Botanical Biopesticides:
A Paradigm Shifting Biosolution for Sustainable Crop Protection

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ABIM CONFERENCE
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Ecoflora Agro
Premier Botanical SOLUTIONS for sustainable crop protection
Our Certified Company
We believe in healthy and sustainable agriculture
Our purpose:
Crop and Life Protection.
Referred to by WIPO* as "The Secret Garden of Innovation and Development"

*World Intellectual Property Organization
Ecoflora Agro is a technology-based company with 18 years of experience developing unique botanical solutions for sustainable crop protection.
Located in the Heart of the Americas
Premier Botanical Solutions for Sustainable Crop Protection

Insecticides, Miticides, and Repellents

Fungicides, Protectants, and Bactericides

Molluscicides
The insect's world is chemical

Chemical compounds determine the relationship between the plants and other groups of organisms associated to them.
Plants evolved to have chemical defenses against competitors and pest organisms (secondary metabolites).
Plants developed biochemical signals to attract and maintain beneficial organisms associated to them.
Most of synthetic pesticides, negatively affect or suppress the auxiliary and beneficial insects that may have adapted to agro-ecosystem.
The Paradigm: Chemical pesticides are the most effective solution for pest control.
Comprehensive Benefits of Plant Extracts in Crop Protection

• A lower dependence on Synthetic Chemical Control to achieve a competitive Crop Protection.

• A significant reduction of risk among pest species, to develop Resistance mechanisms, as a result of a lower Selection Pressure.

• An important reduction of Pest Management Costs, resulting from a lower infestation pressure, lower accumulated residues and damage, and better crop protection and yields.
Comprehensive Benefits of Plant Extracts in Crop Protection

• A significant **increase in the Conservation and Enhancement of CROP BIODIVERSITY** including non-target organisms which in turn, **make a tremendous contribution** to the overall Crop Protection and production.

• **Higher Crop Protection standards** can be attained based on the **application of Plant Extracts** resulting from the **positive interactions** between botanical products and beneficial macro and microorganisms in green house and field crops.

• **Lower toxicological and eco-toxicological risks**, for field workers, consumers, living organisms and the environment.
Comprehensive Benefits of Plant Extracts in Crop Protection

- A more even, **stable and permanent establishment of Beneficial Macro-organisms** associated to Green House and Field Crops where the application of Plant Extracts and Botanical Pesticides is broadly adopted and preferred by growers.

- A **friendlier agro-ecosystem to promote the establishment and growth of beneficial microorganisms**, associated to both: the crop plant itself, as well as to the soil environment where the crop plants occur.
Botanical Pesticides have complex modes and mechanisms of action, which combine a diversity of Lethal and Sub-Lethal Effects, such as:

- Anti-feeding
- Anti-egg-laying effect
- Anti-mating (*pheromone interference effect*)
- Repellent Effect
- Deterrent Effect

These effects combined, can be more than enough to ensure a high standard of *Crop Protection*, even if the lethal effect is medium, low, or negligible.
TECHNICAL PROFILE
SPIDER WEB ANALYSIS

- Abamectine
- Captiva
- Milbemectine

Residual effect (1)
0% = 0 days
25 = 1 - 3 days
50% = 3 - 7 days
75% = 7 - 15 days
100% = More than 15 days

% Mortality larvae direct application 48 haa (4)

% Mortality adult treated surface 48 haa (3)

Toxicological category
0% = Category I Extremely toxic
25% = Category II Highly toxic
75% = Category III Moderately toxic
100% = Category IV Slightly Toxic

% Predatory mites (Phytoseiulus persimilis) survival 48 haa (2)

% Anti feeding effect 9 daa (3)

% Anti egg laying effect 72 haa (3)

% Mortality Larvae treated surface 48 hha (3)

% Mortality adults direct application 48 haa (5)

Methodologies adapted and developed at Neotropical Research Center by Camilo Chacón R&D Manager, Ecoflora Agro
<table>
<thead>
<tr>
<th></th>
<th>Abamectina</th>
<th>Captiva</th>
<th>Milbemectina</th>
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<tbody>
<tr>
<td><strong>CPI</strong></td>
<td>228.447</td>
<td>636.681</td>
<td>494.497</td>
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**Crop Protection Index (CPI)**
Sustainability Index

QUALITATIVE PROFILE: CONTRIBUTION OF PLANT EXTRACTS TO SUSTAINABLE AGRICULTURE

- Crop Biodiversity Conservation
- Impact on Fossil Fuel Consumption/CO2 release
- Survival of Beneficial Insects in the crop
- Conservation of Natural Resources (water, soil, etc.)
- A Healthier Working Environment
- Opportunity for International Certifications
- Contribution to clean food production
- Access to International Food Markets
- Protection to the surrounding Wild Life
- Survival of Beneficial Microorganisms

Legend:
- CapsiAll 1 cc/L
- Finitex 1 cc/L
- Abermectina
- Milbemectina
The use of **Ecoflora’s Plant Extracts** contributes to the conservation and management of Biodiversity (including pollinators, biocontrol and beneficial microorganisms) as well as to agro-ecosystems sustainability.

Through their lethal and sub-lethal effects, these are paradigm shifting tools for effective and sustainable IPM and ICM.
The Paradigm Shift

- "Crop and life protection" are more important than pest control.
- Most Botanical biopesticides / plant extracts have a higher "Sustainability Index" and may even have a higher "Crop Protection Index" than chemical pesticides.