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Repellent efficacy of aqueous neem leaf extract on housefly, Musca domestica (Diptera:Muscidae)

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Housefly, *Musca domestica* (L.) is a major public health pest that acts as a carrier of dangerous pathogenic organisms. Since the indiscriminate usage of chemical pesticides causes serious problems to human and environment and also cause pest resistance to insecticides, it is essential to develop ecofriendly and biodegradable insecticides. The previous studies revealed neem products to be effective against insect pests. In order to find an economically cheap, effective and environmentally safe control method the present study was aimed at evaluating the efficacy of aqueous neem leaf extract on repellent activity of adult housefly using a self-made six-arm olfactometer.

Cotton wool (5 g) soaked separately in the 1:1 (w/v) aqueous neem leaf extract (aq.NLE), mixture of 1:1 (w/v) aq.NLE + turmeric rhizome powder (1 g), mixture of 1:1 (w/v) aq.NLE + black pepper powder (1gm), aqueous solution of turmeric rhizome powder, aqueous solution of black pepper powder (1:1 w/v) and one ml of distilled water as control were placed on separate watch glasses and kept in each bottle (1000 ml) of the six-arm olfactometer. Thirty 1-2 day old adult flies from the laboratory culture were introduced into the centre bottle of the six-arm olfactometer. The number of adults in each bottle was counted at 10 minute intervals up to 60 minutes and after 24 hours of exposure. This was replicated five times. In order to compare the attractant or repellent effect of the oviposition site this study was repeated using pork meat (5 g) soaked in the extracts (1:1 (w/v) aq. NLE; mixture of 1:1 (w/v) aq. NLE and turmeric powder(1 g) ; mixture of 1:1 (w/v) aq. NLE and black pepper powder (1 g), aqueous solution of turmeric rhizome powder(1:1 w/v),aqueous solution of black pepper powder (1:1 w/v) and distilled water separately for one minute) instead of cotton wool.

All experiments were carried out in the laboratory at the temperature 26 ± 2 °C and relative humidity (RH) 70 – 75%. The control experiment was conducted concurrently along with the experimental trials. Data were analyzed using ANOVA, T- test and LSD. The intensity of repellency of the extract was compared with the control.

From the t-test, in the both cases (using cotton wool and pork meat), when adult flies are exposed for 24 hours, all neem leaf extracts showed a significant ($P < 0.05$) repellent effect against house fly than the water control. From the LSD analysis, after 50 minutes of exposure, all the treatments showed equal repellent effect but less than the aqueous control. After 24 hours of exposure, the piece of meat, cotton wool soaked with aq. NLE showed 95.24% and 94.99% repellent effect respectively, while NLE with both additive (turmeric and pepper powder) and additive alone showed 100% repellent effect. Although the additives pepper and turmeric powder showed more repellent activity there was no significant ($P > 0.05$) effect on reduction between aq. NLE and mixture of aq. NLE + pepper and aq. NLE + turmeric. Turmeric and pepper are expensive but neem leaves are freely available in plenty.

Therefore, the results of the present study revealed that the aqueous neem leaf extract at 1:1 (w/v) has potential repellent effect against house fly and could be considered for integration with other control options in the control of housefly.

Keywords: *Musca domestica,* neem leaf extract, repellent, six-arm olfactometer

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