Phyllanthus niruri</i>	:	10%
<i>Allium sativum</i> oil fermented with <i>Saccharomyces cerevisiae</i> (1:1 ratio)	:	10%

### Usage

Ø This herbal formulation to be incorporated to the shrimp feed at 0.9% level and administered to *Penaeus monodon*. Maximum protection (100% survival) when challenged with “*Vibrio anguillarum*” like pathogenic strain (isolated from White spot syndrome virus infected shrimp).

### Advantages

- Ø Very simple technology.
- Ø Herbal ingredients as powdered form are easily available in the local siddha medical shops.
- Ø Additional expenditure is meagre & Eco-friendly.
- Ø Full Protection to shrimps against bacterial pathogen.
- Ø Partial protection against viral invasion.

### Income

Ø Net income for one hectare shrimp farm Rs. 39,760/- per yield.



# C) Product and Technologies



## 15. LOBSTER FATTENING USING FLOATING FRP CAGES

Lobsters are the high valued marine crustaceans and they have a commanding market value in both the international and national markets. The fishermen of Thoothukudi and Kanyakumari districts generally catch a lot of lobsters. However, the moulted and baby lobsters of the catches are discarded as trash. These lobsters do not fetch good price in the market. By rearing them in cages for 3- 4 months, the lobsters grow to a harvestable size and fetch a good selling price.

### Types of cages

Ø Lobster fattening technique has been standardised by the Maritech Research Centre of the Department of Aquaculture, Fisheries College and Research Institute, thoothukudi.

### Stocking management

Ø The lobsters for stocking the cages (i.e. moulted and young ones) will be collected from the lobster collection centers of Thoothukudi and Kanyakumari Districts. In a 4m<sup>3</sup> cage, lobsters upto 200 – 300 Nos. can be stocked.

### Species to be stocked

Ø There are two types of cultivable lobsters commonly available on our coast. They are Spiny lobsters - (i) *Palunirus homarus* and (ii) *P. ornatus*

### Feeding Management

Ø Lobsters need to be fed with live bivalves (Matti). If not available trash fishes, squid wastes, ray fish cuttings, etc can be fed to the cages.

### Harvesting

Ø The harvested lobsters (at the end of 3 to 4 months) can be sold out to the sea food processing plants directly, after confirming and cross checking the existing market price.

### Advantages

Ø Cages for lobster fattening are easily available at the Maritech Research Centre of FC & RI., Thoothukudi

Ø As this is a sea based aquaculture, one do not require land

Ø Lobster fattening using FRP cages can be undertaken quickly than any other aquaculture

Ø This technology is technically feasible economically viable and eco-friendly for adoption

### Cost

Ø Net return per crop / cage = Rs.14,772/-

Ø Net return per crop / cage / year = Rs.14,772 x 3 =Rs.44,316/-  
( 3 crops / year)



# C) Product and Technologies



## 16. RACEWAY TECHNOLOGY

Raceway technology is the promising method to minimize the losses due to environmental degradation. Very high stocking densities in raceways adopted as high as 2000/m<sup>3</sup> could work out effectively if the shrimps are nurtured in nursery raceways and have reached a size of about 3 – 5 g before being stocked in LDPE ponds. This approach seems to result in high survival (above 80%) as well as good growth in final grow out ponds. Nursery raceways could be an ideal option to enhance survival and production in shrimp farming systems.

### Farming Method

- Ø The raceways were cleaned with chlorinated water (10 ppm) and filled upto 0.75 m depth (operating volume 30 m<sup>3</sup>). Culture water was also treated with liquid chlorine (10 ppm active chlorine).
- Ø The raceways were fertilized with fermented product, evolved by us. Culture water was also inoculated with cultured diatom, *Chaetoceros calcitrans*.
- Ø Raceways were stocked with fifteen-day-old postlarvae of *Penaeus monodon* certified as viral pathogen free (especially WSSV) purchased from commercial hatcheries.
- Ø Shrimps are fed with dried crumbled and pelleted commercial feed.
- Ø After the rearing period of 50 days, the raceways can be harvested live and stocked in the limited water exchange (LDPE lined) grow out ponds.

### Usage

- Ø Nursery raceway will help the shrimp farmers to improve the survival rate of shrimps in growout systems.

### Advantages

- Ø Farmers will be doubly benefited by procuring advanced – stage seeds from such raceway based nurseries, as it is highly risky to stock PL 15/20 directly into the growout ponds.
- Ø Nursery raceways would introduce a new phenomenon in shrimp aquaculture management that ensures enhanced survival and increased production through bioremediation.

### Cost

- Ø By investing an amount of Rs. 4.00 to 5.00 lakhs net returns to the tune of Rs. 7.00 lakhs per year can be possible through the raceway technology.



# C) Product and Technologies



## 17. COST EFFECTIVE NEW TECHNOLOGY FOR THE PRODUCTION OF LIVE FISH FOOD WHITE WORM, *ENCHYTRAEUS ALBIDUS*

White worm, *Enchytraeus albidus* is an oligochaete worm of 2 – 5 mm. size living on the surface soil. This worm is an ideal live food for ornamental fishes.

### Product Technology

- Ø Set a culture substratum cement pot of 25 cm height and 29.5 cm diameter.
- Ø Keep the vermin castings at 18 cm height of individual pot.
- Ø Spread fresh tree leaves inside the vermin - casting – bed at 5cm height.
- Ø Sprinkle water every day morning and evening to keep the moisture content at 25 – 30%.
- Ø Allow the excess water to escape through a small outlet kept at the base of the pot.
- Ø Introduce 1000 seed worms into the castings
- Ø Cover the pot with wooden lid to avoid direct falling of sunlight and to facilitate a dark environment.
- Ø Keep 50 leaves of ficus tree spread over the vermin cast substratum in order to help the worms to stay and feed on them
- Ø The white worms clump together into the fibrous part of the ficus leaves simultaneously in several hundreds.
- Ø Freshly place the leaves again and again so that about 5 harvests can be made by the fresh addition of leaf substratum.

### Advantages

- Ø A culture pot of 12 days duration would produce about 32,500 white worms and in one month the yield would be 75,000 worms per pot.

### Income

- Ø An income of Rs. 1000/- can be earned per month per person by undertaking white worm culture.



# C) Product and Technologies



## 1. OPTIMIZED CHILLED PROCESS TECHNOLOGY FRESH FISH WITH DRY ICE AND WET ICE FOR EXPORT BY AIR

Chilled fish exporters in India use only wet ice for chilling and exporting the chilled fish by air. Sometimes very few exporters blindly use the dry ice and wet ice combination without any scientific basis for the export of chilled fish. The use of dry ice alone is expensive and the use of wet ice alone results in an increase in weight of air cargo and cost of air transport, besides loss in nutrients due to melting of wet ice. The optimized level of dry ice and wet ice for effective chilling of fresh fish developed in this technology 1:0.2:0.5 (fish:dry ice:wet ice, wt/wt/wt). Helps in the extension of shelf life of the fishes exported by air.

### Procedure

- Ø Pack the required quantity of dry ice in proper pouches and wet ice in polythene pouches.
- Ø Place the packs with fishes in alternate layers (avoid direct contact of fish with wet ice and dry ice).
- Ø Wrap the packages in polypropylene bags placed in styrofoam boxes and seat air tight with white cellophane tape.
- Ø Store the Styrofoam boxes at ambient temperature without re-icing.

### Advantages

- Ø The extension of shelf life can be obtained.
- Ø Reduction in the cost of air transportation was upto 25% compared to chilling by we ice alone as dry ice sublimates in to weight less gas.

### Income

- Ø Reduction in transportation cost Rs. 150 to 250 per kg.



