BIO EFFICACY TRIAL REPORTS OF OIKOS 3.0% EC 30000PPM BRAND OF SIPCAM, ITALY, TECHNICAL MATERIAL AZADIRACHTIN BY FORTUNE BIOTECH LIMITED, INDIA

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SIPCAM TRIALS ON NEMATODES

In controlling of nematodes the study has been conducted by M/s Sipcam by using Fortune Aza Technical supplied by Fortune Biotech Limited and EC formulation by SIPCAM spa, Italy under the Brand Name of *OIKOS*

In the Mediterranean area and in particular in Italy the practice of controlling nematodes has become widespread in the last decades.

One of the important strategies against nematodes has always been soil fumigation, especially using methyl bromide.

Later on studies were conducted in order to substitute and integrate fumigants with non volatile nematocide substances, mainly carbamates and organophosphorous substances, which present an easier application but are less effective than fumigants.

The imminent elimination of methyl bromide, foreseen for the industrialized countries for 2005 and the growing attention to environment and food security boosted the research of low environmental impact techniques for integrated strategies of defence from nematodes and soil parasites in the last few years.

For the same purposes, Sipcam Italia Spa developed Oikos, a product based upon azadirachtin, a natural substance extracted from Neem seeds, whose effects on some species of nematodes were well known.

In order to better understand Oikos mode of action on nematodes and its efficacy, Sipcam developed a research programme on the national territory. The most representative experts participated to this research.

The studies conducted are considered to be basic for an accurate evaluation of Oikos real applicative possibilities of controlling nematodes in different environments and crops.

Azadirachtin is a new botanical insecticide. Its active ingredient comes from the Neem tree (**Azadirachta indica** Juss) seeds and it is formulated as emulsifiable concentrate. The azadirachtin properties and uses are published in scientific papers by reputable researchers. In this paper the physical-chemical characteristics, mode of action, toxicological and ecotoxicological profile are summerised. Its favourable profile permits to be used in biological or Integrate Pest Management programs.

In vitro action of Oikos against eggs and second stage juveniles free or included in egg masses of **Meloidogyne incognita.** The results of a trial carried out **in Vitro** to verify the effect of Oikos, azadirchtin 32 g/l, (SIPCAM Spa), on eggs and second stage juveniles (JJ2) of **Meloidogyne incognita** (Kofoid e White) Chitwood, free or included in egg

masses, are reported. Some aqueous concentrations of the product, among 0.06 and 1%, were tested on unsegmented eggs, eggs with JJ2 and hatched JJ2 in small glass containers at dark conditions and constant temperature of 24^0C for periods varying between 12 and 20 days. The product resulted more effective on the unsegmented eggs, than on those with JJ_2 , with an evident action also at the lowest concentrations. The hatching rate of the unsegmented eggs was 30-70%, according to the concentration value Also on hatched larvae it has been recorded a reliable effectiveness, directly correlated to the concentration rate. Oikos showed more nematostatic properties than nematicidal ones. In fact the JJ_2 that were immobilized in contact with the product resumed in high percentage their mobility when transferred into pure water. The effectiveness of the product was also observed on the hatching larvae included into the gelatinous matrix.

Application of azadirachtin to control root-knot nematodes in tomato plastic house in Sicily. Results of a trial of nematode control against **Meloidogyne incognita** on tomato grown in a plastic house in Sicily indicated that a commercial formulation of plant extracts of **Azadirachta indica** was more suppressive than fenamiphos and ethoprophos. Azadirachtin treatment significantly reduced root galling and increased yield compared to the chemicals.

The efficacy of azadirachtin (Oikos) in the control of the root-knot nematode. **Meloidgyne incognita** on tomato. A field experiment, carried out in Campania, to asses the efficacy of an extract of **Azadirachta indica (**Oikos) in the control of the root-knot nematode, **Meloidogyne incognita** on tomato cv Centoscocche, indicated that it was as effective as Nemacur (fenamiphos), commonly and satisfactorily used in the area. The acidification of the nematicidal solution or the application of citric acid it self improved quantitatively and qualitatively the yield.

Strategies alternative to chemical soil fumigation for the control of the root-knot nematode **Meloidogyne incognita.** In 2002 an experiment was carried out outdoor on tomato to test the effect of neem oil applied by drip irrigation, in soil infested by **Meloidogyne incognita.** The efficacy of neem oil was compared with that of the green manure of **Raphanus sativus** var. oleifero sown before transplanting of tomato, with that of a chemical fumigant, 1,3 dichloropropene, and with that of a non volatile granular nematicide, fenamiphos. Yields obtained in plots treated with neem oil as good as those observed in the plots treated with the chemicals. Nematode infestation on the roots was significantly reduced, compared to the control only when either 1,3 dichloropropene or fenamiphos were applied. In effective was **R. sativus** cultivated in autumn – spring cycle, before tomato.

Efficacy of Oikos I the control of **Heterodera carotae** on carrot. A control trial was undertaken to evaluate the nematicidal effect of Oikos, an azadirachtin containing neem extract against Heterodera carotae on carrot. The product performed as well as fenamiphos. Nevertheless, the suppression of egg numbers observed in the cysts in the plots treated with Oikos, might indicate a negative effect of Oikos on the prolificacy of the nematode, with benefit on the next carrot crop.

Efficacy of azadiractin against Heterodera glycines. Soil application of azadirachtin, were not properly applied, failed to control Heterodera glycines Ichinohe on soybean. However, it seems that the product has a suppressive effect on the nematode prolificity.

Side effects of Oikos on tomato growth. A trial was carried out a glasshouse at 28^0C to evaluate the eventual side effects of different doses of azadirachtin on the growth of tomato in pots failed with steamed sand. No phytotoxic symptoms, nor growth enhancements appeared during the ten weeks test.

The experimental works included in this collection were conducted in laboratories and in field conditions; they show that Oikos efficacy is valuable against both eggs and second stage larvae, free or included in **Meloidogyne incognita** eggbags.

The efficacy is directly proportional to the concentrations used. However, in general, the activity towards nematodes in some stages, is more nematostatic than nematicidal.

Trials pointed out that productive levels reached by crops treated with current standard synthetic chemicals.

The experiments carried out on carrot and soy-bean against cyst nematodes **Heterodera carotae** and **H.glycines** show a remarkable reduction of the number of the eggs included in the cysts; this foreshadows lower intensities of infestations for the years to come.

The application technique is of fundamental importance for magnifying the activities on nematodes. Azadirachtin should be applied by micro irrigation.

This technique, to be used after the irrigation with water with the addition of acids, enables a regular distribution along root systems.

In addition, even trials conducted at higher doses do not cause phytotoxic effects on treated crops, on the contrary they suggest the possibility of a greater and healthier development of plants as the result of applications.

Besides, due to its easy distribution in the soil through fertirrigation, Oikos can carry out a valid control of numerous phytophagous species of aerial parts of horticultural and floricultural crops.

In conclusion Oikos, for its properties and for the demonstrated efficacy, can be included in programmes of eco-efficient production, in particular in Integrated Pest Management Strategies that will soon open a new age in the field of nematodes control.