

Organic Amendments Induced Host Plant Resistance against Crop Pest

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SUMMARY

Plants in nature have their own auto mechanism to combat the pest damage which includes antixenosis, antibiosis and tolerance. Antixenosis host plant resistance mediated by production of secondary metabolites like phenolics, alkaloids, terpenes, lipids and carbohydrates play important resistance against pest. Phenolics showed significant negative impact on pest incidence in most of crops in which significant positive impacts were recorded with respect to protein, total sugars and reduced sugars. Induced production of these potent plant secondary metabolites by using organic amendments is responsible for induced host plant resistance. Number of organic amendments like Farm yard manure, vermicompost, neem cake and poultry manure can be exploited for induce resistance. Eco-friendly nature, quality product and zero impact on beneficial insects were key features which make them exploit in pest management in IPM.

INTRODUCTION

Synthetic pesticides are extensively used to control the crop pest. Extensive use of insecticides leads to toxicity against beneficial species, resurgence of pest, high residue effect and hazard to human non-target organisms. As important component of IPM, Host plant resistance (HPR) is an important tool for eco-friendly management of pest. HPR mechanism involves Antibiosis, antixenosis and tolerance. Antixenosis involves production of secondary metabolites by plants which adversely affect biology of insect pest. Secondary metabolites may include phenols, tannins, proteins, total sugars, silicon compounds and glucosinates etc., Induced host plant resistance is advance immunization of plant by using biotic or abiotic stimulants. Organic sources of nutrients and amendments are exploited as source for induction of HPR through the production of defensive chemicals in plant increases that influence the development and survival of crop pests. Number of organic amendments such as farmyard manure, poultry manure, vermicompost, neem cake and night soil were used to induce HPR in plants (Belete, 2018).

Successful examples for induced HPR using Organic amendments

Induced Systemic Resistance through Organic Based IPM Module against Pest Infesting Chilli studies by Ravikumar *et al.* (2017) reported the enhanced defensive against pests of chilli with significantly higher phenols and silica content leading to induced resistance. Also, reduced less content of total chlorophyll and reducing sugars making the plants less prone to pest attack and found safer to natural enemies. As, additional effect it increased soil micro floral population which enhanced the mobilization of nutrients to the plant resulting in quality product. The organic manures induced the phenol production in pods and thus induced resistance. Incidence of pod fly and pod bug were significantly reduced by using neem cake and poultry manure which showed significant negative correlation with phenols and significant positive correlation with protein, reducing sugars and total sugars (Bommasha *et al.* 2014). Antixenosis mode of resistance induced resistance by organic amendments showed significant reduction of incidence of *Spodoptera litura* and *Thysanoplusia orichalcea* in soya bean. Significant higher concentration of phenols are responsible for induced resistance in organic treated soya plants whereas, significantly higher concentration of sugars, free amino acids, soluble proteins and prolines were responsible for higher incidence of defoliators in commercial nutrients treated soya bean (Nazeem., 2011). Significant negative correlation was recorded in incidence of ground nut sucking pest with respect to phenolic and tannin concentration in organic cropping system whereas, significant positive correlation was recorded in incidence of ground nut sucking pest with respect to protein and total sugar concentration in commercial fertilizers treated plots (Rao., 2002).

Individual organic amendments have their own contribution towards the induced resistance. Evaluation of incidence of different lepidopteron pest in rice with different organic amendments revealed that maximum incidence of rice yellow stem borer was recorded in commercial fertilizers (NPK) plots followed by FYM and vermicompost whereas, neem cake application showed significant lower population of rice yellow stem borer

and leaf folder (Ashrith *et al.*, 2018). In addition to increased HPR, quality of the products is also increased to a significant level. Quality impact of organic amendments on cabbage revealed significant higher concentration of ascorbic acid, P, K and ash content also, significant storage life is also increases (Kumar., *et al* 2015).

CONCLUSION

Adverse effect of extensive use of insecticides can be mitigated by using potent organic amendments to induce host plant resistance in crop plant to reduce the pest incidence. Eco-friendly, increased quality and quantity of crop and zero effect on non target beneficial insects resulting in sustainable agriculture. Molecular identification of secondary metabolites responsible for induced resistance as better scope in future crop management practice as a component of IPM.

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