Neem and bio-botanical pesticides for mosquito control: safer alternatives to synthetic pesticides

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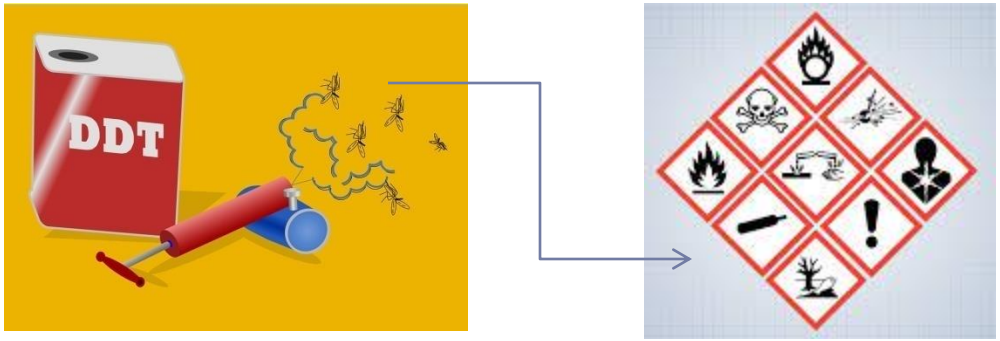
Problems Associated with use of Synthetic Pesticides

- Synthetic chemical pesticides are not only toxic to the target insects but hazardous to non target organisms like humans, animals and environment

- Due to hazards to non target organisms and environmental contamination, Environmental Protection Authorities trying to promote effective alternatives to DDT and synthetic pesticides



Development of Innovative Formulations for Medical vectors

Mosquitoes – Vectors of Dengue, Chikungunya, JE, Malaria and Filariasis

Aedes aegypti

Aedes albopictus

Culex quinquefasciatus

Anopheles

A. aegypti Dengue and Chikungunya - Active during day

A. albopictus

Anopheles culicifacies - Malaria - Active in dark

Culex quinquefasciatus - JE

Bio-Botanical pesticides are safe alternative to synthetic chemicals for mosquito management

Neem and Bt. as bio-botanical pesticides for mosquito control

- Bio-botanical pesticides are gaining popularity as safer alternative to chemical pesticides
- Bio-botanical pesticides are safe to human, non target organism and environment.
- Neem (*Azadirachta spp.*) & *Bacillus thuringiensis* (Bt.) are potential bio-botanical insecticides for controlling mosquitoes and agricultural insects.

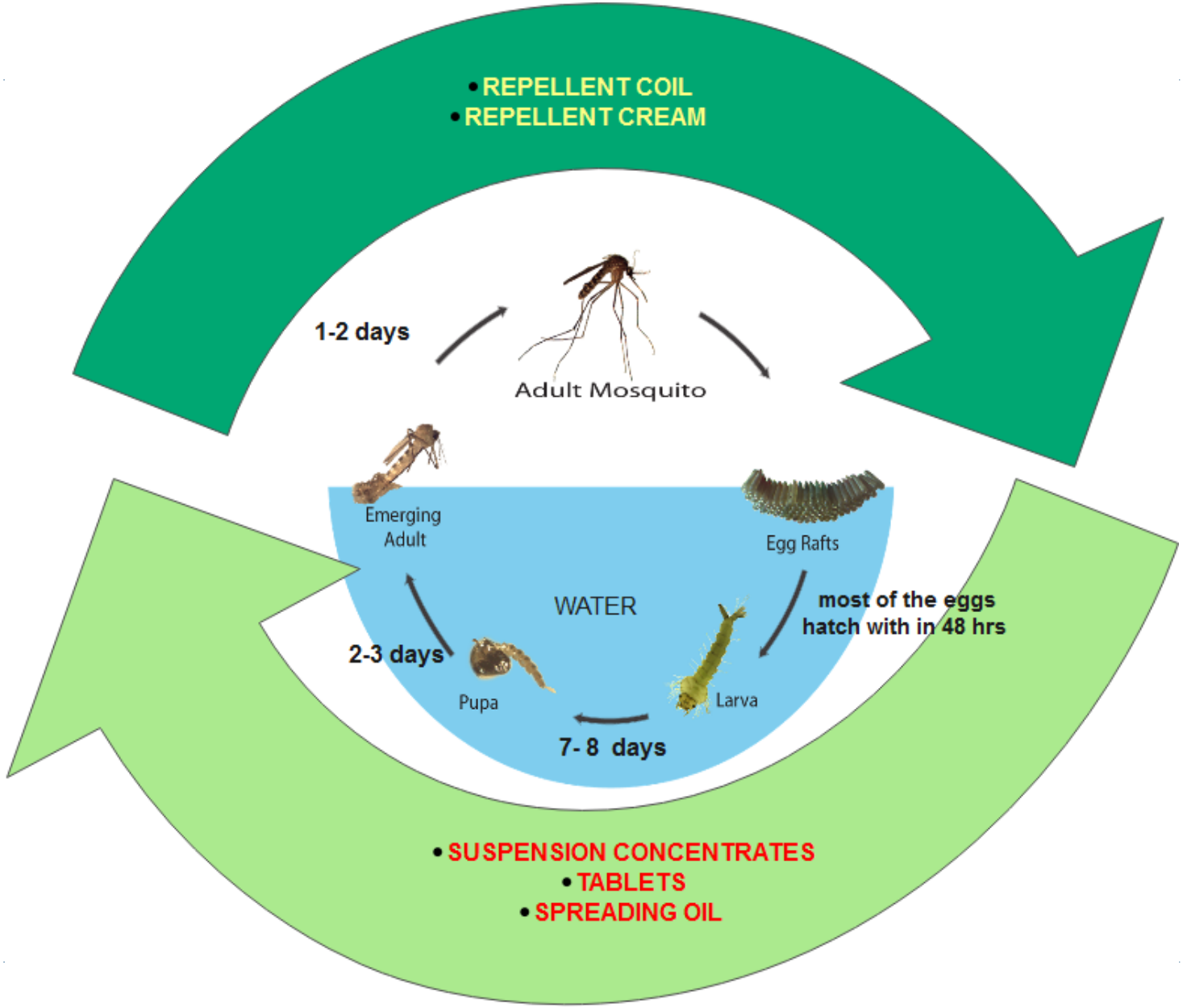
Azadirachta indica

Bacillus thuringiensis

Characteristic features of herbal mosquito control products

- Active components from plant origin.
- Non-toxic and safe to human beings.
- Easily and abundantly available raw materials.
- Economical.
- Good repellent and knock-down effect against mosquitoes.

Products for mosquito control throughout life cycle

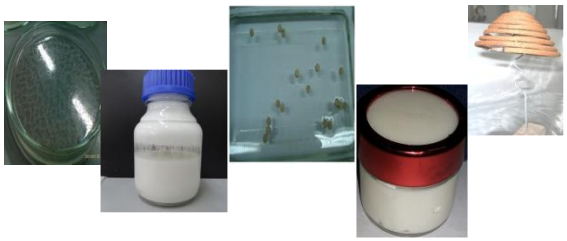


Bio-botanical formulations developed by IPFT

Non-POPs alternatives to DDT(UNIDO sponsored project) :-

I. Neem based formulations

- ✓ Surface Spreading
- ✓ Suspension Concentrate
- ✓ Tablets
- ✓ Mosquito repellent cream
- ✓ coil formulations



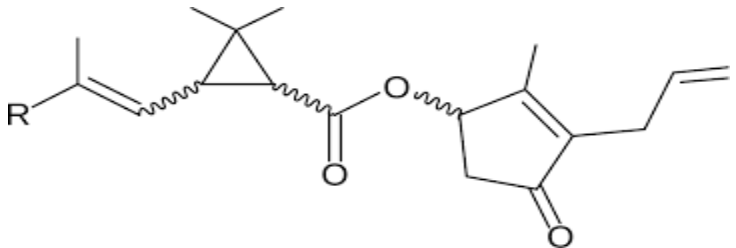
II. *Bacillus thuringiensis* based formulations

- ✓ Suspension Concentrate
- ✓ Wettable Powder
- ✓ Surface Spreading formulations

Technologies transferred to HIL for commercialization for mosquito control applications

Shortcomings of synthetic pesticide based coil formulations

- Mosquito coil formulations presently available in the market are based on synthetic pesticides (Allethrin)
- Their long term use poses risk of asthma, allergy, eye irritation etc to human being.
- Mosquitoes develop resistance upon prolonged use.



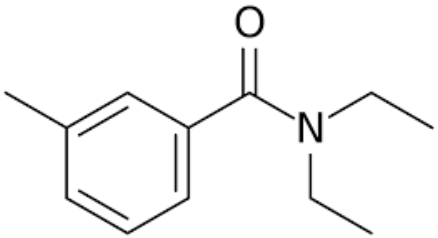
Neem based Coils developed by IPFT

- Coils developed by IPFT are neem and botanical synergist based.
- Do not contain any synthetic, chemical pesticide.
- User and environment friendly

Neem based Mosquito coils

Mosquito Repellent Cream

Mosquito repellents lotions and creams available are DEET based.



- Prolonged use may cause allergies, skin rashes, irritation or redness.

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Botanical based mosquito repellent cream developed by IPFT

Safer and user friendly alternative to chemical repellents, neem based mosquito repellent cream is developed.

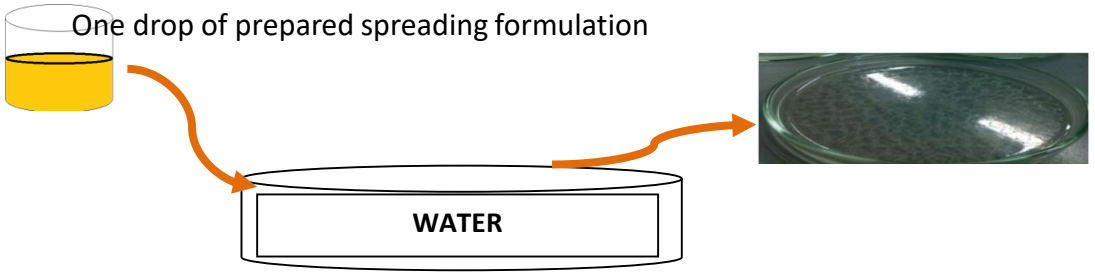
- This green product is based on natural composition without using any synthetic active ingredients
- free from adverse effects to user.
- The bio-efficacy results indicate very good effuicacy i.e. Upto 95% repellency

Mosquito Repellent Cream

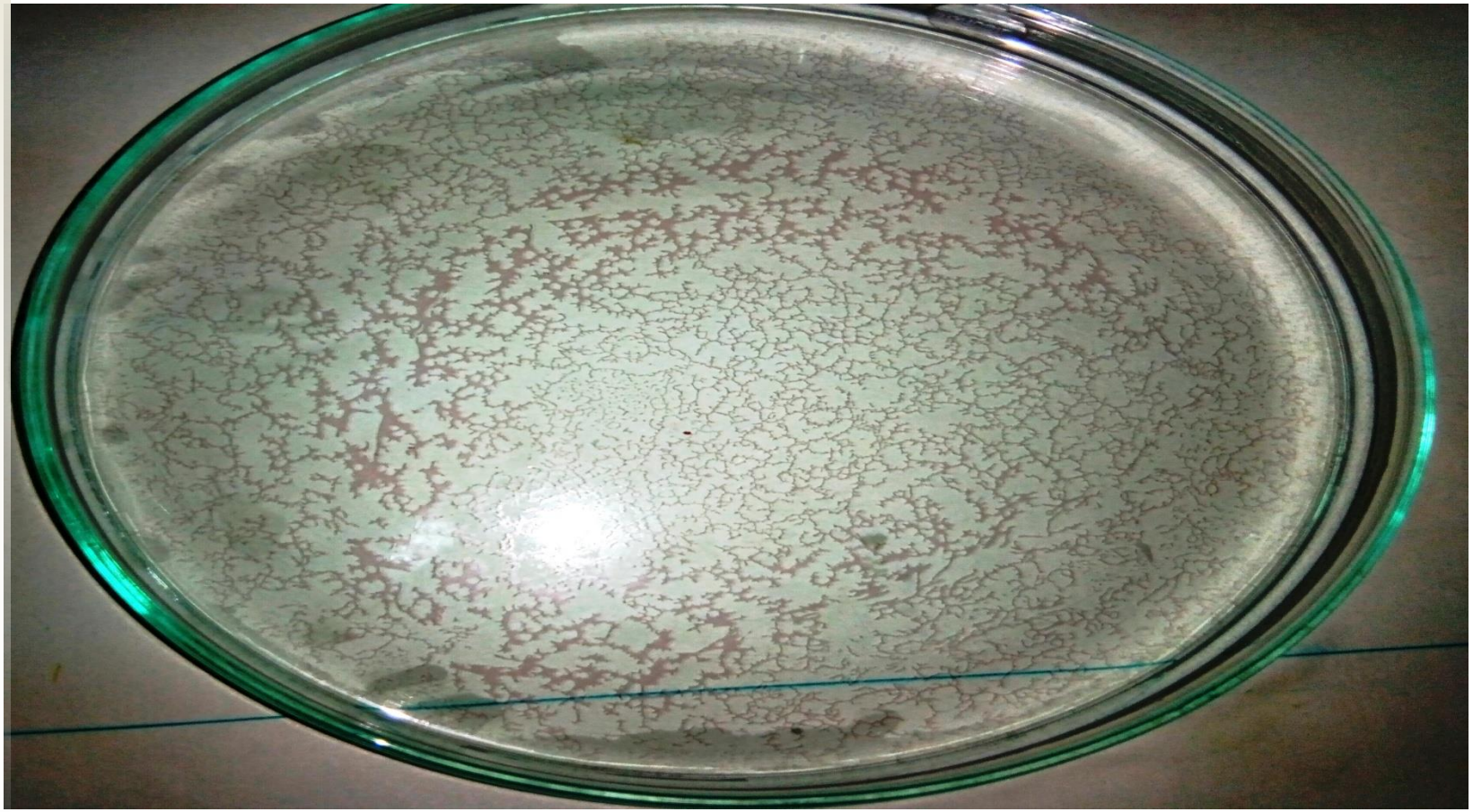
NEEM BASED SURFACE SPREADING FORMULATION DEVELOPED BY IPFT

- Spreading oil formulations may BE directly applied on water surface
- spreads to the water surface within a few seconds.

- The layer of the active ingredient maintains on the water surface for larvicidal effect



SPREADING OIL FORMULATIONS



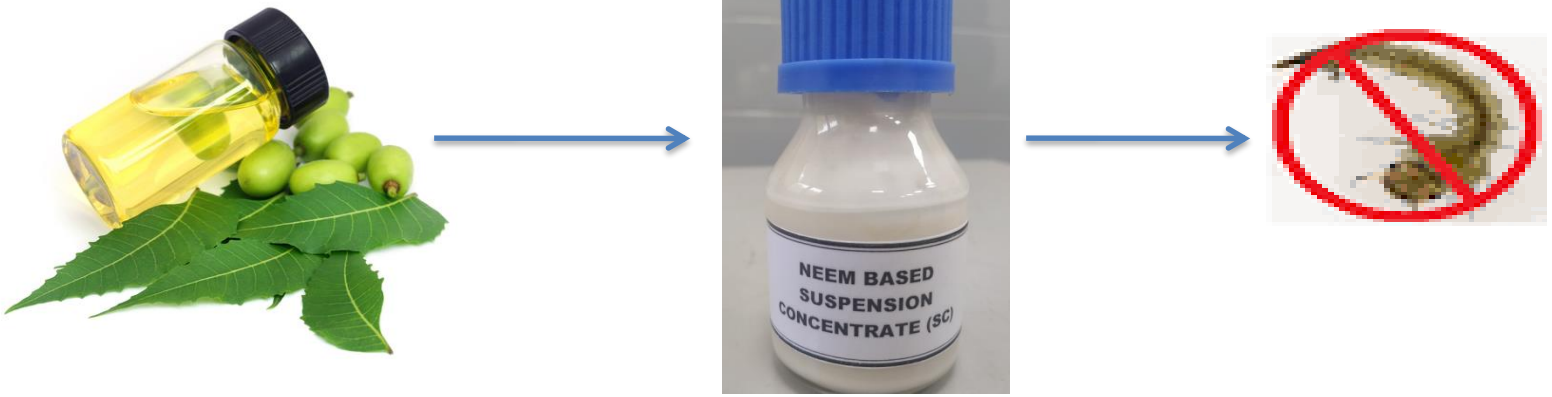
NEEM BASED TABLET DEVELOPED BY IPFT

- Biodegradable sustained release larvicidal tablet.
- Effective in vector management through controlling mosquito at the immature larval stage.
- Safer to the environment, as compared to other chemical larvicides.
- Effective against Culex quinquefasciatus and Aedes albopictus larvae in aquatic environment.
- 100 % mortality after 24 - 48 hours.

BOTANICAL TABLETS

Neem based suspension concentrate developed by IPFT

- Neem based formulations conventionally being used emulsifiable concentrates etc for controlling insects and mosquitoes.
- slvent based EC formulation has drawbacks like phyto-toxicity, flammability, environmental contamination and dermal toxicity.
- Water based formulation may be a safer alternative to EC formulation.



Characteristics of Neem SC

- Non flammable
- Non toxic for non- target organisms
- Efficient in low quantities
- Prevent mosquito egg laying and hatching in water

Bt Formulations for mosquito larvae control

- *Bacillus thuringiensis var. israelensis* (Bti) formulations decveloped for larvae control
- Spreading formulation, suspension concentrate (SC) and wettable powder (WP) formulations developed
- Formulations have adequate efficacy against mosquito larvae.

OTHER BIO-BOTANICAL FORMULATIONS

Following bio-botanical formulations also developed by IPFT for mosquito control:

- Neem based Microemulsion
- Neem base WDG
- Essential oil based mosquito repellent lotion
- Botanical based nano-encapsulated formulations

PRECAUTIONS FOR PREVENTION FROM MOSQUITOES

USE REPELLENT | Pae-diatrician certified, child-friendly roll-ons, sprays, creams etc

WEAR LONG CLOTHES | Long-sleeved shirts/long pants, especially while playing in the open

TIMINGS | Mosquitoes active during early morning and evening, so avoid these timings

LIGHTS | Mosquitoes love darkness + humidity, so keep homes well lit and ventilated

SAFETY | Use mosquito screens on windows to ensure safety inside the home

BREEDING | Stop mosquito breeding by eliminating breeding grounds in water tanks, air coolers, etc

Pesticides, ok, but health and environment first

THANK YOU AND STAY SAFE