

# Insecticidal Activities of *Solanum nigrum* L. Extract Against Pest Infestation of *Momardica charantia* L.

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## ABSTRACT

This study was based on evaluating the efficacy and efficiency of *Solanum nigrum* L. botanical extract against insect pest emergence and infestation on bitter gourd (*Momardica charantia* L.) plant in comparison with chemical pesticide through seed treatment method. The *S. nigrum* appeared as a great repellent against major insect pests of bitter gourd and also inhibit settlement of different growth stages of pests. The study was conducted in Department of Zoology, Jinnah University for Women from July-November 2017. The results indicated that higher pest emergence was observed on negative control plant i.e. 46% of insect pest infestation rate while chemical pesticidal treated plants (positive control) were appeared 6% infestation of insect pest. Minimum pest emergence and infestation was appeared in *S. nigrum* treated plants with efficient and healthy growth of *M. charantia*.

**Keywords:** Seed treatment, repellent, infestation, pests, emergence.

## INTRODUCTION

Agriculture sector of Pakistan apply synthetic pesticides at large scale to enhance yield production by controlling pest infestation, now Pakistani agro-food products being freight to other countries due to over and misuse of chemical pesticides and exceed maximum residue level (MRL) (Chandio *et al.* 2017, 144-149). The methods of pest control is facing many hurdles due to the advent of chemical pesticides resistance issues in major crop pests, the huge and inappropriate use of agro-chemicals caused injurious and cureless impacts on non-target host and environment (Kouser *et al.* 2015, 66-86). Now a days pest control strategies largely depend on application of broad spectrum pesticides with ecofriendly nature that efficiently target the specific pests without destroying surrounding environment (Khan *et al.* 2015, 9-16). Botanical pesticides are well known substitute to chemical pesticides that are highly effective, less toxic to environment and target specific pest, they play a vital role in world's agro-food market due to their biodegradable nature and broad spectrum nature with enhanced action area and substitution of synthetic pesticides thus bio-pesticides give exclusive assets all along the food profit chain and providing further preference for farmers, buyers, sellers and retailers (Ndakidemi *et al.* 2016, 364). Botanical extracts and essential oils can be lethal and have highly toxic to different stages of insect pests by direct contact, ingestion, repellency, ovicidal and larvicidal activities. *Lavender angustifolia* (Mill) and *Hyptis suaveolens* (L.Poit) bio-extracts are also lethal and act as oviposition deterrents against the Queensland fruit fly, *Bactrocera tryoni* (Froggatt) (Karani *et al.* 2017, 1-10).

The present study describe the potential and adequacy of *S. nigrum* bio extract and plant care chemical pesticide for the management of insect pests of bitter gourd plant through seed treatment method.

## OBJECTIVE

The major objective of this study was to control insect pest infestation by applying botanical extract of *Solanum nigrum* L. on bitter gourd (*Momardica charantia* L.) through seed treatment method in comparison with chemical pesticide

## METHODOLOGY

The present study is comprises on 3 major parts i.e. treatment of bitter gourd seeds with *Solanum nigrum* botanical extract along with positive control (plant care chemical pesticides; active ingredient imidacloprid), development of treated seeds and insect pest inspection on developing plants. Add 1ml *Solanum nigrum* (L) bio-extract in each beaker and mix it well. Add 5 fresh bitter gourd seeds in each beaker and mix it well. Leave them beakers for 30minutes to soak. After 30minutes, discard the liquid and marked the seeds as R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub>. Same procedure was repeated for the treatment of seeds with positive and negative control replicates. Climatic condition was dry and indirect sun light penetrated at the area where the pots were placed. The length of area was about 99 cm (3.24ft) and width was about 91 cm (2.95ft). The duration of experiment was July to November. After 4 hours of seed treatment, sowing of seeds was done. The temperature of Karachi was 30 °C and humidity level was 79% in air at the time.

## RESULT AND CONCLUSION

In the respective research, the emergence of pest on treatment plants is crucial for investigating efficacy of *S. nigrum* extract. Major insect pests were observed on negative control plants. In the month of July medium insect pest infestation were observed and it was the minimum rate of insect detection on control plant. Medium concentration of insect pests were observed in the month of August and higher rate of pest emergence were detected in the months of September and October. The overall rate of insect detection was 46%. The insect detection rate on bio-extract treated plants was lowered. Overall rate of insect detection on bio-extract treated replicates were 3%. In July, September and November no insect was detected but only minute quantity of insects detected in the month of August and October. Insect detection on chemical pesticide treated plants (positive control) was higher than bio-extract insect detection rate but overall rate was low as compared to controlled, insect pest detection and it was about 6% during observation period. In the month of July and October, no pest infestation was detected on chemical pesticide treated plants but in months of August, September and November higher insect pests were detected on chemical pesticide treated plants respectively.

## CONCLUSION

On the basis of respective results, authors concluded that *Solanum nigrum* L. appeared as a better and effective alternative of chemical pesticides in management of pest emergence and infestation on bitter gourd plant with enhanced and healthy growth of plants by seed treatment of bitter gourd with minimum pesticidal residue level due to its high bio-degradability nature. The present study suggested that botanical pesticides in future would appear as a green revolution in agro-food industry and act as better replacement of synthetic pesticides.

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