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Research Article

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INSECTICIDAL ACTIVITY OF HYDRODISTILLED STEAM VOLATILES FRACTIONS OF AZADIRACHTA INDICA JUSS. LEAF, HEARTWOOD AND FLOWER AGAINST *CALLOSOBRUCHUS CHINESIS, EPHESTIA CAUTEUA, RHIZOPERTHA DOMINICA*

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ABSTRACT

Insecticidal activity of volatiles of different parts of Azadirachta indica were evaluated against Callosobruchus chinesis, Ephestia cauteua, Rhizopertha dominica, The growth disrupting properties of volatiles is increased 50 fold depending upon the solvent used for dilution In contact toxicity test observed that as the concentration increases the death time of insects is decreased. Comparatively study of leaves, heartwood and flowers indicates flowers are having more potent activity than leaves and heartwood.[1]

KEYWORDS

Neem ,Insecticidal activity, Volatile extracts, Azadirachta Indica.

INTRODUCTION

Azadirachta indica Juss.is the one of the most valuable tree with multiple domestic use and good source of several commercial byproducts. In Ayurveda it is regarded as “Sarva Roga Nivarni” due to its variety of therapeutic activities.

Insects are the main causative agents for grain deterioration and nearly 90% of the total dry matter loss in storage are due to insect pests (Fernando *et al1988)* The control of insect pests is largely based on synthetic pesticides. There are no contact pesticides or fumigants which are safer to control pests in stored food (Chapman and Dyte 1976). Excessive use of synthetic pesticides pollute environment with toxic residues, disrupt natural pest control mechanisms and enhance development of pesticide resistant insect strains (Arthur 1994; Swarnasiri and Palipane1995). Hence there is an increasing demand to develop safe alternatives to replace synthetic pesticides (Tripathi *et al.* 2000). Though the insecticidal effect of leaves of *A. indica* has been thoroughly studied on *S. oryzae*, that of the separated volatile fraction has not been studied. Also, there are few studies done on the effect of volatiles of *M. koenigii* on *S. oryzae*. This study was undertaken to evaluate the bioefficacy of the volatiles of different parts of *A. indica* with the view of developing environmentally safer and effective compounds for the control of this pest.

Steam distillation of plant essential oils has a long history of use in fragrances and flavorings in the perfume/cosmetic and food industries. Recently, essential oils have been suggested as an alternative source of materials for arthropod control due to their broad source of bioactive constituents (Isman 2006). This discovery has prompted focused research efforts on natural product extracts from plants as potential sources of commercial pest control agents. [1,2]

MATERIALS & METHODS

Hydrodistillation of volatiles from neem leaf, heart wood and flowers

Hydro distillation of freshly collected mature leaves, heartwood and flowers was carried out separately immediately after the material was crushed to prevent the loss of volatiles. Clevenger apparatus B.P. used for hydrodisillation.Volatiles was abbreviated as AZL for leaves, AZHW for heartwood and AZF for flowers. Different dilutions were made by using solvent ether. Simple water is used as control.

Collection of Insects

Insects of ***Callosobruchus chinesis, Ephestia cauteua, Rhizopertha dominica*** used in the study were collected from grains and pulses in the locality. Colony of larvae, prepupae, pupae and adults were maintained in the laboratory at an ambient temperature of 23 to 33^{o}C and 75 to 95% relative humidity.

RESULT AND DISCUSSION

Insecticidal activity of hydrodistilled steam volatiles fractions of *Azadirachta indica* Juss. Leaf, Heartwood and Flower Against *Callosobruchus chinesis, Ephestia cauteua, Rhizopertha dominica* indicated in the **Table No.1.**

When the insects were treated with different dilution of volatiles extracted from different parts of neem growth disrupting properties increases as the concentration increases and death time deceases as the concentration of volatiles increases. Comparative study indicates AZF have good activity against *Callosobruchus chinesis, Ephestia cauteua, Rhizopertha dominica* than AZL and AZHW [3, 4, 5, 6]

CONCLUSION

Present study of insecticidal activity indicates that volatiles of Azadirachta indica flowers have good activity against *Callosobruchus chinesis, Ephestia cauteua, Rhizopertha dominica* than volatiles of leaf and heart wood.

Graph 1: % Mortality of AZL, AZHW, AZF at Different Concentration.

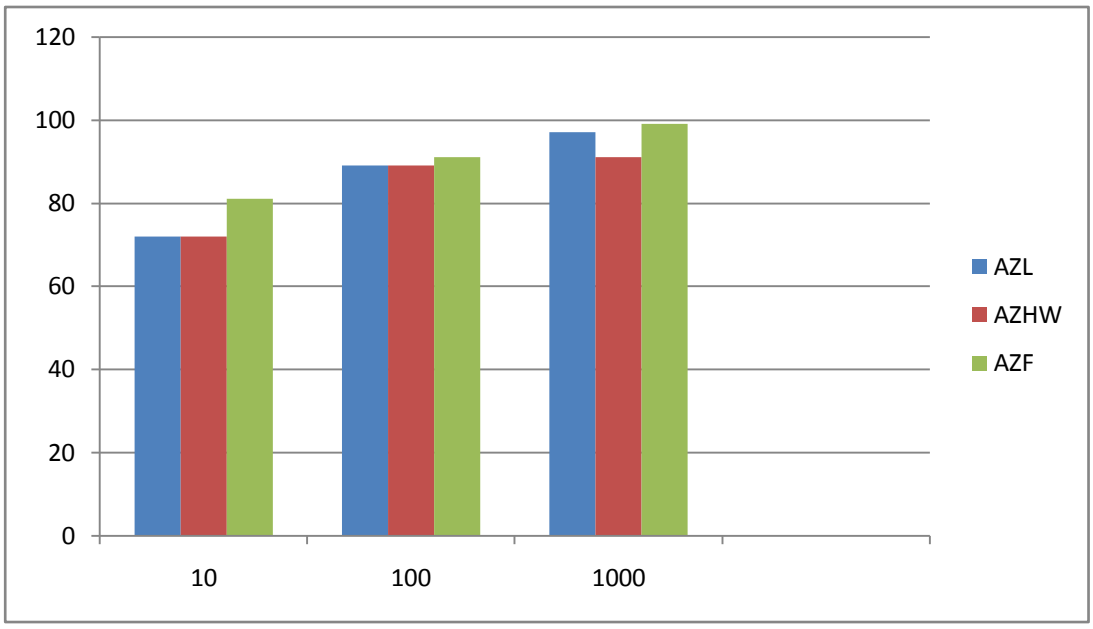

Table No. 1 Insecticidal activity of AZL, AZHW, AZF

Insect species	Part of plant used	No of insects	Dosage (µg/ml)	No of mortality	Death Time (min.)	% mortality
Callosobruchus chinesis	Leaf Volatiles (AZL)	50	10	38	35-40	76
			100	44	18-20	88
			1000	46	14-18	92
Ephestia cauteua			10	35	48-50	70
			100	43	27-30	86
			1000	45	15-20	90
Rhizopertha dominica			10	37	45-50	74
			100	42	28-31	84
			1000	47	13-17	94
Callosobruchus chinesis	Heart wood Volatiles (AZHW)	50	10	37	52-56	74
			100	40	26-30	80
			1000	42	18-20	84
Ephestia cauteua			10	35	38-42	70
			100	42	28-33	84
			1000	45	19-22	90
Rhizopertha dominica			10	36	55-58	72
			100	38	40-45	76
			1000	44	16-30	88
Callosobruchus chinesis	Flowers Volatiles (AZF)	50	10	34	55-58	68
			100	43	25-30	86
			1000	47	15-17	94
Ephestia cauteua			10	36	48-50	72
			100	42	28-32	84
			1000	46	13-18	92
Rhizopertha dominica			10	39	45-55	78
			100	44	35-40	88
			1000	48	15-20	96

REFERENCES

1. A. Para agama, K. H. T. Abeysekera, L. Nugaliyadde, K. Abeywickrama , Bioactivity of leaf volatiles of *Azadirachta indica* A. Juss. and *Murraya koenigii* Spreng. against *Sitophilus oryzae* L. (Coleoptera: Curculionidae). Tropical Agricultural Research and Extension 5(1 & 2) : 2002 17-20
2. Marc C. Dolan,and *Aedes aegypti* (Diptera: Culicidae) Gabrielle Dietrich, Nicholas A. Panella & Joseph j. Karchesy, Biocidal Activity of Three Wood Essential Oils Against *Ixodes scapularis* (Acari: Ixodidae), *Xenopsylla cheopis* (Siphonaptera: Pulicidae), , J. Econ. Entomol. 100(2): 622-625 (2007).
3. O. M. Ameen, L. A. Usman, I. A. Oladosu, N. O. Olawore and I. A. Ogunwande, Bioactivity of rhizome essential oils from two varieties of *Cyperus articulatus* (L.) grown in Nigeria, using brine shrimp (*Artemia salina*) lethality tests method,Journal of Medicinal Plants Research Vol. 5(6), pp. 1031–1033, 18 March, 2011
4. Xuehuan Feng, Hongyun Jiang, Yanning Zhang, Weizhi He and Lan Zhang, Insecticidal activities of ethanol extracts from thirty Chinese medicinal plants against *Spodoptera exigua* (Lepidoptera: Noctuidae) Journal of Medicinal Plants Research Vol. 6(7), pp. 1263-1267, 23 February, 2012
5. Koul, Suresh Walia & G. S. Dhaliwal, Essential Oils as Green Pesticides: Potential and Constraints Opender, *Biopestic. Int.* 4(1): 63–84 (2008)
6. Jyotsna A Saonere Suryawanshi, Neem - natural contraceptive for male and female an overview, International Journal of Biomolecules and Biomedicine (IJBB) Vol. 1, No.2, 1-6, 2011

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