

Biopesticide - *Hy-Act* (*HyPSO 25 EC*)

“*Hy-Act*”- Biopesticide (seed oil based formulation developed from *Hydnocarpus pentandra*).

History indicates that *H.pentandra* oil possesses many medicinal properties. But no information on its pesticidal properties is available. Hence, the bioactivity was evaluated on the key insect pests of Ailanthus, Casuarina and Teak. Preliminary study conducted both in the laboratory and field conditions revealed that the oil possesses insecticidal properties against these pests. Hence oil biopesticide formulation was prepared and it showed effectiveness in managing the insect pests in terms of larval mortality; *Hyblea punea* (80-90%), *Inderbella quadrinotata* (60-80%) and *Eligma narsisuss indica* (45-55%). The formulation is also found to act as feeding deterrents, growth inhibitors, repellents (or) oviposition inhibitors against the target insect species.



Hy-act - released by Honourble Minister Smt.Jayanthi Natarjan, Ministry of Environment and Forests, Govt.of India in Tree growers mela held at IFGTB during 24-25th Feb'2012.

About the product: *Hydnocarpus pentandra* seeds were collected, processed, air dried and oil was extracted by organic solvent distillation. The bioefficacy of the oil was analyzed by conducting a series of laboratory bioassays and found larval mortality and antifeedancy. Based on the performance in the lab studies, efforts have been made to identify individual compounds using TLC, HPLC and GC MS MS and the bioactive compounds were characterized and identified. The compounds identified were reported to have insecticidal properties. Hence, suitable preformulation named as **Hy-Act** (**HyPSO 25 EC**) was developed and found better results than the neem formulation and few synthetic pesticide.

How to use: 100ml formulated '**Hy-Act**' can be mixed with 10 li of water to spray over 1.5-2.0 lakhs seedlings in order to contain aforementioned insect pests. 500 ml of '**Hy-Act**' may be needed for 1 ha of young 1-2 yrs old plantations. The cost of biopesticide 100ml bottle is Rs. 80/- only.

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Biopesticide - *Tree PAL*^H

Tree PAL^H formulation is developed from seed oil of *Hydnocarpus pentandra*, *Pongamia pinnata*, *Azadirachta indica* and essential oil of *Lantana camara*.

About the product: Seed oils of *P. pinnata*, *A. indica*, *H.pentandra* and essential oil from *L. camara* were found to possess pesticidal properties based on our preliminary screening against insect pests of Ailanthus, Casuarina and Teak both in the laboratory and field conditions. Hence, the formulation was developed using non-edible tree borne oil seeds viz., *P. pinnata*, *A. indica*, *H.pentandra* and essential oil from *L. camara* and showed effectiveness in managing the insect pests in terms of larval mortality; *Hyblea parea* (80-90%), *Inderbella quadrinotata* (60-80%) and *Eligma narsisuss indica* (45-55%). The formulation is also found to act as feeding deterrents, growth inhibitors, repellents (or) oviposition inhibitors against the target species. As a result the formulation is named as *Tree PAL*^H.

How to use: 100 ml of *Tree PAL*^H may be added to 10 litres of water and sprayed to infested plants at a week intervals. The requirement of *Tree PAL*^H formulation per hectare of plantation is worked out to be 100 ml. 100 ml *Tree PAL*^H can be mixed with 10li water to spray over 1.5 to 2.0 lakhs seedlings. 500 ml of *Tree PAL*^H may be needed for 1 ha of young 1-2 yrs old plantations. The cost of biopesticide 100ml bottle is Rs. 80/- only.



Tree PAL^H - released by Honourble District collector Shri.Karunakaran, Coimbatore in Tree grower's mela held at IFGTB during 23-24th Feb'2013.

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Ento~fight Nasa (Biopesticide)

(Entomopathogenic endophytic fungus - *Nigrospora sphaerica* (Sacc.) E.W. Mason)

Biological control has become an important tool for Integrated Pest Management (IPM). Use of microorganisms for the management of insect pests and diseases is risk free. Several endophytic microbes are known to have anti-insect properties. Endophytes are microbes that colonize living, internal tissues of plants without causing any harm to their host. These endophytes protect their hosts from infectious agents and adverse conditions through secretion of bioactive secondary metabolites. Endophytic fungal metabolites are used as potent bioinsecticides against a wide range of insect pests. Therefore, research on endophytic fungus of entomopathogenic significance, *Nigrospora sphaerica* isolated from teak (*Tectona grandis*) was carried out and identified bioactive secondary metabolites of insecticidal properties with 62-65 % of larval mortality.

Biopesticidal properties

An endophytic fungus, *Nigrospora sphaerica* isolated from *Tectona grandis* is found to possess anti-insect potential against teak and ailanthus defoliators' viz., *Hyblaea purea*, *Atteva fabriciella*, and *Eligma narcissus indica*. Preliminary study conducted both in the laboratory and field conditions revealed that the preformulation possesses high level of insecticidal properties against these pests. The oilbased preformulation showed effectiveness in managing the insect pests in terms of larval mortality, feeding deterrents, growth inhibitors, oviposition inhibitors against these insect pests. Its extract was analyzed by GC-MS to identify bioactive secondary metabolites of insecticidal toxicity. The compounds present in the extracts reported to have insecticidal properties. Therefore, **Ento~fight Nasa** a biopesticide may be considered as a promising biopesticide against these insect pests.

Ento~fight Nasa (Biopesticide) preformulation

Mineral oil based spore suspension of *Nigrospora sphaerica* @ 4×10^9 /ml is preformulated with suitable adjuvant for field application to protect crop plants from insect pests of defoliator (leaf feeder) in nature.



Ento~fight Nasa - released by Dr.Ashwani kumar, IFS, Director General, ICFRE during his visit to IFGTB on 19th November, 2014

Application of Ento~fight Nasa

250 ml of preformulated biopesticide, **Ento~fight Nasa** may be added to 25 litres of water and sprayed to infested plants at once. The spores in the suspension infect the larvae and it may be augmented itself in the field based on availability of hosts (insect larvae). No further application is needed. Promising results will be obtained within a week.

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Crawl clean (Green insecticide)

The papaya mealybug (PMB), *Paracoccus marginatus* Williams and Granara de Willink (Hemiptera : Pseudococcidae), native to Mexico and Central America, is a minor hemipteran insect found to colonize on diversity of plant species within a community of agri-horti-forestry ecosystem. Its host range includes more than 100 species of plants including plumeria, papaya, jatropa, hibiscus, range of vegetables, fruits, flowers, ornamental crops and weeds. First report of its occurrence was in 1995 and thereafter it has spread to more than 15 countries. In India it was recorded during July 2008 on papaya (*Carica papaya* L), jatropa (*Jatropha curcus* L.) and tapioca (*Manihot esculenta* Crantz) besides incidence on flower crops, vegetables and fruits. Extensive survey was conducted on the colonization of mealybug from 2011-2014 in 20 districts of Tamilnadu. High host preferences were reported on the plants belonging to the family Euphorbiaceae, Fabaceae, Malvaceae, Solanaceae, Apocynaceae and Amaranthaceae. Due to its short life cycle, more generations per year, higher fecundity, easy dispersal, protective mealy coating, etc., helped this pest to multiply in enormous proportions. If left unchecked, *P. marginatus* will cause considerable loss to quality planting materials besides loss in yield. Introduction of classical biological control agents such as parasitoids and predators namely *Acerophagus papayae* (imported from Mexico), *Anagyrus loecki*, *Pseudleptomastix mexicana* and *Spalgis epius* respectively, in controlling the population of mealybug was not found effective as expected. Hence, focus was paid on application of some botanicals to contain the pest menace.



Crawl clean - released by Shri Ashok Lavasa, IAS Secretary, MOEFCC during his visit to IFGTB on 15th June 2015.

How to use: IFGTB has taken an effort to develop botanical pesticide with ethnobotanical records. We identified very promising and prospecting bioactive compounds from certain flora for their biopesticidal properties against the invasive alien insect pest, *P. marginatus* causing extensive damage to agricultural, horticultural, floricultural and forestry crops in Tamilnadu. As a result, biopesticide preformulation is developed from leaf powders of *Melia dubia*, *Pongamia pinnata*, *Aristolochia bracteata*, *Adhatoda vasica* and *Vitex negundo*. Equal proportion of finely sieved leaf powders of aforementioned plants is mixed with the sticking agent and packed as 200gm packet with the cost of Rs. 25/- per packet. Packet containing 200gm of leaf powder should be mixed with 10 liters of hot water and boil it for 10 minutes, followed by filtration using fine mesh cloth after cool it. Then make up the volume into 10 liter using water and spray over the leaves which is infesting with mealy bug. Mortality or shrinkage of mealybug will be observed within 12 hrs of application.

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Growth promoting product – “Tree Rich Biobooster”
(An alternate media for potting mixture)

A growth promoting product “**Tree Rich Biobooster**” using ecofriendly organic materials for growth improvement of fast growing trees species such as *Casuarina*, *Gmelina*, *Ailanthus*, *Melia* and *Eucalyptus* has been developed.

Plantation forestry has tremendous scope for rural livelihood improvement and wood based industries. However, supply of quality planting stock to the farmers is the major bottle neck due to lack of micro and macro nutrients, insect pests, and diseases. Various nursery practices are available individually for pests, diseases and nutrient management however, integrated strategy to manage growth, pests and diseases is lacking, hence, the product **Treerich biobooster** has been developed for the production of quality planting stock for farm and plantation forestry. The developed product may be used as an alternate to potting media to raise nursery.

Treerich biobooster Pellets - Decomposed organic material along with FYM, PGPRs, PPFM and AM fungi in a suitable proportion and made into a disc/pellet of 100mm/35mm size with 120-160gms. The EC is 0.23 and the pH is 6.4. One pellet of the said size will expand to 20cm height with 17cm diameter after adding 700ml of water in a standard (17x20cm) polybag for raising seedlings. The total cost of the five pellet containing pack is Rs.25/-



The total cost for making a pellet is Rs.5/- and which is cost effective when compared to traditional method (Rs. 12.50/-) of bag filling. Biobooster is less weight, hence transportation is also very easy. Most importantly the water holding capacity is one week hence, watering is minimized and with very little maintenance of seedlings till six months.

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Growth enhancer – “Vermico-IPM” (Instant Potting Mixture)

A growth promoting product “**Vermico-IPM**” using ecofriendly organic materials for growth enhancement of fast growing trees species such as *Casuarina*, *Gmelina*, *Ailanthus*, *Melia* and *Eucalyptus* has been developed. It is an instant potting medium for raising seedlings.

Plantation forestry has tremendous scope for rural livelihood improvement and wood based industries. However, supply of quality planting stock to the farmers is the major bottle neck due to lack of micro and macro nutrients, insect pests, and diseases. Various nursery practices are available individually for pests, diseases and nutrient management however, integrated strategy to manage growth, pests and diseases is lacking, hence, the product **Vermico-IPM** has been developed for the production of quality planting stock for farm and plantation forestry. The developed product may be used as an alternate to potting media to raise nursery.

Vermico-IPM Pellets - Decomposed organic material along with vermicompost and vermiculite and FYM in a suitable proportion and made into a disc/pellet of 60mm/60mm size with 150-300gms. The EC is 0.23 and the pH is 6.4. One pellet of the said size will expand to 12cm height with 6cm diameter after adding 350ml of water in a standard (6x15cm) polybag for raising seedlings. The total cost of the eight pellet containing pack is Rs.20/-

Biological products based on natural products derived from biomanures offer an ecological and effective solution to crop productivity, health and pest problems. Such bioboosters are an alternative to synthetic molecules that continue to be used appropriately, particularly in developing countries, threatening the environment and human health. New chemicals with improved properties are available but are beyond the means of many farmers in developing countries. The use of bioboosters is of high safe. If produced, formulated and applied in appropriate ways, such bioboosters can provide ecological and effective solution to production of healthy planting resources. In view of the experience gained by the researchers over the past one decade in the field of biofertilizers, biopesticide and made culture bank in the institute, it is essential to develop biobooster for the Nutrient Management of important forest tree species like Eucalyptus, Casuarina, Teak, Ailanthus, Gmelina and Neolamarckia species.



Vermico- IBM Growth Enricher (Instant Potting medium)- released by the Honourable Minister of Shri.Prakash Javadekar, Ministry of environment Forests & climate change, Govt. of India during his visit to Coimbatore on 2nd Feb’2016.

Beneficiaries of the Technology

Prominent beneficiaries – **Farming community**

User groups are **farmers** and State Forest Departments and Forest Development Corporation and other biofertilizer industries who are investing considerable amount of resources in search for biofertilizer and biobooster related processes.

Economics of the technology

Biobooster are developed by utilizing organic material is an environmentally safe method. The productivity of the short rotation native tree species was increased by growth promoting efficiency of this biobooster. Since the pellets were not expensive, the growers need to spend very less money for raising quality planting stock without using potting media/mixture. Since the development of biobooster is user friendly, self help group can be well benefited to make the product in a large scale which gives them additional income.

The total cost for making a pellet is Rs.1/- and which is cost effective when compared to traditional method (Rs. 4.50/-) of bag filling. Biobooster is less weight, hence transportation is also very easy. Most importantly the water holding capacity is one week hence, watering is minimized and with very little maintenance of seedlings till six months.

Tara Red- Natural pigment

Title of the Technology: “Tara-Red” is a natural colourant/pigment extracted from the unripe fruits of red tamarind, *Tamarindus indica* var. rhodocarpa which gives red colour with sour and sweet taste. It may be used as cake toppings, colouring agent for food serves, particularly for jam preparation, also well suited for cosmetics and textile industries.

Nature of Technology

Natural colours are preferred over artificial colours world-wide due to the side effects. The demand for natural colours has experienced significant growth, and analysts forecast, it will continue to increase as consumers become more skeptical of mass production techniques and safety issues. Tamarind (red variety) *Tamarindus indica* var. rhodocarpa (found one among thousand tamarind tree) is one of the trees in dryland agriculture which increases production and income, besides imparting stability to the farming system and recommended for Fruit Based Agroforestry Systems for Drylands. Hence the product “Tara Red” was developed from the unripe fruits of multipurpose red tamarind tree.

The extract was made from the processed unripe fruits of red tamarind using polar solvent methanol, concentrated and over dried to remove the solvent. Chromatographic analysis revealed the presence of anthocyanins responsible for its natural red colour. The concentrate can be added with pectin in an appropriate concentration and topped over the cake. The pigment was tried in jam preparation and found well suited.

Beneficiaries of the Technology

Prominent beneficiaries – **Textile industries, Cosmetics and food serves like cake toppings, jam and health drink etc.** The powder/concentrates may be added as a colouring agent for food, cake, ice cream, jelly etc.

Economics of the technology

1kg of red tamarind cost about Rs.200/- yields 8g or 17 ml of the extract containing major red pigment, which may be used as a natural colourant for the preparation of 50kg of jams (Rs. 10,000/-). The colour strength is high (77%) when compare to commercially available natural pigment from other fruit sources (1-25%).

Market potential

Global dye market is US\$ 30-42 billion. Demand is 7-9lakhs MT @3%/yr. Natural colour demand is 8-9%. Hence, market potential is much more for natural colourants.



Tara Red

**Natural pigment from
Tamarindus indica var *rhodocarpa***

Red pigment anthocyanins from red tamarind were extracted and characterized for use in food serves-Jam preparation.



“Home Garden Kit”

A “Home Garden Kit” developed by IFGTB was released by the chief guest **Padma Shri Dr. P. R. Krishnakumar**, Managing Trustee, The AryaVaidya Pharmacy Ltd, Coimbatore during the meet. The home garden kit is carried in an ecofriendly cloth bag with Tree rich biobooster (an organic potting mixture developed from waste), a *Tulsi* sapling (medicinal plant); a *Sorgamaram* (vastu tree) sapling; a *Bhendi* (Okra) sapling; *Bhendi* (Okra) seeds, an organic insecticide along with a “user pamphlet”.



Release of Home garden Kit by Padma Shri Dr. P. R. Krishna Kumar, MD, AVP, Coimbatore and its distribution



SimcaBC

Simca BC—biopesticide developed from seed oil of *Simarouba glauca* DC.

Insect pests are one of the major limiting factors in crop production resulting to develop pest control strategies. Oflate biological control has become a vital tool for Integrated Pest Management (IPM) because of its non phytotoxicity, specificity to insect pests, biodegradable nature and commercialization potential. Plants are the rich storehouse of biochemical that could be tapped for use as biopesticide. Biopesticide an ecofriendly approach for pest control has the potential to replace about 2-3% of conventional synthetic insecticide which is hazardous to human health. There are about 970 registered biopesticides in India, and most of which are microbial biopesticides. Neem formulation is the only oil based biopesticide available in the market. Therefore, a biopesticide formulation named “**Simca BC**” has been developed using seed oil of *S. glauca* as an alternative to chemical pesticides for the management of insect pests of forestry, agricultural and horticultural importance.

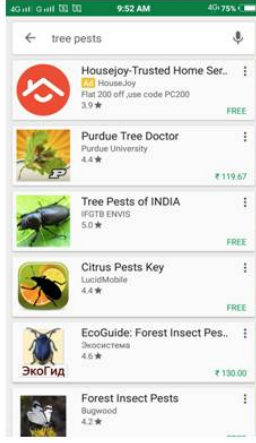
Biopesticidal properties of “Simca BC”

“**Simca BC**” has been found to be very effective in insect pests management. The seed oil based biopesticide formulation is becoming popular for managing insect pests of agriculture and horticulture crops. Though *S.glauca* (Sourga Maram) is an edible oil, found to possess insecticidal activity due to the presence of fatty acids especially oleic acid.

The oleic acid content is found to be as high as 51.29 % in *S.glauca* seed oil which is responsible for its antifeedant/insecticidal activity against targeted insect pests. Hence, a biopesticide formulation named “**Simca BC**” has been developed and the formulation has been evaluated for its efficacy against the key insect pests of Ailanthus and Teak viz., *Atteva fabriciella*, *Eligma narcissus indica* and *Hyblea purea* respectively under laboratory and field conditions. The oil formulation showed effectiveness in managing the insect pests and it was also observed that the formulation has antifeedancy of 80 %; and 75% of larvae failed to attain pupa, hence population build up has been arrested due to generation gap with no phytotoxic and residual effect. Antifeedant effect of seed oil is of great importance in the field of insect pest management which help in the maintenance of ecological balance. In addition to its biopesticidal property with 70 – 80% reduction in population when compared to synthetic insecticide and with no further infestation of insect pests of crops which would bring down the cultivation cost. To spray over 1.5 to 2.0 lakhs seedlings in the nursery, 100 ml of “**Simca BC**” can be mixed with 10 Litre of water. For 1 ha of 1-2 yrs old plantations, 500 ml of “**Simca BC**” may be needed.



A free mobile “app” on “Tree Pests of India”



மரப்பயிரை தாக்கும் பூச்சியினம் 'மொபைல் செயலி' அறிமுகம்



insect pests of 25 important tree crops and the information about insects, damage caused and control measure

மரப்பயிரை தாக்கும் பூச்சியினம் 'மொபைல் செயலி' அறிமுகம்

கோவை, மார்ச் 30- மரப்பயிர்களுக்கு தீங்கு விளைவிக்கும் பூச்சியினங்களை கண்டறிந்து, தடுப்பு நடவடிக்கை எடுப்பதற்காக, மொபைல் செயலியை, வன மரபியல் மற்றும் மரப்பெருக்கு நிறுவனம் அறிமுகப்படுத்தி உள்ளது.

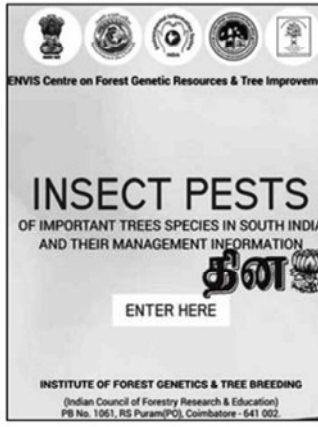
கோவை, வன மரபியல் மற்றும் மரப்பெருக்கு நிறுவனம், 'tree pests of india' என்ற பெயரில் மொபைல் செயலியை அறிமுகம் செய்துள்ளது.

இந்த செயலியில், தைலம், தேக்கு, சவுக்கு உள்ளிட்ட, 25 வகையான மரங்கள், அவற்றை அழிக்கும் உண்ணிகள், புழுக்கள், பூச்சிகள் உள்ளிட்ட, 65 வகையான பூச்சியினங்கள், அவற்றை கட்டுப்படுத்தும் வழிமுறை, தடுப்பு மருந்து, பரிந்துரைக்கப்பட்ட மருந்துகள், உரக்கிடங்குகளில் கிடைக்கும் மருந்து விவரம் தெரிவிக்கப்பட்டு உள்ளது.

விஞ்ஞானி செந்தில்குமார் கூறிய தாவது:

மரப்பயிர்களை தாக்கக்கூடிய பூச்சியினங்களை கண்டறிந்து, கட்டுக்குள் கொண்டு வருவதற்கு என்னென்ன நடவடிக்கை எடுப்பது என்பது தொடர்பான விவரங்களை, மொபைல் செயலியில் தெரிவித்துள்ளோம்.

தென்மாநிலங்களில் காணப்படும் மரங்கள், பூச்சியினங்களை பற்றி குறிப்பிட்டு உள்ளோம்.



■ கோவை வன மரபியல் நிறுவனம் அறிமுகப்படுத்தியுள்ள மொபைல் ஆப். அடுத்த படம்: பூச்சிகள் பற்றிய விவரங்கள் இடம் பெற்றுள்ளன.

இனி, வட மாநிலங்களில் காணப்படும் மரங்கள், பூச்சியினங்கள் பற்றிய தகவல்கள் பதிவேற்றம் செய்யப்படும்.

இத்தகவல்கள் புத்தக வடிவிலும், 'இ-புக்' வடிவிலும் இருந்தன. விவசாயிகள் ஒவ்வொரு இடமாக தேடிச் செல்வதை தவிர்க்க, சுற்றுச்சூழல் தகவல் மையம் மூலமாக, மொபைல் செயலி அறிமுகம் செய்துள்ளோம்.

மத்திய அரசின் 'டிஜிட்டல் இந்தியா' நடவடிக்கையில் இதுவும் ஒன்று.

இச்செயலியை இலவசமாக பதிவிறக்கம் செய்து கொள்ளலாம். தற்போது, தகவல்கள் ஆங்கிலத்தில் உள்ளன. தமிழ் மற்றும் மலையாளத்தில் மொழி மாற்றம் செய்யும் பணி நடந்து வருகிறது; ஆறு மாதத்தில் பதிவேற்றம் செய்யப்படும். இவ்வாறு, அவர் கூறினார்.

