



# BIOLOGICAL ACTIVITY OF AQUEOUS AND ETHANOLIC STEM EXTRACT OF *Annona squamosa* Linn AGAINST DIFFERENT ANT SPECIES

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**Abstract:** An evergreen shrub belonging to the family Annonaceae is *Annona squamosa* Linn .These plants have anti cancerous activity, used as antioxidants and medicinal importance, which widely used in preparation of antihead like medicines. These plants also show the antimicrobial, larvicidal and insecticidal activity. In present study, we focused on *A.squamosa* stem bark phytochemical and the insecticidal activity of extract against the different types of ants. In that insect mortality was checked by two different methods. The insecticidal activity ratio of *A.squamosa* shows the range between 80-94% .Therefore, it can be concluded that the aqueous and ethanolic extract of *Annona squamosa* Linn against different ant species has the efficiency towards the use in insecticide.

**Index Term:** *Annona squamosa*, Phytochemical, Insecticidal activity

## I. Introduction

Phytochemical shows the versatile applications. Medicinal plants are the richest source of bioactive compounds which can be used as drug from the traditional systems .Modern medicines, pharmaceutical intermediates and chemical entities for synthetic drugs. (Tiangda, C. H.,et al,1997).The word wide production is damaged due to presence of insects, microbial deterioration and other factors such as temperature, aeration, humidity and cleanliness of bulk storage, which are estimated to be 10-25% as a annual post-harvest losses. (Haouas D,Ben Halima-Kamel et al, 2008). The Phytochemical are compounds which has been used as drug for antimicrobial, anti-inflammatory, anticancerous, antispasmodics, anti-

oxidant and as a insecticides. These medicinal plants contain some organic compounds or bioactive substances which provide definite role in human disease treatment.

The best example is *A.squamosa*, the fruit of plant commonly known as the custard apple which is eatable. This plant belongs to the Annonaceae family. It is small, evergreen, straggling shrub commonly occurring in India. Ants have colonized almost every landmass on Earth, Antarctica and a few remote or inhospitable islands lacking indigenous ants and form 15-25% of the terrestrial animal biomass. (J..Ashokkumar et al, 2010) They can damage crops and invade buildings. The insecticidal activity of the seed extract, leaf extract of the custard apple was studied by different ways. The activity against the different types of insect shows the efficiency of *A.squamosa*. (Hedin P A et al, 1997)

The *A.squamosa* stem bark extract have shown the effective activity for pest control against a range of an insect/pests. The active molecules present in the plant extract make it an effective insecticide. (Yadav R.N.et al,2011) Therefore, the present study/work focuses on the insecticidal activity against different ant species. The necessity of controlling insect usually use the synthetic or chemical insecticides but they are very expensive, being environmentally hazardous, easily resistance with insect and their toxic effects on human health (Baloch et al,2013 ). The use of natural insecticides play important role in pest control management.

Crude extract of seeds, leaves, bark, twigs and fruits obtained from the plant species of Annonaceae have been extensively tested in recent years for bioactivity to pest /insect and related arthropods worldwide. *Asimonia tribba*, *Annona muricata* and *A.squamosa* are the species that have been most frequently examined for their insecticidal effect (Murray B. isman ,Rita seffrin) From the wide variety of the important compounds like acetogenins, suamocin and annonacin have shown the greatest impact against insect (Vinayaka, K. S et al,2009). The extract of *A.squamosa* plant has been extensively used in the recent years for the bioactivity towards pest and related arthropods control.

## II. Material and Methods

### 2.1 Collection and Identification

The stem bark of *A.squamosa* were collected from campus of Swami Ramanand Teerth Marathwada University, Nanded (MH). The four different insect species that is *Solenopsis* , *Monomerium minimum*, *Componota pnylnvancusin* and *solnopsis invicta* etc were selected from the local area of college. The identification and authentication of material was carried out at Dept. of Botany and Zoology at S.R.T.M.U. Nanded (MH), India.

## 2.2 Extraction of Phytochemicals

The stem bark of *Annona squamosa* was dried under shade and fine powder prepared by using the mechanical grinder. The stem bark powder was subjected for successive Soxhlet extraction with Distilled water and ethanol as solvents. After completion the plant extract was evaporated at 40 0 500 C and preserve in dried form for further use. *A.Squamosa* aqueous and ethanolic extract was then subjected for qualitative analysis.

## 2.3 Insecticidal Activity of *A.squamosa*

The Insecticidal Activity checked against different types of ant species like *Solenopsis*, *Monomorium minimum*, *Camponotus pennylvanicusn* and *Solenopsis invicta* etc. The activity was checked by following methods

### 2.3.1 Method I

The test sample was prepared by dissolving 200mg of crude extract in 3ml of acetone and loaded in Petri dishes covered with whatsmann's filter paper No.1. After that 10 insects were placed and incubated at 27<sup>0</sup> C for 24 hours with 50% relative humidity in growth chamber. Likewise the control was prepared. The results were analyzed as percentage mortality ratio.

Growth Regulation (%) = No. of Insect alive in test/ No. of Insect alive in control X100

The entire test performed in triplicates and data analysis was carried out.

### 2.3.2 Method II

The insecticidal activity of aqueous and ethanolic extract of *A.squamosa* stem bark of different conc. were tested on two types of ant species that is *Monomorium minimum* and *Solenopsis* respectively. 20 insect placed in each beaker containing variable conc. of extract that is 10, 20,30,40,50 mg/ml. A control was kept without adding extract. The insecticidal effect of extract determined by counting the No. of dead insect after 24 hours. Each test repeated thrice & percentage of insect mortality was determined.

## III. Result and Discussion

In present study, the Phytochemicals in *A.squamosa* have the great efficiency against insects. The extract contains different biologically active compounds which contributed toward their insecticidal activity. These secondary metabolites shows conventional applications against different insect. The extraction of Phytochemical in *A.squamosa* was carried out by using the soxhlet extraction process. The aqueous and ethanolic further tested for qualitative analysis in that ethanolic plant extract contains alkaloid, protein, carbohydrates, steroid, tannin, oxalate, quinone, phenol, amino acid etc but we found that saponin and flavonoid is absent. Likewise, in aqueous all above Phytochemicals is present except phenol and tannin. This test shows the conformation for presence of various essential components which make it a good and effective against microbes, larva, insect etc.

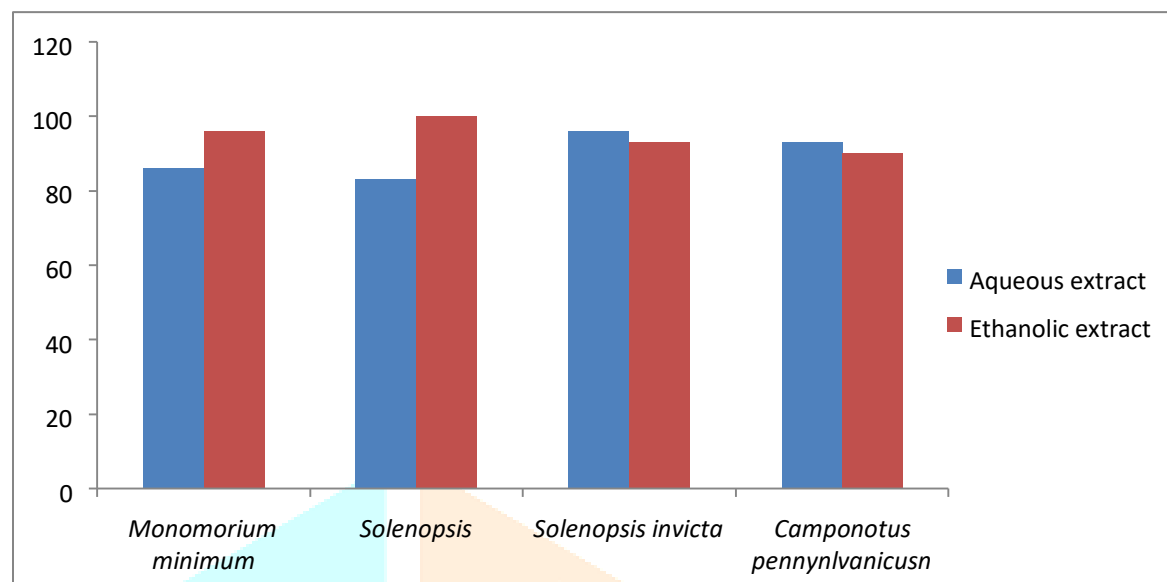
Sr. No	TEST	Aqueous extract	Ethanolic extract
1	Test for Phenols	-	+
2	Test for Tannins	-	+
3	Test for Glycoside	+	+
4	Test for Flavonoid	+	-
5	Test for Saponin	+	-
6	Test for Phlobatannin	-	-
7	Test for Steroid	+	+
8	Test for Terpenoid	+	+

### 1.1 Phytochemical analysis of *Annona squamosa*

The insecticidal activity of stem bark of *A.squamosa* was studied by various researchers which described the essential applications of Phytochemicals present in *A.squamosa* in the pharmaceuticals for drug development, as a insecticide, repellent and antioxidant. The *A.squamosa* also described for the anticancerous and antibacterial agent.

Sr.no	No. of Insects (10)	Insect Mortality (%)	
		Aqueous extract (200mg/m)	Ethanolic extract (200mg/ml)
1	<i>Monomorium minimum</i>	86	96
2	<i>Solenopsis</i>	83	100
3	<i>Solenopsis invicta</i>	96	93
4	<i>Camponotus pennynlvanicusn</i>	93	90

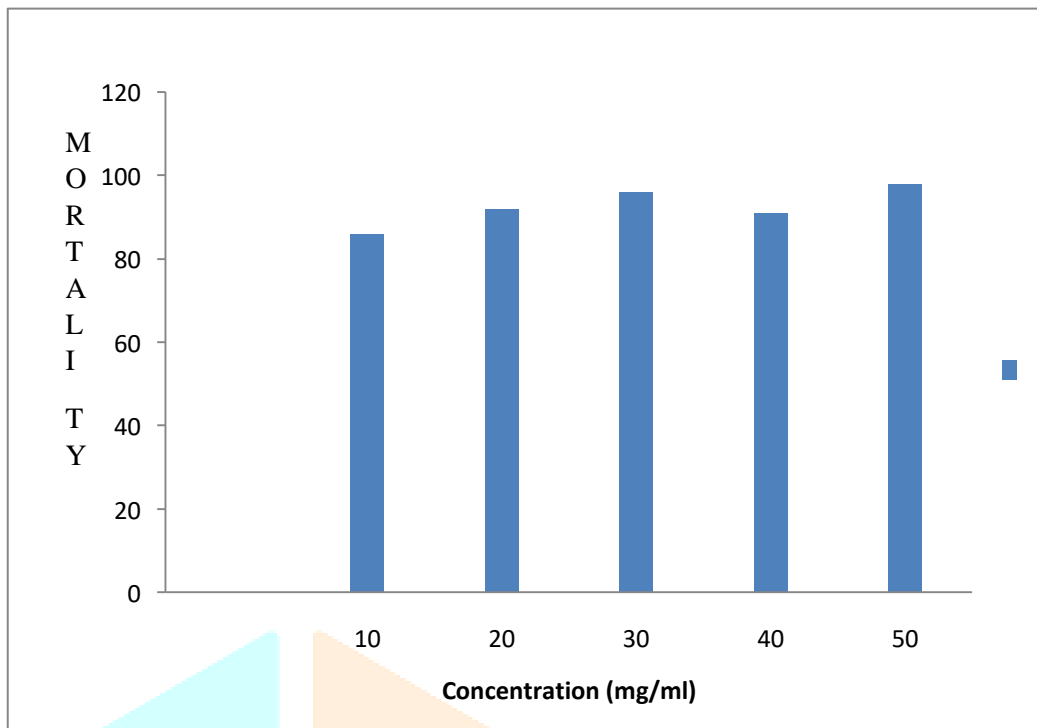
## 1.2: Insecticidal activity of aqueous and ethanolic extract of *Annona squamosa*



**Fig1: Insecticidal activity of aqueous and ethanolic extract of *Annona squamosa***

Sr. no	Concentration ( mg/ml)	Insect mortality (%)
1	10	86
2	20	92
3	30	96
4	40	91
5	50	98

**Table1.3: Insecticidal activity of ethanolic extract of *Annona squamosa***



The present work focuses on the activity of stem bark extract against insect like *Solenopsis*, *Monomerium minimum*, *Componotapnnylnvanicusin* and *solnopsisinvicta* which are ant species commonly found in various regions of plant, soil etc. Insecticidal activity of *A. squamosa* stem bark extract carried out opposite these ant species. The activity studied by two ways in the first method, the insect mortality checked by using 200 mg quantity of both aqueous and ethanolic extract. In that aqueous extract insect mortality ratio is like *Solenopsis* (83%), *Monomerium minimum* (86%), *Componotapnnylnvanicusin* (93%) and *solnopsisinvicta* (96%) while in ethanolic extract the insecticidal activity observed is *Solenopsis* (100%), *Monomerium minimum* (86%), *Componotapnnylnvanicusin* (90%) and *solnopsisinvicta* (93%).

In second method, Insecticidal activity of ethanolic extract of *A. squamosa* is carried out by using the variable range of extract concentration (mg/ml) against ant. Insect mortality (%) recorded as 86, 92, 96, 91, 98%. The comparative study shows that, the *A. squamosa* have the very effective activity against the insect.

#### IV. Conclusion:

Insecticidal Activity of different plant sources has been reported earlier but the activity of stem bark extract of *A. squamosa* is found rarely while searching a literature. However there is no report found that shows activity of *A. squamosa* against ant species.

Therefore, the use of natural plant components as an Insecticide plays an important role in controlling pest.

## V. References:

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