

Countryside leaf extracts act as an Eco-friendly natural pesticide

AshokeHazra*
A.K.P.C. Mahavidyalaay
Subhasnagar, Bengai,
Dist-Hooghly, Pin-712611
W.B., India

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Abstract

Present research discusses how countryside leaf extracts act as reasonable pest control for different crops, vegetables, fruits, flowers. Many modern pesticides are used today to store toxic materials in soils, air, and water. These toxin materials affect plants, animals as well as human health. These are also non-biodegradable in our environment. These leave extracts are toxic to insects pests. For this purpose, we collect Neem leaf, Indian Bael leaf, Green Chiretta leaf. After preparation of leaf extracts and uses of different crops, it may be concluded that the decreasing order of the pest control of natural leaf extracts is a Mix of all three leaves>Neem leaves> GreenChiretta> Indian Bael. Elico(171, Mini Spectro) machine was used to characterize these leaf extracts. Especially this pesticide uses on potato field to protect Aphids in West Bengal. Using these natural pesticides, after 2 week 95% Aphids were died.

Keywords: Aphids, Green Chiretta, Indian Bael leaf, Mix of leaf, Neem leaf, natural pesticide, Spectro.

Introduction

In connection with our earlier studies [1], we are trying to improve the preparation, uses, and awareness of natural pesticides, which have beneficial effects on our environment.

Over the past few decades, there has been a growing interest in using pesticides of plant origin for pest control. Due to the shortcomings of synthetic chemicals prevalent in agro-ecosystems, there is a growing interest in botanical pesticides in crop management. To protect our environment from pollution, the use of natural compounds instead of conventional pesticides increases. The neem tree is the most promising plant species to synthesize pesticides [2-7]. Neem based pesticides kill [8-12] beneficial insects and do not interfere with crop growth. Various studies have shown that Neem protects crops from birds, beneficial insects or the non-toxic and most expensive 200 insects for humans. It provides a natural alternative to synthetic pesticides. Neem can not directly kill crop insects. It works in a variety of ways to kill all sucking and chewing insects in the bay who refuse to eat sprayed leaves and die of starvation and disrupt the sexual reproduction of insects so that their life cycle is disrupted and ended. Using natural pesticides reduces the hazards of human health, animals, plants, and our loving environment.

Methodology

2.1 Materials

The materials are Neem leaf, Indian Bael leaf, Green Chiretta

2.2 Apparatus

The apparatus consists of weighing balance, beakers, conical flask, wash bottle, spatula, stirrer, filter paper (Whatman 40).

2.3 Sample Preparation

Green leaves of Neem, Indian Bael, Green Chiretta were collected from the gardens. Then these were chopped separately.

2.4 Sample Extraction

I follow the cold method of extraction method.

2.4.1 Cold Extraction

To prepare neem leaf extract, at first 1 kg of green chopped neem leaf was first required and added 5 litres of distilled water. Then experiment had done for 21 days.

Indian Bael leaf, Green Chiretta leaf, Mixed these three leaves extracts were prepared by the same procedure.

After 7 days, 14 days and 21 days, extracts were filtered as insecticides.

2.5 Characterization of Extract

The cold extracts were characterized using UV/Visible (Elico, 171, Mini Spectro) spectroscopy to determine the wavelength of maximum absorption.

2.6 Spraying procedure

- (i) Use 2.5 litres concentrated leaf extract and 2.5-litre water per spray machine, i.e., 10 litres concentrated leaf extract per bigha. The volume is to be adjusted depending on the exact conditions prevailing, as the intensity of the pest attack.
- (ii) Spraying should be undertaken in the morning or late in the evening. Under hot conditions, the frequency of spraying should be increased. They were spraying once in 7 days and every day in the rainy season in winter.
- (iii) Insects lay eggs on the underside of the leaves. So it is essential to spray under the leaves also.
- (iv) It is better to use low concentrations of extracts frequently.

Results and Discussions

Fig.1 to Fig.4 shows the absorbance data of different leaf extracts after 7 days. Fig.5 to Fig. 8 show the absorbance data of the leaf extracts after 14 days. Fig.9 to Fig.12 show the absorbance data at a different wavelength of the leaf extracts after 21 days.

From this experiment, it has been found that for Neem leaf extracts after 7 days, 14 days and 21 days, intercepts are 2.275, 3.00 and 3.54, respectively. As intercept values are high, then the absorbance data also high. The activity of these natural pesticide increases gradually from 7 days to 21 days. After 21 days, the activity of extracts is not so good. For this cause, after 21 days, absorbance data of extracts are not discussed.

A mix of all three leaf extracts shows a higher intercept value in spectrophotometric data than the other single leaf extracts (Neem, Indian Bael, Green Chiretta). The intercept value of the Mix of all three leaf extracts is 3.22, 3.78 and 3.98, respectively, after 7 days, 14 days and 21 days, respectively. A natural pesticide mix of all three leaf extracts (Neem, Indian Bael and Green Chiretta leaf) works very well against pests. In our countryside, these leaves were readily available and non-hygienic.

After 7 days result of spectrophotometric data of our experimental leaf extracts

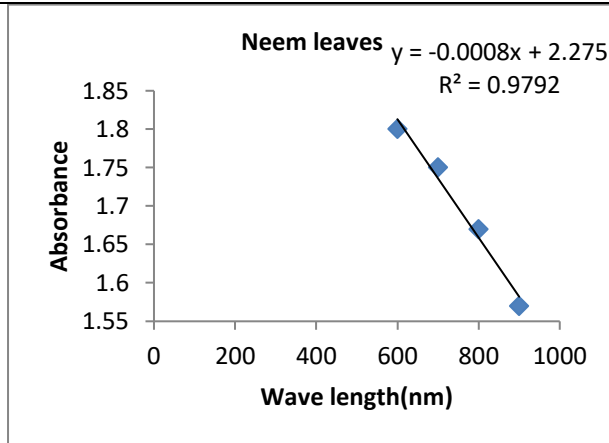


Fig.1. A plot of Absorbance Vs. The wavelength for Neem leaf extracts after 7 days

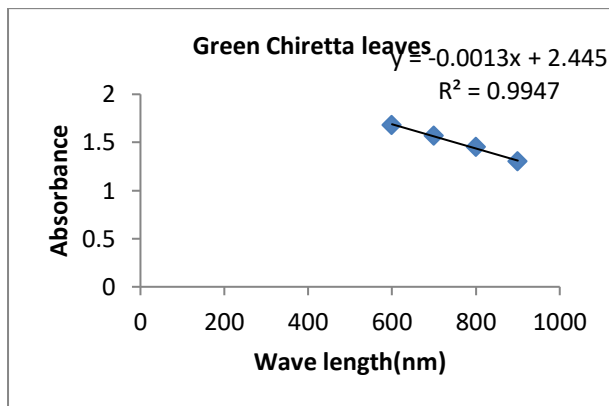


Fig.2. The plot of Absorbance Vs. The wavelength for Green Chirettaleaf extracts after 7 days

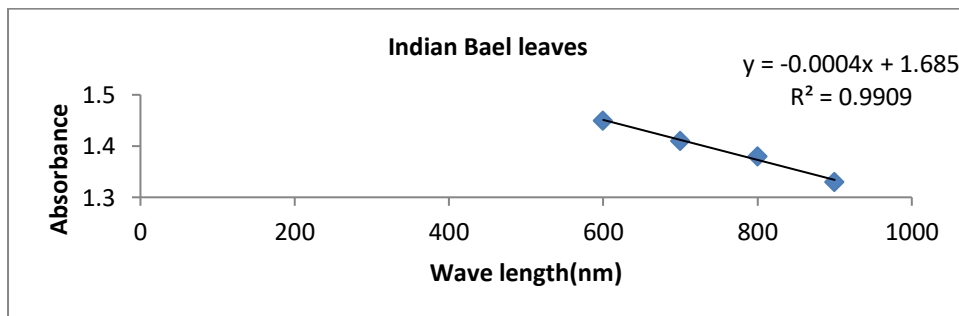


Fig.3. A plot of Absorbance Vs. The wavelength for Indian Bael leaf extracts after 7 days

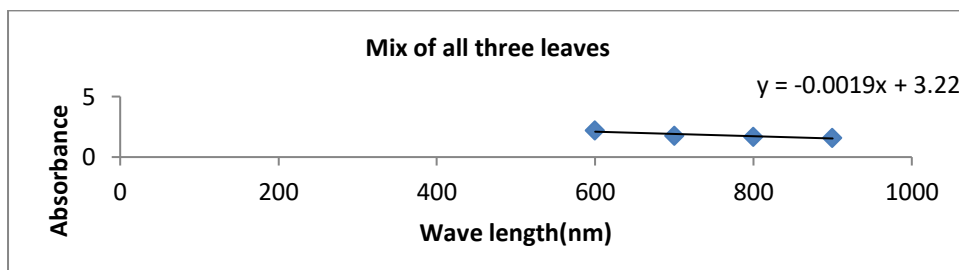


Fig.4. A plot of Absorbance Vs. The wavelength for MixMix of all three leaves extracts after 7 days.

After 15 days result of spectrophotometric data of our experimental different leaf extracts

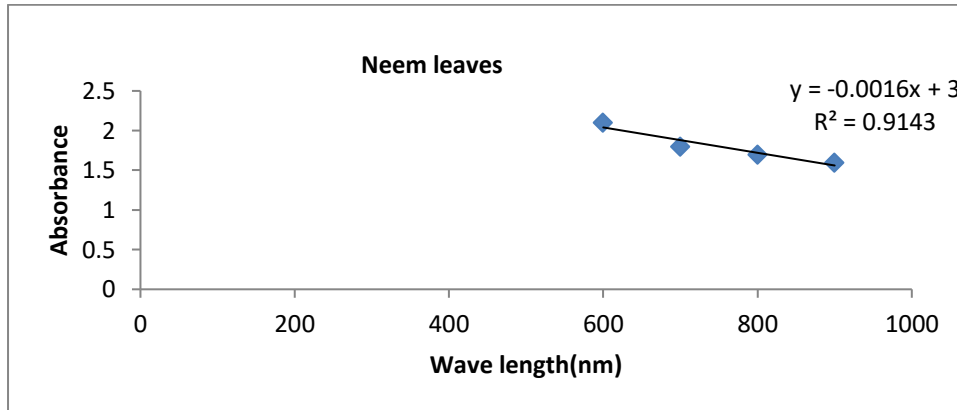


Fig.5. A plot of Absorbance Vs. The wavelength for Neem leaf extracts after 14 days

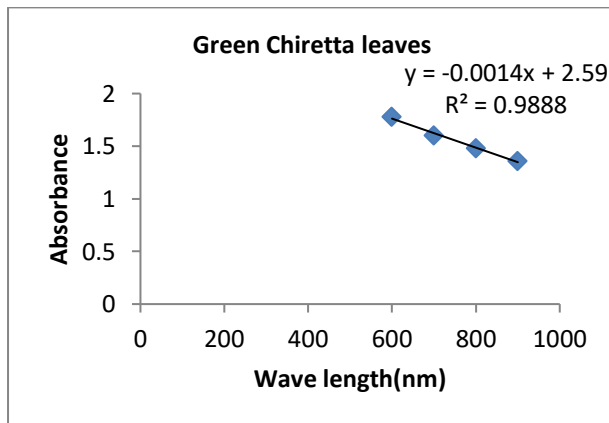


Fig.6. A plot of Absorbance Vs. The wavelength for Green Chiretta leaf extracts after 14 days

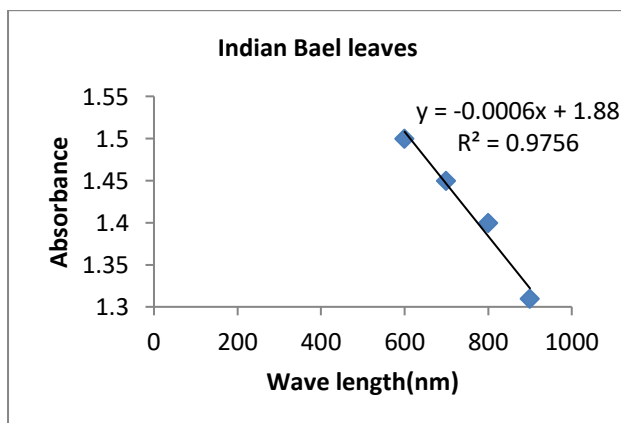


Fig.7. A plot of Absorbance Vs. The wavelength for Indian Bael leaf extracts after 14 days

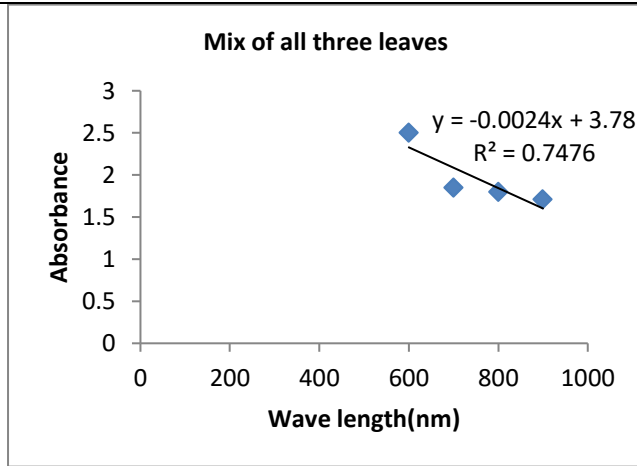


Fig.8. A plot of Absorbance Vs. The wavelength for Mix of all three leaf extracts after 14 days

After 21 days result of spectrophotometric data of our experimental leaf extracts.

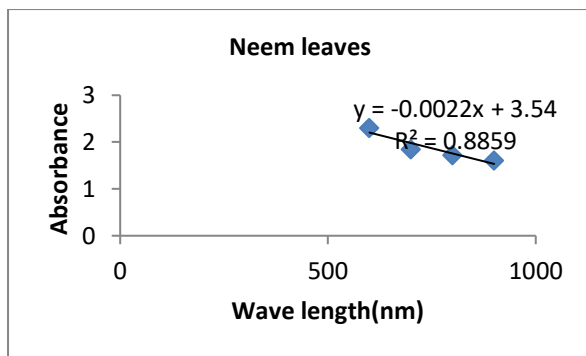


Fig.9. A plot of Absorbance Vs. The wavelength for Neem leaf extracts after 21 days

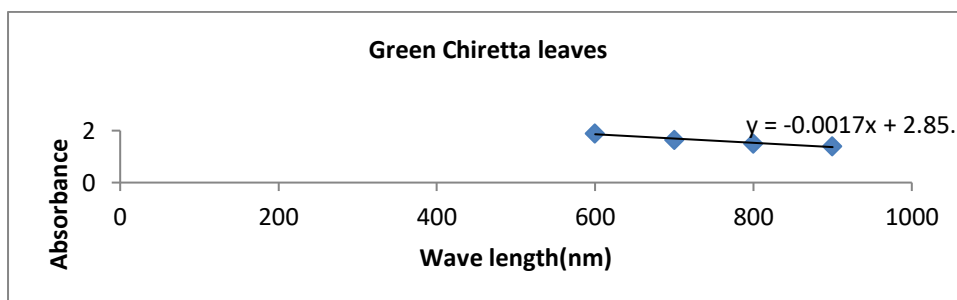


Fig.10. A plot of Absorbance Vs. The wavelength for Green Chiretta leaf extracts after 21 days

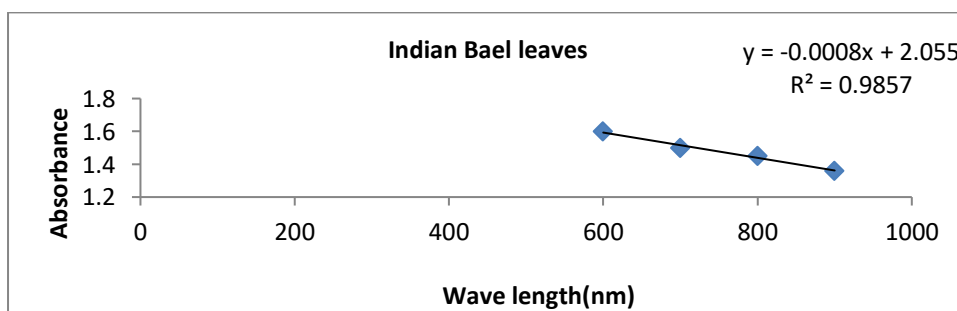


Fig.11. A plot of Absorbance Vs. The wavelength for Indian Bael leaf extracts after 21 days

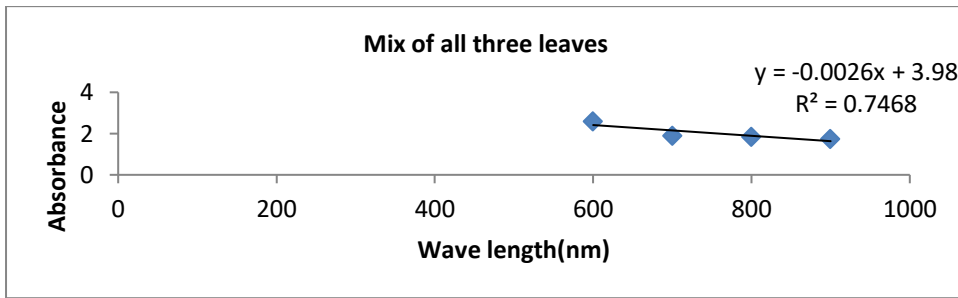


Fig.12. A plot of Absorbance Vs. The wavelength for Mix of all three leaf extracts after 21 days

Now a days, different poisonous chemicals can be used for a quick result against pests. However, these chemical-based pesticides are too harmful to soil, air, water, and our environment. For this reason, our research focuses on environment-friendly natural pesticides, and we get a better result after using these pesticides.

Aphids are attacked by potato in West Bengal. They are also called sucker. For this attacked by aphids, the leaves of potato turn to curl. So, their existence in our crops is damaging. As well as production will be less. Cultivators can not get their desirable production.

Week 1, we are taking our natural pesticide like Indian Bael leaves, Green Chireta leaves, Neem Leaves, Mix of all three leaves. In our potato fields, five small plots are chosen for this study.

For the 1st week we spray the above four pesticides were mix with some shampoo solutions. Shampoo solutions are better additive for pesticide spraying which works better against Aphids.

After 1st week, 70% Aphids were died by these natural pesticides. But after 2nd week, 95% Aphids were died by using our prepared natural pesticides.

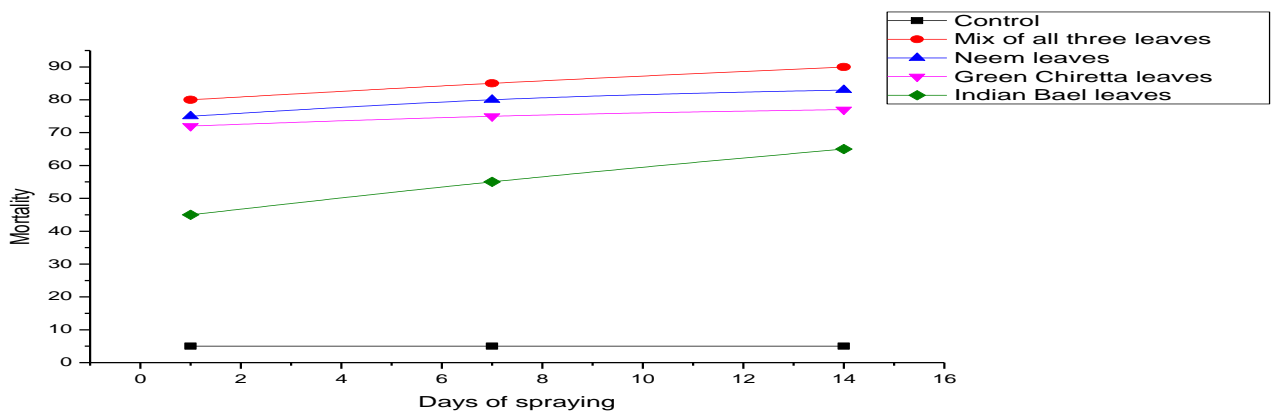


Fig.13. Plot of Mortality Vs. Days of Spraying (after Week1)

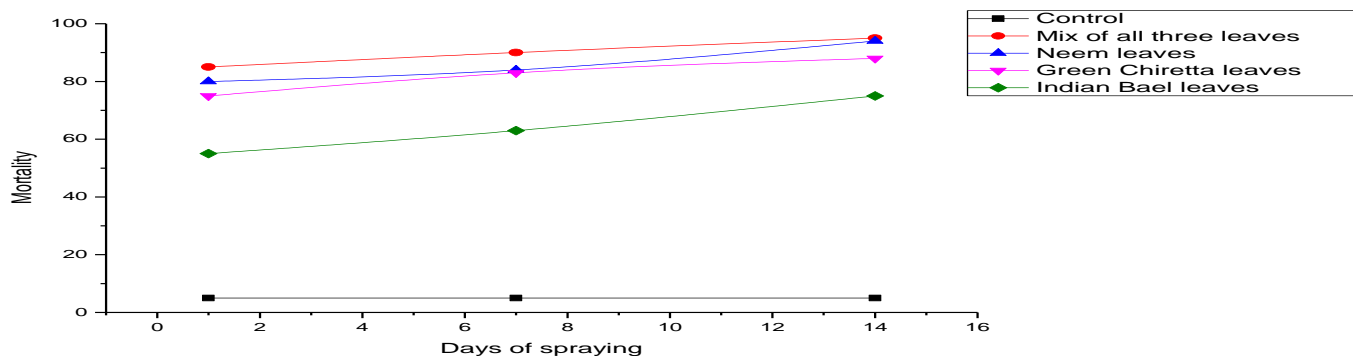


Fig.14. Plot of Mortality Vs. Days of Spraying (after Week2)

The better performance was observed in this sequence: Indian Bael Leaves < Green Chiretta Leaves < Neem Leaves < Mix of Bael, Chiretta and Neem leaves. The results were given in the Fig.13 and Fig.14 respectively. At control condition (where spraying does not occur) there was no change i.e, Aphids are too much attacked by the potato leaves.

Our experimental result reveals that the decreasing order of the leaf extracts are : The Mix of all three leaves > Neem leaves > Indian Chiretta > Indian Bael for pest control use.

Conclusions

From the above study, it may be concluded that countryside leaf extracts show better performances against pests. The Mix of neem-based leaf extracts shows a good result from our observation. It may also be concluded that the decreasing order of the pest control of natural leaf extracts is Mix of all three leaves > Neem leaves > Indian Chiretta > Indian Bael. Many modern pesticides are used today to store toxic materials in soils, air, water. To reduce toxic materials, we try to use nature-friendly pesticides. Due to the non-toxicity of the countryside, leaf extracts provide a prominent alternative for developing sustainable and eco-friendly pesticides. This pesticide uses on potato field to protect Aphids in West Bengal. Using these natural pesticides, after 2 week 95% Aphids were died. It may be concluded that home made countryside leaf extracts acts as good pesticides against Aphids of our potato fields in West Bengal.

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- Email id for the corresponding author: hazra.ashoke@gmail.com