

Effect of Biopesticide from the Stems of *Gossypium Arboreum* on Pink Bollworm and Lepidoptera

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ABSTRACT

Pink bollworm and Lepidoptera development quickly in numbers which is a typical animal group that produces around 100 youthful ones inside certain days or weeks. This assault influences the harvests broadly in the tropical and sub-tropical temperature areas. Thus, to keep up with the yield of harvests the vermin ought to be kept away by utilizing pesticides. The unnecessary measure of the purpose of pesticides influences the dirt, land, and as well as human well-being, and contaminates the climate. Thus, an ozone-accommodating biopesticide is extracted from the stems of the *Gossypium arboreum*. Thus, the extraction of biopesticide from the stems of *Gossypium arboreum* demonstrated that the quantity of pink bollworm and Lepidoptera is diminished step by step in the wake of showering the arrangement on the impacted region of the plant because of the presence of the gossypol.

Keywords-- Pink Bollworm, Lepidoptera, Gossypol, Ozone-Friendly, Extraction

Gossypium arboreum is an arborous plant having a place in the Malvaceae family. It is one of the antiquated yields developed by individuals and it has been utilized for north of 4,000 years. It is at first developed for filaments for the material business and oil from cottonseed. The most economically significant cotton species is *G.hirsutum* which is developed to create 80% of the world's cotton. The cotton fiber and the oil delivered are wealthy in fats from oils and protein which are usually utilized for creature taking care purposes. The cotton plant contains a harmful substance compound named Gossypol. Gossypol is a phenolic compound with a substance recipe of C₃₀H₃₀O₈. This name is gotten from the plant variety logical name *Gossypium* and since it is a phenol compound name is finished with 'ol'. Gossypol's subatomic weight is around 518 and it is a yellow shade and it is glasslike. It is insoluble in water and hexane however solvent in chloroform, butanone, and so on.,

The gossypol is created from the color organs in seeds of *Gossypium arboreum*. The color organs are little dark spots around the cotton plant yet the focus is higher in the seeds of *Gossypium arboreum*. The seed of *Gossypium arboreum* contains around 28g of gossypol/kg. This substance advances a few harmful impacts and gives protection from the bug. This substance influences the respiratory parcel of the bugs. After the extraction, the gossypol fixation goes from around 0.02 to 6% however before the grouping of cotton seed might go from more than 12000 mg/kg of complete gossypol. Gossypol is a profoundly responsive substance that quickly ties with minerals and amino acids.

I. INTRODUCTION

Pesticides are a substance that is utilized to keep the plant from a vermin or for use as a plant development controller causing a scope of hurtful well-being impacts on people. Consequently, the most ideal way to keep away from the synthetic impacts is to utilize biopesticide. Biopesticides are modest and more secure choices for the items, people, and the climate too. Biopesticides are ordered into three sorts, for example, biochemical, microbial, and plant-integrated protectants. The

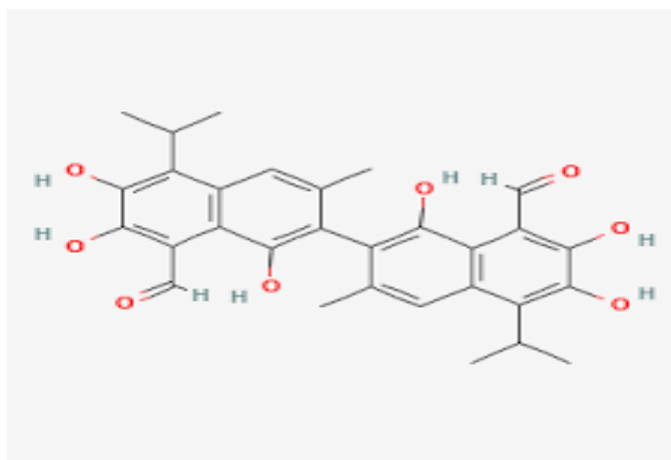


Figure 1: Gossypol

The utilization of pesticides in agribusiness is traced back to the start of farming itself and it turned out to be more famous with time because of expanded bothers corresponding with diminishing soil richness. The principal significant manufactured natural pesticide is dichlorodiphenyltrichloroethane (DDT). DDT was hailed as a supernatural occurrence in light of its broadspectrum action, ingenuity, insolubility, economics, and simplicity in application. Biopesticides acquired part of significance given eco-accommodating nature, keeping the climate spotless and green and less poisonous contrasted with engineered pesticides

Biopesticides are biochemical pesticides that are normally happening substances that control bothers by nontoxic components. Biopesticides are living organic entities or their items or side effects that can be utilized for the administration of irritations that are damaging to plants. They present less danger to the climate and people. The generally utilized biopesticides are living creatures, which are pathogenic for the nuisance of interest. These incorporate bio fungicides, bioherbicides, and bioinsecticides. There are not many plant items likewise which can be utilized as a significant biopesticide source. Plant integrated protectants incorporate substances that are created normally on hereditary alteration of plants.

Different biopesticides are ready from cow pee separates, matured curd water, Gasparini removes, need cow pee extricates, blended leaves separate, stew garlic separate, tobacco with other plant extricates in cow pee, seed treatment with rhizome powder and cow's pee, papaya organic product separate, onion bulb separate, and so on.

II. EXPERIMENTAL METHODS

Plant Materials

The shells of *Gossypium arboreum* were poised, and the shells were sun-dried for 4 days to become dried and the shells were ground to a reduced fine powder by the milling processes.

Materials and Solvents

Soxhlet extraction unit, Simple distillation unit.

The solvents used for the extraction process are Cyclohexane.

Extraction of Biopesticide

The biopesticide is produced from the shells of *Gossypium arboreum* through simple grinding and extraction methods. The Soxhlet extraction is used when the obtained compound has a confined solubility in a solvent and the impure substances are insoluble in that solvent.

The extraction of biopesticide from the shells of *Gossypium arboreum* is administrated by using cyclohexane as solvent using the Soxhlet apparatus as solvent. 200ml of cyclohexane is crammed in the round bottom flask. The fine powder is weighed as 10g,15g,20g,25g,30g,35g, and 40g. at first 10g of the fine powder is charged into a thimble and kept inside the extractor. The apparatus is kept in the heating mantle and the solvent is heated at the range of 80-85°C, the solvent in the round bottom flask gets heated and vaporizes, and then condensed by the water flowing through the inlet and outlet pipe around the condenser.



Figure 2: Experimental setup for extraction of the solution from the raw material



Figure 3: Simple distillation process for extraction of oil

The process is continued for about 2 hours to obtain the solution containing oil. After extraction, the sample is filtered out to remove the insoluble solid substance as residue and filtrate containing oil with solvent. The filtered solution proceeds to the simple distillation. Later, the solvent is distilled out and the Oil remains in the round bottom flask. The same procedure is followed for the various weights of the sample. The obtained oil is tested for pesticide properties by standard methods.

III. RESULTS AND DISCUSSIONS

In the end, oil was extracted using the soxhlet apparatus, and then it was separated using a distillation process. Samples of oil are examined for the perseverance of oil obtained and yield.



Figure 4: yellowish light sample(Cyclohexane)



Figure 5: Oil separated after Simple distillation

The results are shown below.

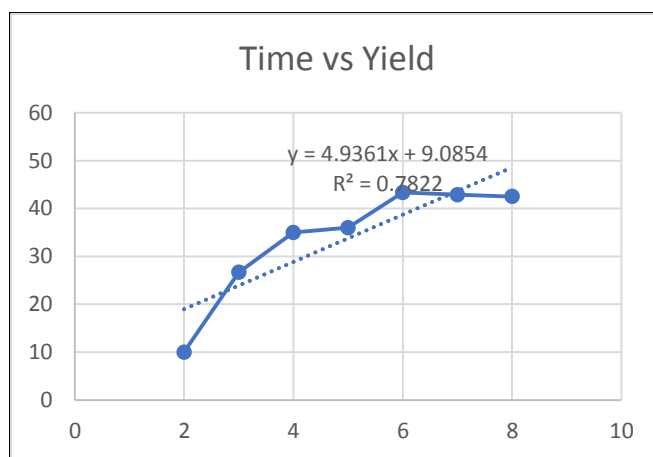
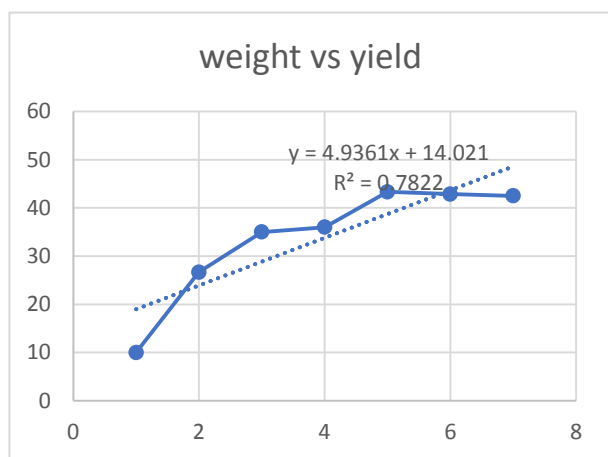
Ingredient (Weight in g)	Solvent (Cyclohexane in ml)	Time(hours)	Oil extracted in ml	Yield %
10	200	2	1	10
15	200	3	4	26.67
20	200	4	7	35
25	200	5	9	36
30	200	6	13	43.33
35	200	7	15	42.86
40	200	8	17	42.5

To Test its Pesticidal properties we Undergo a Gas Chromatography Test in which we obtained some results that are visualized below

S.no	Parameters	Obtained Results
1.	Stearic Acid	1.3
2.	Lauric Acid	1.6
3.	Palmitic Acid	0.3

It confirms that Fatty Acids are present here. Stearic Acid, Lauric Acid, and Palmitic Acid are contained in Gossypium Arboreum oil. With the reference to

pesticide formulation for our product, we can suggest the liquid formulation because our ingredient has an oil form.

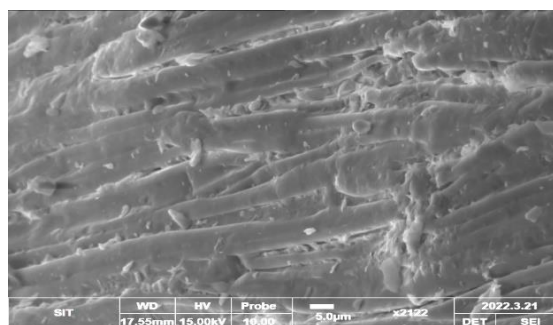
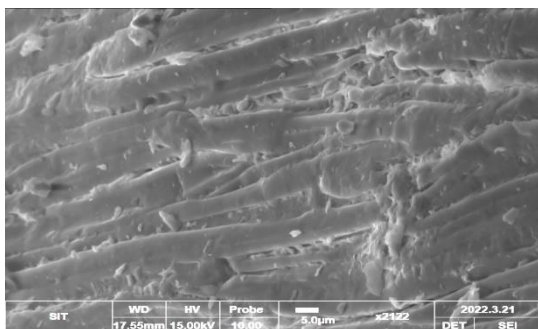


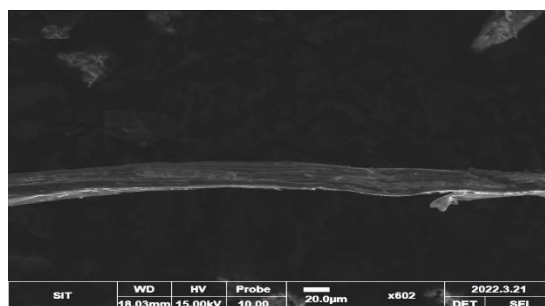
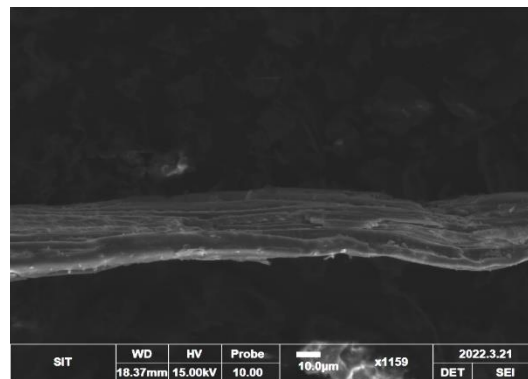
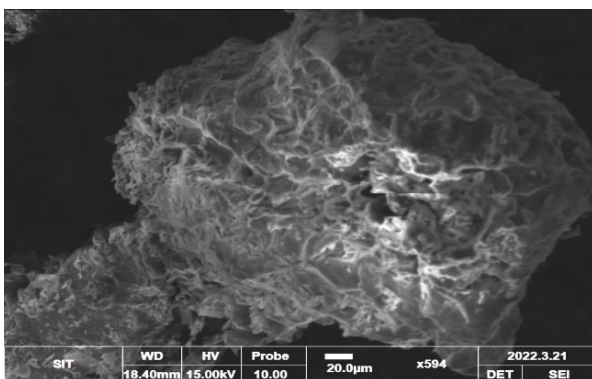
IV. CONCLUSIONS

Pink bollworm, Lepidoptera, and some of the insect sucking pests have major attacks on the plant and

decrease the production of plants. By, using these pesticides we can able to increase the maximum yield % without damage to crops.

The Sem analysis of the raw material are:





1. Presence of Fatty Acids in the oil help us to destroy Pink bollworm and Lepidoptera on the affected surface of the plant.
2. Bio-Pesticides are considered Eco-Friendly.
3. Bio-Pesticides will not affect the Earthworm and Soil Fertility.
4. Appearance of Toxicity present in the Fatty Acid will resist the Pink bollworm and Lepidoptera.

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