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EFFECT OF ORGANIC AMENDMENTS AND GROWING MEDIA ON PLANT ATTRIBUTES OF BRINJAL NURSERY

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Abstract

Brinjal is an important transplanted vegetable crop of solanaceae family cultivated in India. It is susceptible to various root diseases and pests out of which root knot nematode in recent years has been reported to cause serious damage to brinjal. In this study the effect of using organic amendments in soil less media is studied and its effects on various plant growth attributes are recorded. Cocopeat and vermicompost were used as soil less growing media along with organic amendments i.e. Trichoderma, crucifer residues and AM fungus individually as well as in combination. It is noteworthy to state that soil less media with various organic amendments were superior in all plant growth attributes in comparison to the conventional soil media. This findings can be a building block in creating awareness and acknowledging the benefits of use of various biological amendments in soilless growing media in geographies and fields infested with root knot nematode.

Keywords **:** Trichoderma, Brinjal, vermicompost, growing media.

Introduction

Brinjal or eggplant (*Solanum melongena*) is a principal crop of solanaceae family grown in sub tropics and tropics. It is a popular indigenous vegetable crop of India which is cultivated in 733 thousand hectares and contributes for 7% of the total vegetable production in the country (www.nhb.com, 2017). Brinjal is attacked by various root diseases and pests, out of which root knot nematode has recently become very critical causing significant losses to brinjal farmers. A healthy nursery is a pre requisite for a productive crop stand however, raising a healthy nursery on nematode infested soils pose a serious challenge to brinjal farmers. Sustainable agriculture aim to manage soil and plant health while relying less on chemical inputs. The non-judicious use of chemicals for raising healthy nursery may cause degradation in soil fertility and environmental pollution. In view of this organic amendments and soilless media for raising healthy nursery is a safer alternative in sustainable agriculture. The individual effect of organic amendments on suppression of root pests and positive plant health effect in soil is well documented. However, the benefits of use of various biological amendments in soilless growing media is not widely known and established in India. .

Material and Method

The present investigation was conducted in the department of Amity Institute of Organic Agriculture, Amity University, Noida during 2017-18. The root knot nematode infested soil was collected from hotspots areas identified at Kurag village in Solan district of Himachal Pradesh, India. The collected soil samples were kept in refrigerator for use in plug-tray experiment. The experiment was laid out in Factorial Completely Randomised Design with 8 treatments in factor one viz. T-1 (Control), T-2 (Trichoderma), T-3 (AM Fungus), T-4 (Crucider residue), T-5 (Trichoderma + AM fungus), T-6 (Trichoderma + Crucifer residue), T-7 (AM Fungus + Crucifer residue) and T-8 (Trichoderma + AM Fungus + Crucifer residue) and three treatments in factor two, G-1 (Field Soil), G-2 (Vermicompost) and G-3 (Cocopeat). The data were analyzed statistically and interpreted.

Result and Discussion

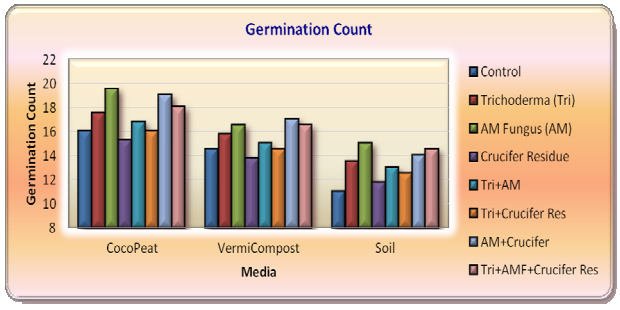
The two factor i.e. growing media and soil amendments and their interaction effect differed significantly in per cent germination, days to 50% germination, shoot length, root length and fresh weight.

Per cent Germination

Among the different growing media, the best percent germination was observed in cocopeat followed by vermicompost and soil. Among different soil amendments incorporated in cocopeat, the maximum per cent germination was observed in AM fungus (T-3) followed by AM fungus + crucifer (T-7) treatment and Trichoderma+ AM fungus + Crucifer residue (T-8). In vermicompost, the maximum germination was observed in AM fungus+ crucifer (T-7) closely followed by AM fungus (T-3) which were statistical at par and superior than control (T-1). In soil, the maximum per cent germination was observed in treatment AM fungus (T-3) followed by Trichoderma+ AM fungus + Crucifer residue (T-8) and AM fungus+ crucifer (T-7) which are all statistical at par and superior than control (T-1).

The interaction effect of different soil amendments and growing media Cocopeat + AM fungus registered the highest percent germination, while lowest per cent germination was recorded in Soil with no amendments.

Valeria (2015) reported that AM fungus role is known to have positive effect on germination in radish. The role of soil less media plays a positive role in seed germination. Bhardwaj (2011) reported medium of vermicompost, sand, soil and cocopeat showed highest germination percentage in papaya.



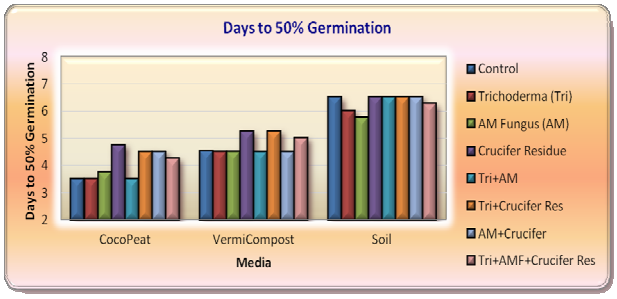
Days to 50% germination

Among the different growing media, the earliest to 50 per cent germination was observed in cocopeat followed by vermicompost and soil.

Among different soil amendments incorporated in cocopeat, the minimum days to 50 per cent germination was observed in Trichodema +AM fungus (T-5) followed by treatment of AM fungus (T-3). While soil amendments incorporated in vermicompost and soil respectively, all treatments were at par and there was no statistical difference among the treatments.

Regarding the interaction effect of different soil amendments and growing media, Cocopeat with no amendments, cocopeat + Trichoderma and Cocopeat + Trichoderma + AM fungus recorded the lowest days to 50 per cent germination as compared to rest of the treatment interactions.

Bhardwaj (2011) reported growing medium of vermicompost, sand, soil and cocopeat provided quickest germination. Asaduzzaman *et al.* (2010) reported useful of *Trichoderma spp.* to enhance the germination of chilli seeds as well as reduction to delayed germination.

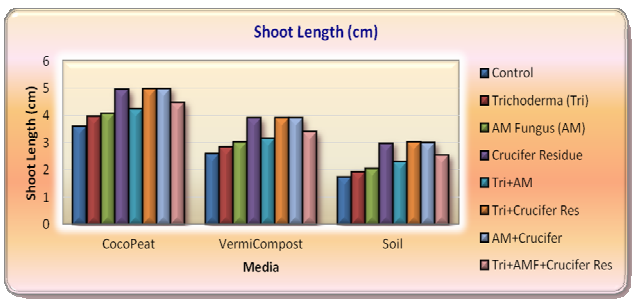


Shoot Length

Among the different growing media, the shoot length was recorded maximum in cocopeat followed by vermicompost and soil. Among different soil amendments incorporated in cocopeat the maximum shoot length was observed in Trichoderma + Crucifer Residue (T-6), AM fungus + Crucifer residue (T-7) and Crucifer Residue (T-4). All these three treatment were statistically at par with each other. While in vermicompost and soil, similar trend was observed for shoot length.

The interaction effect of different soil amendments and growing media, the maximum shoot length was recorded in Cocopeat + Trichoderma + Crucifer Residue, Cocopeat +AM fungus + Crucifer residue and Cocopeat + Crucifer Residue.

Bhuiyan, *et al.* (2016) reported biomass yield, seedling height and nutrient uptake by tomato seedlings increased greatly with the use of AM inoculum. In additional to AM fungus, trichoderma has also reported to have positive impact of shoot length. Ban, Gwendolyn *et al.* (2018) reported in their study in tomato and bean that on an average, Trichoderma inoculation increased the root and shoot length, and the fresh weight up to 26.4, 9.6 and 18.8%, respectively over the control.

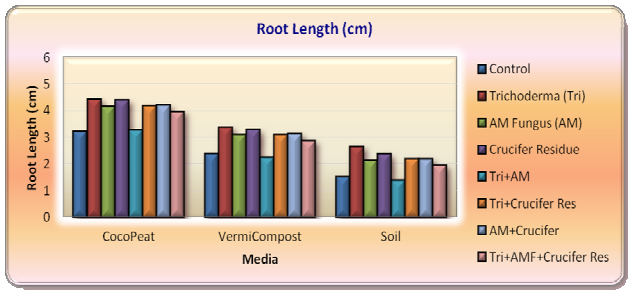


Root Length (cm)

Among the different growing media, the root length was observed highest in cocopeat followed by vermicompost and soil. Among different organic amendments incorporated in cocopeat and vermicompost respectively, the root length was highest in Trichoderma (T-2) and Crucifer Residue (T-3) which are statistically at par with Trichoderma +crucifer (T-6) and AM+Crucifer (T-7). However, among different organic amendment incorporated in soil, the root length was observed highest in Trichoderma (T-2) followed by crucifer residue (T-4) which were at par with Trichoderma +crucifer (T-6) and AM fungus+ crucifer residue (T-7).

The interaction effect of different soil amendments and growing media, Cocopeat +Trichoderma and Cocopeat + Crucifer Residue which were statistically at par with Cocopeat + Trichoderma + crucifer residue and Cocopeat + AM Fungus + Crucifer residue.

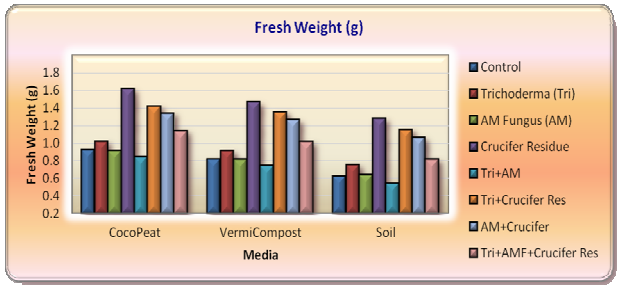
Tanwar *et al.* (2013) demonstrated that application of *T. viride* alone or in combination with other growth promoting microbes (AM fungi and *P. fluorescens*) proved to be a promising factor for improved growth performance, including root length.



Fresh weight

Among the different growing media, the maximum fresh weight was observed in in cocopeat followed by vermicompost and soil. Among different organic amendments incorporated in cocopeat, the maximum fresh weight was observed in crucifer residue (T-4) followed by Trichoderma + crucifer (T-6) and AM+Crucifer (T-7). However, in case of different organic amendments incorporated in vermicompost and soil respectively, the maximum fresh weight was observed in crucifer residue (T-4) which is statistically at par with Trichoderma + crucifer (T-6) followed by AM fungus + crucifer residue (T-7).

The interaction effect of different soil amendments and growing media, cocopeat + crucifer residue recorded highest fresh weight followed by vermicompost + crucifer residue.



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