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BIOTOXICITY SCREENING OF *MELIA AZEDARACH* L. AGAINST MOSQUITO (*ANOPHELES STEPHENSI* LISTON.) LARVAE

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This submission is the epitome of sum and substances of biotoxicity screening of aqueous extract of different parts of *Melia azedrach* L. against mosquito (*Anopheles stephensi* Liston.) larvae in general and seed in particular. The toxicity assessment has been done by scoring larval mortality percentage at different concentrations.

Keywords : *Anopheles stephensi*; Bioprospecting; *Melia azedarach*; Natural insecticide.

Melia azedarach L., Family-Meliaceae, commonly called as Bakain, which in english equivalent is Persian Lilac. The epithet Melia is from Greek name of the tree, refers to ash, although the tree does not resemble as ash and the epithet azedarach is from Parsian name of this species *azad-drakht*, meaning an independent tree. The tree is a native of the sub-Himalayan and Siwalik tract of India; also common in Burma, China and Persia. Grows wild in Baluchistan. It is very common in Uttar Pradesh, Madhya Pradesh, Bihar, Punjab and other states of India.

It is a medium-sized deciduous and very fast growing tree. It has smooth, dark-grey or brown bark, cracked vertically in long fissures and has a spreading crown. Leaves are beautiful and fern like, compound subdivided at the base into several pinnae, each bearing 5-7 leaflets. They turn yellow and fall in December-January, new leaves appear in March alongwith flowers.

Numerous soft lavender-coloured and scented flowers are borne in large axillary panicles during March-April. They are followed by ellipsoid-drupaceous fruits, which rippen in the cold weather, remain hanging in yellow clusters till the next flowering season. Each fruit contains five seeds having a natural perforation, which makes them ideal for beads.

Leaf, bark and fruit accredited with insect repellent properties. Leaf juice anthelmintic, diuretic and emmenagogue, gum used in spleen enlargement[1]. Seed cures bleeding piles and leaf is an antiseptic healer[2].

During ethnobotanical survey in Uttar Pradesh the authors came across an information that the local people of Tarai region add different parts of Bakain (*M. azedarach* L.) in nearby small water bodies to kill mosquito larvae, and thus keep their population under control. The periodic examination of such water bodies revealed the fact that the population of mosquito (*A. stephensi* Liston.) larvae was managed to some extant. This idea compelled us to screen different parts of the tree against mosquito larvae.

The different parts (Flowers, Fuits, Leaves, Seeds, Stem and root barks) of the *M. azedarach* L. were collected from Tajpur village of Gonda District of U. P. India and dried in the shade. The powder was prepared with the help of mixer-grinder, the water extract of different parts was prepared by putting 100gm powdered materials in one litre boiling tap water and the mixture left for 24 hours. Then the mixture was stirred well, squeezed and filtered with muslin cloth. The stock solution was diluted serially to obtain different working concentrations viz 5%, 10%, 15%, 20% and 25% by mixing water collected from natural water bodies rearing mosquito larvae.

A culture of mosquito (*A. stephensi* Liston.) larvae, collected alongwith natural water from Roxburgh Garden of Botany

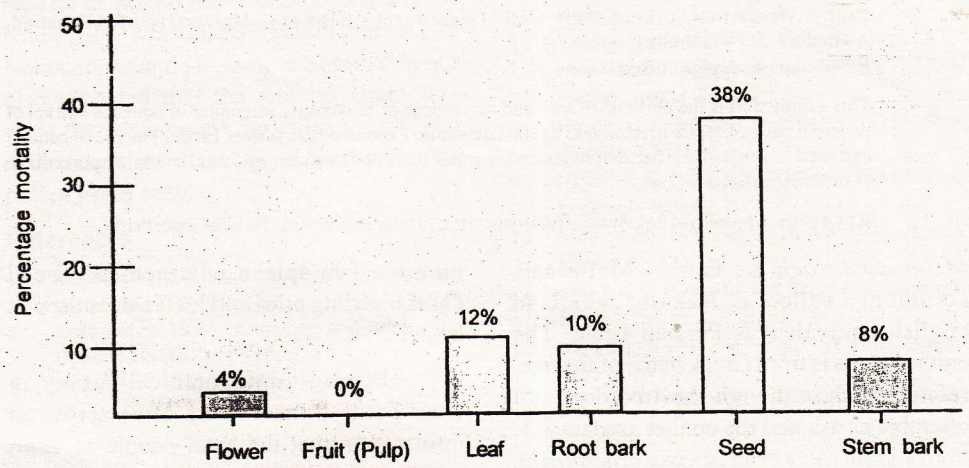

Fig. 1. Aqueous extract (15%) of different parts

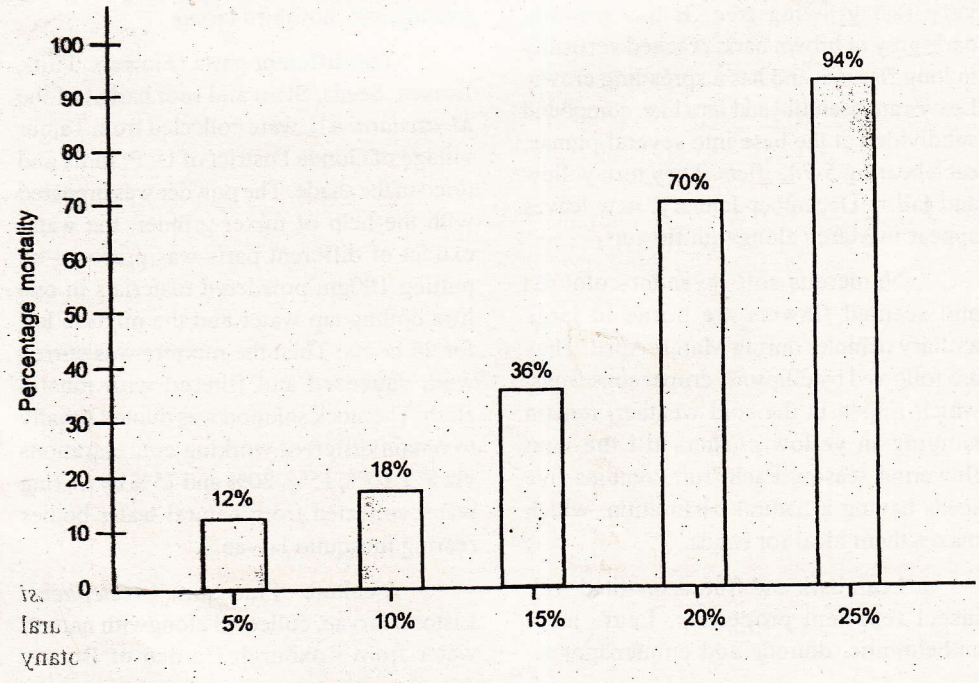

Fig. 2. Aqueous seed extract dilutions.

Department, University of Allahabad was maintained at room temperature and 50 larvae of different developmental stages were treated with aqueous extracts of different parts of *M. azedarach* L. of 15% (intermediate of all dilutions) concentrations so as to find out the relative toxicity potential of different parts at fixed concentration. Their respective toxicity (larvicidal activity) was analysed by scoring mortality percentage after 24 hours exposure (Fig. 1). The different concentrations of aqueous extract of seed were used to treat three replicates with each concentration and the average mortality of mosquito larvae scored after 24 hours exposure at room temperature (Fig. 2).

The relative larvicidal activity assessment shows that at the same concentration (15%) of aqueous extracts of different parts of the plant exhibit different level of toxicity (Fig. 1), which was found maximum in seeds. This differential toxicity is due to the specific distribution pattern of active larvicidal agents present in different parts of the tree. The response of larvae against different aqueous concentrations of seed extract (Fig. 2) can be explained on the basis of differential permeability and its uptake by mosquito larvae[3-4].

Now a days the synthetic insecticides viz. DDT, BHC, Chlordane, Aldrin, Dieldrin and PCB (Polychlorinated biphenyls) are intensively used to control insect pests, which are not readily degraded and therefore, enter in the food chain as such. Their concentration goes on increasing at successive trophic levels in the ecosystem through biomagnification, causing damage to the biodiversity and pollution in the biological system. The condition is getting alarming due to their continuous application[5]. Lots of efforts have been made to control the mosquito population but so far none has proved to be more effective. Because they have already reached a resistant stage and are well suited to wage a defensive war. Therefore, we should seek for the new approaches of management so as to minimize their incidence. In this regard there is an urgent need to develop environmentally safer and readily biodegradable insecticides, which may cause no or minimum damage to non target organisms. Recently number of plants have been screened against the insects to control their population[6-11].

The findings of the study are therefore, important in the direction of bioprospecting of natural insecticides. The aqueous seed extract of *M. azedarach* L. is a potent larvicide and can be used at commercial level to manage the mosquito population. It can also be tried on other insect larvae. Further refinement of the process can yield better results, which can not only be useful in the insect pest management programs but also avoid the risk of environmental quality deterioration and genetic erosion.

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