Section IV: Field Crop Pests (includes cereals and vegetables)

ACUTE TOXICITY OF BOTANOCHEMICALS GINGER OIL AND THYMOL AGAINST PADDY LEAF FOLDER *Cnaphalocrocis medinalis* (GUENEE) (LEPIDOPTERA: PYRALIDAE)

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The rice leaf folder, *Cnaphalocrocis medinalis* Guenée (Lepidoptera: Pyralidae) is a predominant foliage feeder in all the rice ecosystems and widely distributed in rice growing area all over the world and losses may extend up to 80 per cent. Among the major pests that infests rice, rice leaf folder *Cnaphalocrocis medinalis* (Guenee) (Pyralidae: Lepidoptera) is an insect with migratory characteristics that poses a major pest threat to rice plants. Outbreaks of serious rice leaf folder infestations have been reported in many Asian countries, including India, China, Pakistan, Japan, Korea, Malaysia, Sri Lanka and Vietnam. Globally, up to 21 per cent loss of attainable yield in rice was estimated due to insect pests. In India, it was established that the attainable yield of rice reduced even up to 70 per cent due to severe infestation of insect pests.

In Tamil Nadu, the yield loss is from 30 to 80 per cent due to leaf folder in epidemic situation. Every unit of increase in infestation by *C*. *medinalis* decreased the yield by 14 to 1.46 per cent during summer and wet season

Use of pesticides caused several environmental problems, so attempts were made to screen eco-friendly compounds with selective toxicity and environment-friendly. Many plant essential oils show a broad spectrum of activity against insect pests ranging from insecticidal, antifeedant, repellent, oviposition deterrent and growth regulatory activities.

In this context, an attempt was made to assess the acute toxicity of essential oils thymol and ginger oil against third and fifth instar larvae of *C*. *medinalis*

Topical bioassay was performed with third and fifth instars of *C*. *medinalis* using 10, 20, 30, 40 and 50 per cent concentration of ginger oil prepared with distilled water. Tween 80 was added to dissolve oil in water at the rate of one drop per ml. The second extract, thymol was prepared by diluting with water after addition of petroleum ether for different concentrations of 2,4,6,8 and 10 per cent.

One microliter of prepared solution was applied to the dorsal surface of the thorax of each larva using Hamilton micro injector. Five larvae per replication were treated and each treatment was replicated thrice. In addition, the same number of insects was treated with distilled water only for control. After treatment, the insects were transferred into 9 cm diameter petri dishes lined with absorbent cotton containing host food. Insect mortalities were recorded at 12 hours after treatment. The result of this treatment was compared with neem oil at 2 per cent concentration. Original data were corrected by Abbott's formula.

$$\text{Percentage of corrected mortality} = \frac{\text{Oberved mortality} - \text{Control mortality}}{100 - \text{Control mortality}} \text{ X100}$$

Per cent mortality increased with increase in concentration from 10 to 50 per cent of ginger oil and from 2 to 10 per cent of thymol with exposure time of 12 hours. Ginger oil at 10, 20, 30, 40and 50 per cent concentration recorded 46.66, 60.00, 73.33, 80.00 and 100 per cent mortality respectively against third instar larvae compared to neem oil @ 2 per cent which recorded only 33.33 per cent mortality (Figure – 1). Thymol at 2, 4, 6, 8 and 10 per cent concentration recorded 40.00, 60.00, 80.00,80.00 and 93.33 per cent mortality respectively against third instar larvae compared to neem oil @ 2 per cent which recorded only 33.33 per cent mortality (Figure – 2). Similar trend was noticed in the 5th instar larvae for both ginger oil and thymol.

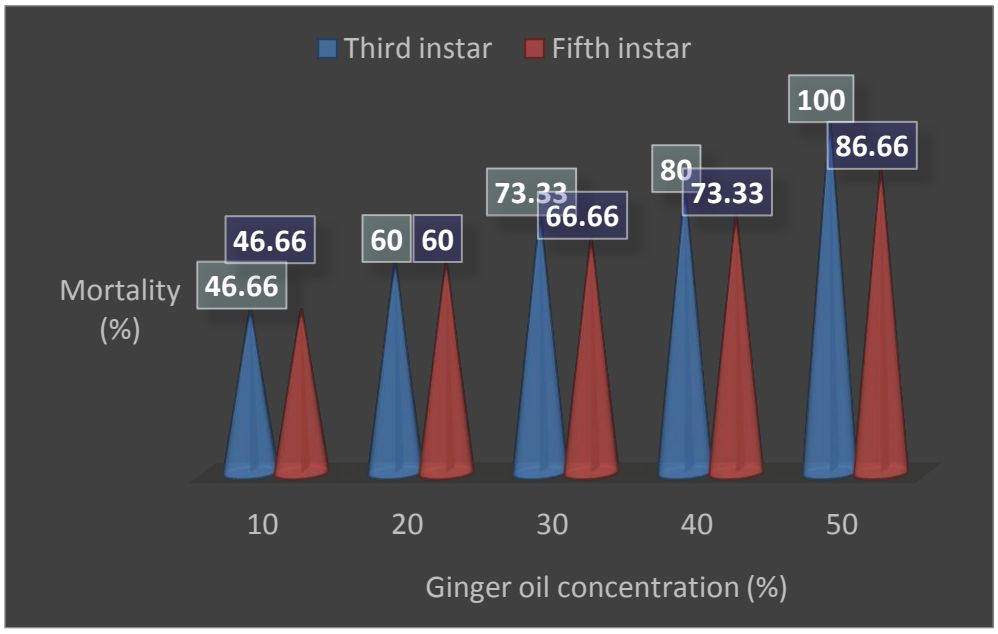

Figure 1 - Acute toxicity of ginger oil against 3rd and 5th instar larvae of *C. medinalis*

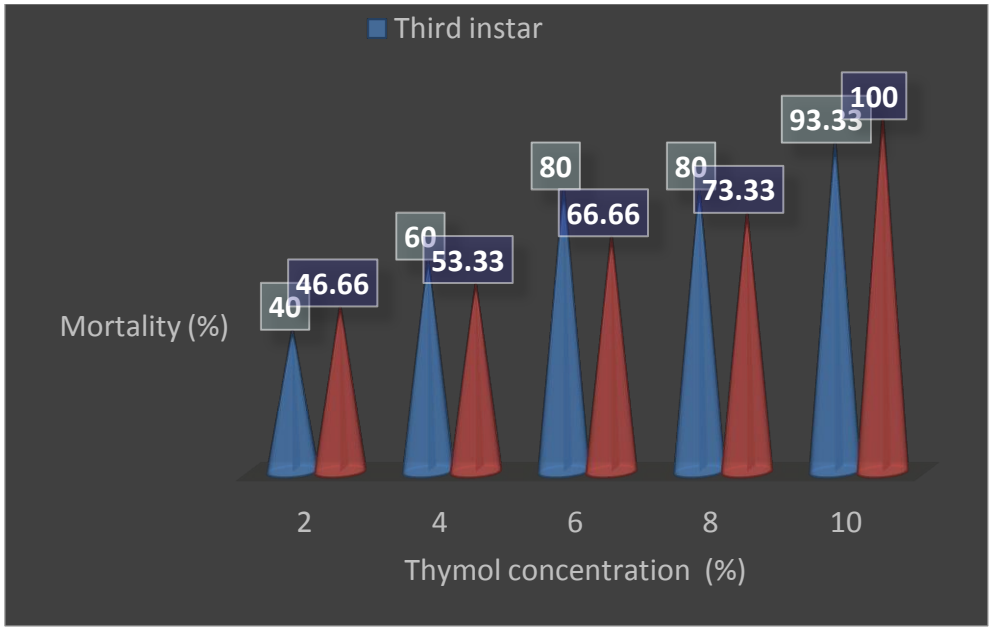

Figure 2 - Acute toxicity of ginger oil against 3rd and 5th instar larvae of *C. medinalis*

Topical bioassay of ginger oil and thymol at 50 and 10 per cent effected 100 and 93.33 per cent mortality respectively on third instar larvae of *C. medinalis*. Topical bioassay of ginger oil and thymol at 50 and 10 per cent effected 86.66 and 100 per cent mortality respectively on fifth instar larvae of *C. medinalis*.