

## EFFICACY OF TENEKIL AGAINST NEMATODES PARASITISING CHILLIES (*CAPSICUM FRUTESCENS*)

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An indigenous candidate nematicide, *Tenekil* (Polychlorinated petroleum hydrocarbon) was tried for controlling plant parasitic nematodes attacking chillies (*Capsicum frutescens*) grown at the Applied Biology Experimental Farm of the PCSIR Laboratories, Karachi. *Carbofuran* (*Furadan* 3 G) and *Aldicarb* (*Temik* 10% granular) were used as standard nematicides. At the conclusion of the experiment after 16 weeks, the number of plant parasitic nematodes recovered from *Tenekil*, *Carbofuran*, *Aldicarb* and control rows was 120, 110, 160 and 380 per 100 ml of soil, respectively. The average fruit yields were 357, 542, 443 and 190 g in the corresponding sets. The height of the plants and fresh and dry weights of the roots were inversely proportional to the number of nematodes recovered from soil.

### INTRODUCTION

There is scanty awareness about plant parasitic nematodes in Pakistan, although the climate and soil types of most parts of the country provide favourable combinations for the activity and reproduction of majority of the reported plant pathogenic nematodes. Surveys conducted so far have indicated the presence of highly virulent forms of nematodes in Pakistan associated with several economically important agricultural and horticultural crops. Although the nematode problem is severe, it is only in some cases that a nematicide is used to check the loss caused by nematodes. Nevertheless, with the growing realization, more and more persons are getting to become nematode-conscious, and some firms have already started marketing imported nematicides. Since these compounds are costly and out of the reach of the common farmers, the need of an indigenous preparation to control nematodes was felt. Considering that a broad spectrum pesticide will be of greater benefit to farmers, it was thought feasible that *Tenekil* (formerly *Petkolin*) which was developed for the control of sugarcane *Pyrilla* and sucking-insects [1, 2, 3] and has also been found effective against some nematodes [4, 5] should be tried for evaluating its efficacy against a wide variety of nematodes attacking different crops in Pakistan. *Tenekil* is a polychlorinated petroleum hydrocarbon obtained from oil refineries. It has 60-62% chlorine content, 0.30% acidity, 162 as flash point and is non-toxic to plants upto 1%. Its mammalian toxicity is: oral LD 50 = 4245 and dermal LD 50 = 9000 mg/kg [3].

The present paper reports the results of an experiment which was conducted on chillies (*Capsicum frutescens*) at the experimental field of PCSIR Laboratories, Karachi as a part of a series to test the efficacy of this compound on a variety of agricultural and horticultural crops. *Carbofuran* (*Furadan* 3 G) and *Aldicarb* (*Temik* 10% granular) were taken as standard nematicides for the sake of comparison.

### MATERIALS AND METHODS

A plot of land measuring 11.4 x 9.6 meters was selected at the Experimental Field of the PCSIR Laboratories, Karachi. After amending the soil with farmyard manure and preparing the bed, 12 strips (rows) each 8 m long and 1 m broad with an interspace of 36 cm were made for the four treatments viz. *Tenekil*, *Carbofuran*, *Aldicarb* and untreated control set. A 36 cm strip on all the four sides of the plot served as guard space. The rows and interspace and guard spaces were kept weed-free throughout the experimental period. Hand hoeing was done when needed and care was taken to avoid cross transfer of soil from one row to the other.

Soil samples were taken separately from each row in polythene bags for the determination of the initial number of nematodes, i.e. the pretreatment count. After this, *Tenekil* was applied at a rate of 5 ml/plant (100 ml per row) while 5 g per plant (100 g per row) of *Carbofuran* and *Aldicarb* were used and the strips were irrigated. Two week-old seedlings of chillies (*Capsicum frutescens*) raised

in nematode-free soil in pots were transplanted to the experimental site after one week of treatment at a rate of 20 per row at a distance of 45 cm from each other. Care was taken to transfer the seedlings of approximate height and thrift. The treated and control rows were randomised. Each row received irrigation separately but all on the same day at regular intervals.

After 16 weeks, soil samples were taken from each row. Harvesting was recorded and thrift and phytotoxicity, if any were noted. After this four plants of approximate size from each row were uprooted. Roots were excised and their fresh weight was recorded. Dry weight of the roots was measured by weighing, drying in an oven at 90° for 24 hr. and reweighing.

Extraction and enumeration of nematodes in soil were done after Oostenbrink [9] with slight modification. Depending upon nematode density in water after extraction, either the whole suspension was counted under stereoscopic binocular microscope or 5, 10, 25 ml samples of 100 ml were examined.

#### RESULTS AND DISCUSSION

In furrow application, *Tenekil*, *Carbofuran* and *Aldicarb* significantly suppressed the population of plant parasitic nematodes, *Hoplolaimus indicus*, *Tylenchorhynchus* spp., *Helicotylenchus multicinctus* and *Pratylenchus coffeae*. After 16 weeks, most significant treatments were with *Tenekil* and *Carbofuran* (calculated value of 't' at 3 df and .05 p is 3.57 and tabulated value at the same level is 3.182 respectively, whereas in *Aldicarb*, the

calculated value is 2.329 at 3 df and .05 p and that tabulated value 3.182; the t value is not significant. The average height of plants (P = .05) was 35 cm in *Tenekil*, 35 cm in *Carbofuran*, 38 cm in *Aldicarb* and 22 cm in control. The average yield (P = .05) per plant was 357 g in *Tenekil*, 542 g in *Carbofuran*, 443 g in *Aldicarb* and 190 g in control. The average fresh weight per plant was also more in *Carbofuran*, *Tenekil* and *Aldicarb* than in the control (Table 1). The results of the experiment indicate that *Tenekil* significantly suppresses the population of nematodes as *Carbofuran* and *Aldicarb* did. Naqvi *et al* [8] reported *Tenekil (Petkolin)* to have been effective in controlling parasitic nematodes. Khan and Naqvi [6] noted good control of spiral nematodes by using *Oxamyl* and *Carbofuran*. Recently Khan *et al.* [7] have used *Tenekil* for providing a protective coating on banana rhizomes against plant parasitic nematodes. Hafiz and Raski [5] applied *Aldicarb* and *Phenamiphos* to control *Xiphenema index* and noted these chemicals significantly reduced the population. These authors also observed better control by *Phenamiphos* than by *Aldicarb*. Brodie [4] applied *Carbofuran*, *Aldicarb*, *Phenamiphos*, *Ethoprop* and *Oxamyl* nematicides to control the population of *Globodera rostochiensis* and noted that these compounds are effective in suppressing the population of nematodes.

The results of present experiment provide evidence that *Tenekil (Petkolin)* is an effective nematicide comparable with *Carbofuran* and *Aldicarb*. However, in view of its indigenous characteristics and better cost benefit ratio, *Tenekil* makes a better choice.

Table 1. Effect of *Tenekil*, *Carbofuran* and *Aldicarb* on the number of nematodes, (height, yield of plants, fresh and dry weight of roots after 16 weeks of treatment)

| (a) Nematode species                      | Number of nematodes per 100 ml soil (% of control) |                   |                 |         |
|---|--|-------------------|-----------------|---------|
|   | <i>Tenekil</i>                                     | <i>Carbofuran</i> | <i>Aldicarb</i> | Control |
| <i>Helicotylenchus multicinctus</i>       | 50 (35.7)  | 40 (28.5)         | 80 (57.1)       | 140     |
| <i>Hoplolaimus indicus</i>                | 20 (18.1)  | 30 (27.2)         | 40 (36.3)       | 110     |
| <i>Tylenchorhynchus</i> spp.              | 20 (28.5)  | 20 (28.5)         | 10 (14.2)       | 70      |
| <i>Pratylenchus coffeae</i>               | 30 (50.0)  | 20 (33.3)         | 30 (50)         | 60      |
| Total                                     | 120 (31.5)   | 110 (28.9)        | 160 (42.1)      | 380     |
| (b) Average height of plants (cm)         | 35   | 39                | 38              | 22      |
| (c) Average yield per plant (g)           | 357  | 542               | 443             | 190     |
| (d) Average fresh wt. of root/plant (g)   | 100  | 200               | 90              | 90      |
| (e) Average dry wt. of root per plant (g) | 58   | 90                | 50              | 30      |

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