



TECHNICAL SHEET

A NEW AND EFFICIENT VIROSOFT^{CP4} FOR THE CODLING MOTH CONTROL

1- BIOINSECTICIDES BASED ON BACULOVIRUSES .

For last decades, baculoviruses (granulosis virus and nuclear polyhedrosis virus) have received great attention as **potential microbial insecticides**. The reason for that is their high insect host specificity. In agriculture and forestry, numerous nuclear polyhedrosis viruses and some granulosis viruses are **recognized to be most effective in controlling insect pest populations**.

Baculoviruses are occluded virus and so are **very safe for humans, birds, beneficial insects like bees, any other insect than the one targeted or vegetation**. In agriculture and forestry, a number of granulosis viruses and nuclear polyhedrosis viruses are recognized to be most effective in controlling insect pest populations.

Over the years, some insect pest populations resistant to chemical insecticides have been identified. **Baculoviruses have the capacity to adapt to the insect hosts** so much so that the issue of resistance becomes of no concern. This characteristic represents an **enormous advantage** to the long term sustainability of bio-insecticides based on baculoviruses.

For all these reasons a number of nuclear polyhedrosis viruses and some granulosis viruses have been produced and **bioinsecticides based on baculovirus used widely for many years in the world to control several**

insect pests.The residues of these baculoviral insecticides are of no danger to the environment or human health.

In this context and based on a proven technology, **Virosoft^{CP4}** produced by BioTEPP Inc, is **effective, safe and eliminates** insect resistance that can be found with the use of other control technology.

2- VIROSOFT^{CP4} IS A PRACTICAL AND ECOLOGICAL SOLUTION .

Virosoft^{CP4} bio-insecticide is compatible with other ecological control methods and can be applied with conventional equipment .This viral insecticide works in complementarity with beneficial organisms and other pest biocontrol products.

The granulovirus is used **against each generation of codling moth larvae** .The baculovirus gets into the insect'gut and dissolves in the alkaline gut lining.It replicate itself in the intestinal cells and gets into the insect's haemolymph and fat body.The granulosis disease progress over some days (5 to 10) .Granulosis infected larvae change color,dissolve and swell,releasing the granulosis occlusion particles.This granulosis is **extremely toxic to codling moth larvae** .

3- A NEW VIROSOFT^{CP4} MORE STABLE AND MORE EFFICIENT AGAINST CODLING MOTH:

A new **Virosoft^{CP4}** has been developed by BioTEPP Inc. This viral **insecticide based on the codling moth granulosis virus has been developed to control it's host, an insect pest found in** all ecozones in North America.

Although this technology has already been used in the world, **Virosoft^{CP4} is the first baculoviral insecticide product** against Codling moth **to be jointly registered in United States and Canada.**

Furthermore, this bio-insecticide responds to the requirements of the Foods Quality Protection Act (FQPA) . It has also different organic recognitions and is OMRI listed (bti-3087).

4- A NEW CONCEPT FOR THE VIROSOFT^{CP4} PRODUCTION

- A NEW ISOLATE CODLING MOTH GRANULOSIS VIRUS :

The codling moth granulosis virus used in the **Virosoft^{CP4}** production was isolated from a natural granulosis infected Codling moth larvae collected in the Canada in 1996.**This isolate is highly infectious and pathogenic for the codling moth larvae .**

Thus, an important fact about Virosoft^{CP4} is that it is using a baculovirus which has been isolated from the area in which it will be used in its natural form. It is not an imported virus nor is it genetically modified.

- AN IMPROVED PROCESS ENSURING LONG TERM EFFICACY.

Large scale production of baculoviruses is achieved by mass rearing larvae of the susceptible insect. The production of **Virosoft^{CP4}** is based on a similar method.

Biotepp's new team has developed a modified process for the rearing of granulosis-virus infected Codling moth larvae and for collecting the granulosis virus.This particular modification ensures to obtain **a pure Virosoft^{CP4} suspension with a very high and stable insecticidal potency.**

5- THE NEW VIROSOFT^{CP4}, A VERY STABLE AND EFFICIENT BIOINSECTICIDE PRODUCT .

The **new Virosoft^{CP4}** suspension is highly stable and very effective against Codling moth. As mentioned on the labels, this bioinsecticidal suspension contains 4×10^{13} occlusion bodies per liter, representing 0.07% of granules inclusions in this baculoviral suspension .

A- Highly concentrated.

As specified on the label, the new **Virosoft^{CP4}** suspension contains 4×10^{13} occlusion bodies per liter ,**the highest concentration of viral bodies of all similar viral insecticides, thus increasing significantly it's efficacy.**

B- Highly stable and efficiency.

Bioteests have recently been done, both in US under supervision of Dr L.Lacey (USDA Research Center in Yakima) and in Canada ,by Drs J.Cossentine and C.Vincent (Agriculture and Agri-Food Canada), to evaluate the stability and effectiveness of the new **Virosoft^{CP4}** in controlling the codling moth larvae.

Results showed that **Virosoft^{CP4}** stored at 35°C (95°F) for two weeks and diluted at 1:1000 and 1:100 000 provoked 100% mortality of neonate codling moth larvae. Furthermore, **Virosoft^{CP4}**, stored for 13 weeks at at 25°C (77°F) and of 35°C (95°F), still diluted at 1:1000 and at 1:100 000 provoked respectively a 100% and a 93% mortality level of neonates. **Virosoft^{CP4}, diluted for spraying, is highly stable and efficient.**

C- Highly efficient.

Field tests were undertaken in US by Dr J. Brunner, Entomology Director at the Washington State University and by Dr L. Lacey, Director of the Yakima USDA Laboratories and in Canada by Dr J. Cossentine of the Pacific Agri-food Research Center in Summerland, British Columbia and by Dr C. Vincent of the Horticultural R&D Center in St-Jean-sur-Richelieu, Quebec, Canada.

Results show:

- **A high codling moth larvae mortality.**
- **A considerable codling moth population reduction.** For example the count of adult moths trapped in control plots both after first and second generation were as high as 270. In **Virosoft^{CP4}** treated plots the count of captured adults were as low as 3 to 30 after the first generation and only 0.5 to 4.5 after the second generation). **A more than 98% codling moth population reduction.**
- **An efficient fruit protection against codling moth.** Compared to the untreated plots, **Virosoft^{CP4}** protected 50% to 66% more fruits. (Three additional to the usual four applications of **Virosoft^{CP4}** gave an even higher protection).

- A very significant residual activity of Virosoft^{CP4} against codling moth of up to 14 days after spraying.

- THE NEW VIROSOFT^{CP4} IS AVAILABLE :

Thus , the new Virosoft^{CP4} bio-pesticide offers an efficacy that compares to chemical insecticides without the related potential problems. The insecticidal potency of the **product is evaluated for each production batch.**

Furthermore, to warrant it's high potency, Virosoft^{CP4} will now be sent in a frozen suspension, ready to be mixed, for the protection of apples, pears, plums and walnuts against Codling moths . When received, the best conditions to insure its stability and morbidity strength are that it be **kept frozen or at one (1) degree Celsius (thirty-four (33) degrees Fahrenheit)**.

The new Virosoft^{CP4} a purely natural product has different organic recognitions and is OMRI listed (bti-3087). It can be applied up until the time of harvest and the delay for re-entry into the fields after a treatment is of only four hours.

DIRECTIONS FOR VIROSOFT^{CP4} USE :

-This microbial insecticide contains *Cydia pomonella* granulovirus. Viral occlusion bodies must be ingested by Codling moth larvae to be effective;

-**Virosoft^{CP4}** application should be timed so that early-instar larvae on the surface of the leaf or fruit come in contact with the granulovirus before entering the fruit. This product is to be applied by ground equipment only;

-For each application: **250 ml (3.2 fl. oz)** of Virosoft^{CP4} will treat 2.5 acres (one hectare). It's about 10¹³ occlusions bodies per 2.5 acres;

-**Applications** should be made in sufficient volume of water to ensure thorough coverage of the fruits and leaves.

--For better results,**at least 6 or 7 applications of Virosoft^{CP4}** are recommended (**One application a week**).

- **Make the first Virosoft^{CP4} application at 210 degree-days (F) after biofix** as determined by first consistent moth catch in pheromone trap;

- **Apply diluted Virosoft^{CP4} with jet or conventional sprayers just prior or at egg hatching and thereafter, another 6 or 5 times in seven to ten days intervals,** depending on temperature ;

- **Virosoft^{CP4}** can be applied with stickers like NU-Film ,UV protectants and with other pest control products.

- **It is recommended** that the viral insecticides be applied in late afternoon or on a cloudy day to avoid direct exposure to sunlight.

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