



Effects of Vermicompost and Manure on Yield and Yield Components of Coriander (*Coriandrum Sativum L.*) as a Medicinal Herb

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Abstract

The purpose in this research was to study the effects of Vermicompost and poultry manure on yield and yield components of the medicinal plant coriander (*Coriandrum sativum L.*) in the Shahr-e- Ghods region. A factorial experiment using the randomized complete block design with three replications was conducted in the Islamic Azad University of Shahr-e- Ghods. The first factor was three levels of Vermicompost: (0%), (15%), (30%), the second factor three levels of poultry manure: (0%), (10%), and (20%), and the third factor the mutual effects of these two factors. Results showed that in most studied characters there were significant differences between the applied treatments and the control. Application of Vermicompost and poultry manure increased seed yield, percentage of essential oils, etc., but the Vermicompost treatment caused the largest improvements in most characters. For example, the maximum seed yield (5.79) was achieved with the application of 30% Vermicompost, while these treatments had the least effect on the 1000-seed weight, the number of stems per plant, and the harvest index. The mutual effects of applying 30% Vermicompost and 20% poultry manure resulted in the highest percentage of essential oils content (1.73 percent) compared to the control, while these treatments did not influence the number of stems per plant, the biological yield, the number of umbels per plant, and the essential oils yield. Results of this experiment showed that application of Vermicompost and poultry manure could play an important role in increasing the efficiency of coriander production.

Keywords: Vermicompost, Poultry manure, Coriander seed yield, Percentage of essential oils

Introduction

Organic farming is a farming method that enjoys a special position today. In this method, sustainable production of food crops, in combination with environment protection and attention to social and economic relationships, is important. Moreover, materials used in organic farming are considered one of the main pillars of soil fertility because they have beneficial effects on the physical, chemical, and biological properties of soils and on soil fertility too. Use of organic materials helps farmers save inputs and energy. Organic farming has applications in various sciences such as agriculture, ecology, and environmental sciences; and it has generated increasing interest among farmers, researchers, officials, and policy makers (Moradir, 2009; Jahan et al., 2010; Darzi et al., 2011; Tahami Zarandi et al., 2011). At present, a fertilizer called Vermicompost is used as an environmental innovation to increase the qualitative and quantitative growth of medicinal plants. Vermicompost is an organic humus by specific types of earthworms as a result of turnover relative digestion of organic waste (manure, crop residue, etc.) while passing through the digestive tract of animals there is (arancon et al., 2004). This organic fertilizer

also increases irrigation intervals, has great water and nutrient absorption and retention capacity, increases porosity, and improves aeration and drainage (darzi et al., 2010; Saeednezhad et al., 2010; Asgharipour M.R. 2012). Organic compost or vermicompost as a way to reduce pathogens and organic contaminants have been suggested in the nutrient-rich plant will produce valuable products (Fernandez et al., 2010). Features Vermicompost at herb plants is Persistence of many species of flowering ornamentals, maintaining the color and fragrance of flowers at the time of supply, an increase of essential oils and herbs are effective in preventing yellowing and loss of leaves, germination of seeds, increased persistence of cut flowers during storage at Florists(arancon et al., 2004). Poultry manure is another organic fertilizer that improves biological activities, cultivation, and soil physical properties (Jahan et al., 2010; darzi et al., 2011). Three fresh chicken manure equivalent to 50 kg of potassium sulphate, 100 kg triple superphosphate and is 50 to 100 kg urea. Poultry manure composition is very different than other animal manures. Fresh poultry manure is range 70% moisture. Poultry manure. If properly maintained and transferred to the field and should be taken fertilizer very valuable. The best method of determining the amount of poultry manure per ha of poultry manure is decomposed test. In this test, the amount of nutrients in chicken manure and chemical properties, particularly *ph* is characterized. Amounts Consumption with respect to the experimental analysis of poultry manure and soil test is determined. Poultry manure on the fields are used in different seasons. The consumption of poultry manure in autumn maximum time for decomposition poultry manure and nutrient release that will be provided. Application of poultry manure in autumn to prevent nitrogen loss in light textured soils is not recommended. In its application in the spring for waste nitrogen in the field, there is little opportunity, However, its use in spring Farming operations and planting delays And can increase soil compaction In most cases, they use poultry manure manure in the summer and winter And the use of poultry manure before planting, Full mix it with soil plowing to avoid placing the seeds in a place with high poultry manure Recommended (Mitchell., 1995; Schmith., 1998). Given the continuing increase in Vermicompost application compared to other fertilizers, this organic fertilizer is expected to cause dramatic developments in agriculture.

Materials and Methods

An experiment was conducted in the experimental field belonging to the Agricultural College of the Islamic Azad University of Shahr-e- Ghods Branch in 2013 in order to study the effects of Vermicompost and poultry manure application on yield and yield components of the medicinal plant coriander. Coriander seeds were selected from local seed stocks. This was a factorial experiment using the randomized complete block design with three replications and nine treatments in pots. The first factor was three levels of Vermicompost (0, 15, and 30 percent of the volume of pots), the second factor three levels of poultry manure (0, 10, and 20 percent of the volume of the pots), and the third factor the mutual influences of the first two. All three factors were evaluated at vegetative, flowering, and post-flowering stages. Seed were planted on the 20th day of the first month of spring. Growing, mechanical weeding, irrigation, and chemical weed control operations were carried out. The characters studied included seed yield, biological yield, plant height, 1000-seed weight, harvest index, number of stems per plant, number of seeds per umbel, number of umbels per plant, and percentage of essential oils content. Four plants were selected randomly from each treatment to determine these characters. ANOVA was performed using the SAS software, comparison of the means was carried out by employing the LSD test at five percent probability level, and the diagrams were plotted using Excel.

Results and Discussion

ANOVA concerning percentage of essential oils content indicated that the Vermicompost treatment was significant at the one percent probability level. Comparison of the means of the data on essential oils content revealed that the treatment of 30% Vermicompost with 1.55 percent had the highest essential oils content and the control treatment with 0.80 percent the lowest (Figure 1).

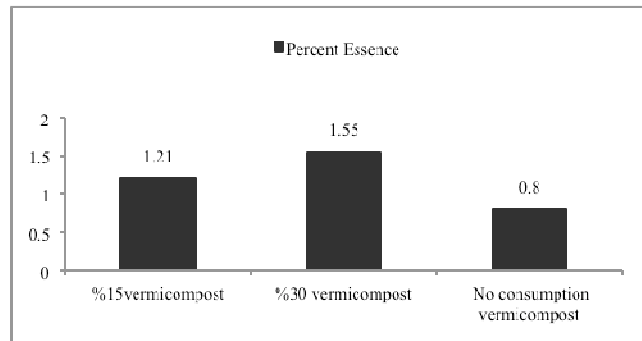


Fig. 1- Effects of Vermicompost on essential oils content (in percentage): a, 30% Vermicompost, b, 15% Vermicompost, and c, no Vermicompost applied. The symbol ■ represents the percentage of essential oils content

ANOVA regarding the data on percentage essential oils content showed that the effects of poultry manure were significant at the one percent probability level. Comparison of the means of data indicated that the treatment of 20 percent Vermicompost increased essential oils yield to 1.37 percent compared to the control treatment, while the control treatment had the lowest essential oil content (0.99 percent) (Figure 2).

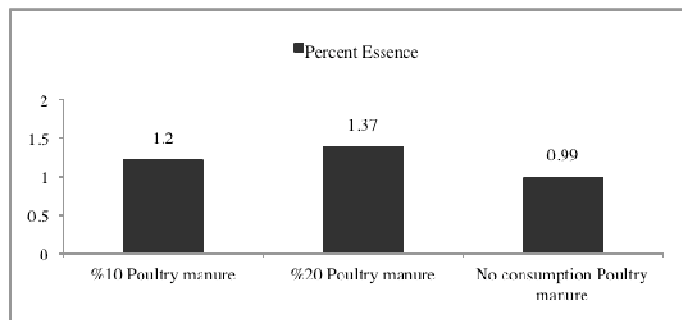


Fig.2- Effects of poultry manure on essential oils content (in percentage); a, 20% poultry manure, b, 10% poultry manure, and c, no poultry manure applied. The symbol ■ represents percentage of essential oils content

ANOVA of the data concerning the percentage of essential oils content showed that the mutual effects of Vermicompost and poultry manure were significant at the one percent probability level. Comparison of the means indicated that the treatment of 30% Vermicompost and 20% poultry manure had the maximum essential oils content (1.73 percent) and the control treatment the minimum (0.50 percent) (Figure 3).

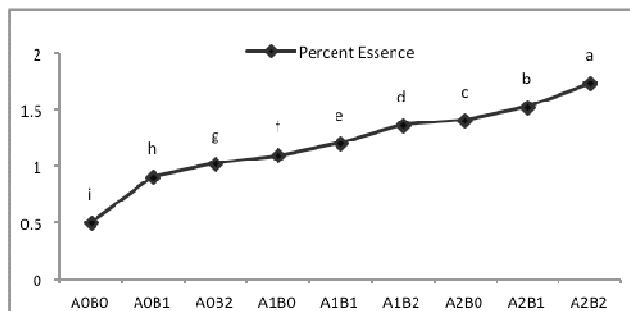


Fig.3- Mutual effects of Vermicompost and poultry manure on essential oils content (in percentage), the symbol ■ represents percentage of essential oils content

Conclusions

In all, results of the experiment showed that application of Vermicompost and poultry manure significantly increased yield and could act as a factor in increasing soil fertility in sustainable agriculture systems, and that Vermicompost application was more effective in these respects compared to poultry manure.

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