Efficacy of aqueous extract of *Citrus aurantifolia* (Kaghzi Neemboo) on Mortality and Hatching of *Meloidogyne incognita*

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Nematodes are a diverse group of organism inhabiting different environments. Amongst various nematodes root knot nematode *Meloidogyne incognita* are universally considered destructive to almost all the plants including vegetables, fruits and some cereals crops.

Various control methods have been tested for managing root-knot nematode population. Amongst them use of phytotherapeutic substances is most promising. In the present study, aqueous extract of peels of *Citrus aurantifolia* (Kaghzi neemboo) was tested on mortality and antihatching property against *M. incognita*.

Aqueous extract of peels of kaghzi neemboo (*Citrus aurantifolia*) was prepared as per method of Vijaylaxmi et al. (1979). 10 gms of peels were ground with 10 ml of distilled water. It was then sieved through muslin cloth and filtered with Whatman No. 1 filter paper.

For in vitro experiment, 1 ml of root knot nematode inoculum containing about 50 J2’s was incorporated in different concentrations of aqueous peel extract viz. S, S/2, S/4, S/8, S/16 and S/32 accordingly. Distilled water containing same number of J2’s kept as control served as control. Observations after 24, 48 and 72 hrs were recorded on percent mortality of J2.

For evaluating antihatching property, 5-6 fresh egg masses were taken from pure culture of *M. incognita* and they were put in sterilized Petridishes containing different dilutions of the extract of *C. aurantifolia* viz. S, S/2, S/4, S/8, S/16 and S/32. Hatching of J2’s was observed after 24, 48 and 72 hrs of exposure. Equal number of egg masses kept in distilled water served as a control. Three replications were kept for each concentration.

RESULTS AND DISCUSSION

The results depicted that the stock (S) concentration showed as high as 87.2% J2’s mortality only after 24 hrs which increased to 96.8% and 100% after 48 and 72 hrs respectively. Other concentrations viz. S/2 to S/16 also exhibited more than 60% mortality rate after 24 hrs. which increased to 89% after 72 hrs 97.5%, 95.4%, 94.4% and 91.5% mortality was met by S/2, S/4, S/8 and S/16 concentrations respectively after 72 hrs of exposure (Table 1).

As per literature available, not much work has been done using these peels as nematode controlling agent. However other workers have employed different parts of *Citrus* sp. against nematodes. Desai et al. (1973) used aqueous extract of different parts of *C. reticulata* plants against *M. incognita* and *M. Javanica*. Essential oil from the skin of *C. aurantium* and *C. medica* was used by Nagva and shapoval (1977) against *Ditylenchus*. Various organic compounds like citral, limonens and dipentene were reported in its oil by Guenther (1966). Fungicidal effect of essential oil of *Citrus* sp. has also been reported by Dubey (1991).

From the overall results of in vitro experiments, it could be envisaged that peels of *C. aurantifolia* contain nematicidal compounds which can be used successfully in controlling population of *M. incognita*. 
Results on hatching of J2 from eggs of *M. incognita* showed that Stock concentration was the best as no hatching of J2’s occurred after 24, 48 & 72 hrs of exposure. 5-8 J2’s were hatched in S/2 to S/32 concentrations after 24 hrs compared to 30 J2’s hatched in control. After 48 hrs of exposure control had 40 live J2’s whereas S/2-S/32 conc. had only 5-9 J2’s. Only 6-9 larvae were found hatched in S/2-S32 conc. After 72 hrs as compared to 41 J2 in control (Table).

Hence, from the above results, it can be concluded that aqueous extract of *Citrus aurantifolia* (Kaghzi neemboo) causes adverse effect on hatching process of *Meloidogyne incognita*. Probably, the chemicals released by the peels had an adverse effect on the physiology of the egg, thus causing deleterious effect on hatching. However no such work came across during literature consultation taking these peels for observing antihatching property of *M. incognita*.


**REFERENCES**


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**Table 1.** Per cent mortality and hatching of J2’s of *M. incognita* in *in vitro* at different concentrations of aqueous extract of *Citrus aurantifolia*

<table>
<thead>
<tr>
<th>S</th>
<th>Concentration</th>
<th>Percent Mortality after hatching</th>
<th>Number of J2’s hatched after hatching</th>
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<td></td>
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<td>24</td>
<td>48</td>
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