

POLLUTION-FREE PESTICIDES

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ABSTRACT

In this paper the insecticidal properties of *Annona Squamosa* seed oil, *Calotropis Latex*, *Euphorbia Antiquorum Latex* are described.

1. INTRODUCTION

Ecologists are voicing their concern about the pollution caused due to indiscriminate use of pesticides. The answer to combat this menace is natural pesticides from plants like *Annona Squamosa*, *Calotropis*, *Euphorbia Antiquorum*, *Citrullus Colocynthis* etc.

2. ANNONA SQUAMOSA

Annona Squamosa or Custard apple trees grow wild in the forest regions of Mahboobnagar, Medak, Nanded, Nalgonda in Andhra Pradesh and in some parts of other states in India. The fruit has many seeds. The seed is flat and about 2 cm. long with brittle shell and the percentage of shell and kernels is 31.5 and 68.5 percent respectively. The kernel has been found to contain 39.5 per cent of a brown coloured non-drying oil with an iodine value of 83.3. The fatty acid composition of the oil as per cent weight is as follows:

Myristic, 0.3; palmitic, 12.5; stearic, 8.9; arachidic 1.8; hexadecenoic, 2.3; oleic, 54.2 and linoleic, 20.0.

The oil is similar to groundnut oil but also contains the toxic principle.

2.1 Decortication of Seeds

The decortication of seeds can be carried out by any beater type decorticator available in the market. In our investigations a power driven decorticator with a revolving shaft having 3 blades with wide openings was used and found satisfactory. Separation of nulls from the kernels was done by hand screening and winnowing. A mechanical shaker separator with air separation would be more efficient on a large-scale,

and would prevent inflammation of eyes and nose by fine hull rust.

2.2 Expression of Oil

For efficient expression of oil, it is desirable to grind the kernels to 30-40 mesh and cook the meal with a little water at about 70°C. No special technique is necessary in expression of the oil, which can be done with any of the usual oil milling machinery such as expellers or hydraulic presses. Ghanies could be used, but the yield of oil will be lower.

2.3 Hazards to Workers

The oil affects the conjunctiva causing redness and inflammation, and therefore, handling the seed entails risks to workers. The use of rubber gloves and eye glasses will help a great deal in preventing accidents. The workers should also be cautioned not to rub their eyes with their fingers while handling the seed meal, and special attention should be paid to these safety precautions.

2.4 Properties

1. The oil, hot pressed or hot extracted, can be used as an insecticide, since it contains a toxic principle (5.8% on the weight of the oil. Insecticidal tests showed that a 8% solution of raw oil in kerosine is a highly toxic contact poison to pumpkin beetles, cabbage aphids and house flies and a stomach poison to saw-fly larvae and pumpkin beetles. A 8% solution of this oil in kerosine has been found to be equivalent to 6% D.D.T. or (Gammexane) as an insecticide towards a variety of the common insects which destroy agricultural crops.
2. The oil can be used for soapmaking as a substitute for the more expensive groundnut oil usually used by the soap-making industry. Soaps were made from same, with or without addition of coconut oil by the three well-known processes cold process, semiboiled process and the boiled process and found to compare well with similar soaps made with groundnut oil. The toxic constituent in the oil being sensitive to alkali appears to be destroyed on conversion of the oil into soap.
3. The oil can be used as a plasticiser in alkyd preparation at any oil length, using either glycerol or pentaerythritol.

2.5 Detoxification

Detoxification of the custard apple seed oil can be affected by alkali refining employing a lye containing a 50% excess of alkali on the theoretical amount required to neutralise

the free fatty acids in the oil. The refined oil is light in colour and free from toxicity. Preliminary feeding trails on white mice were quite successful, but further trails will be necessary before it can be considered fit for human consumption.

2.6 Oil Cake

The residual oilcake left after expression of the oil, contains about 4.3% of nitrogen; hence, it can be useful as an organic nitrogenous fertilizer. The defatted cake contains 20.9% protein. A papain hydrolysate of the cake can be employed as an accessory nutrient in the lactic fermentation of sugar cane molasses; and the proteins of the cake containing essential amino acids can form a satisfactory dietary supplement in feeding stuffs for cattle and poultry. The alcohol-extracted cake from which the toxic matter has been removed, may be used as cattle-feed.

3. CALOTROPIS TO CONTROL RED HAIRY CATER PILLAR

The plant `CALOTROPIS` grows wildy throughout India. This plant has large leaves. The Latex is generally used by rural people to cure wounds.

In Chittoor District, Andhra Pradesh, India, groundnut is being grown in thousands of acres. The crop is attacked by `RED HAIRY CATER PILLAR` which reduces the yield considerably. I found when the leaves of `Calotropis` are placed in the groundnut field the cater pillar consumes the plant leaves, which results in arresting `Pupation`, Thus the menace of the cater pillar can be tackled. This caterpillar appears on groundnut crop more under rain fed conditions. As such if thorough research is carried out on the above observation, I am sure this will help immensely the farmers growing groundnut.

With the wide use of chemical fertilisers, the natural fertility of the soil is reduced gradually. There is the need to enrich the soil and also to conserve the fertility by the use of greenmanure. With wide mechanisation, the animals have become scarce and hence the animal dung.

Here I recall the famous equation:-

$$C = B : E$$

The carrying capacity of any land depends on the biotic potential and the environmental resistance.

Calotropis offers a rich source of green manure and grows wildy. Hence this can be grown in Government vacant lands.

4. RAT POISON FROM THE LATEX OF "EUPHORBIA ANTIQUORUM"

During sowing of Groundnut, the crows were a menace as

they used to take away the seed. When the Latex of `Euphorbia Antiquorum` mixed in cooked rice and placed on trees, the crows after eating it died within minutes. Thus the crow problem is solved. This led me to think of using the Latex to kill rats. Obviously the Latex must be very poisonous.

Of course we are having many rodenticides available readily in the market. But the plant `Euphorbia Antiquorum` grows wildly and occurs widely. As such the poison is readily available locally.

CONCLUSIONS

The natural pesticides from plant material discussed above show that they are locally available besides being pollution free. It is high time thorough research is conducted to study some of the properties mentioned above more indepth.

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