International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 10 | October - 2022 Impact Factor: 7.185 ISSN: 2582-3930

Impact of Vermicompost and Chemical Fertilizer on Onion Crop (*Allium cepa)*

Kamble V. S.
Assist. Prof. Department of Zoology.
Sangola College Sangola,Dist- Solapur (M.S.).

Abstract

The experiment was conducted to study the impact of vermicompost prepared from waste pomegranate fruits and chemical fertilizer on onion crop (Allium cepa). The vermicompost was applied in combination with chemical fertilizer. In present study, length of leaf, length of tuber, diameter of tuber and weight of tuber was considered. The over all development of onion crop was recorded in the combination of vermincompost and chemical fertilizer as compare to only vermicompost and only chemical fertilizer.

Key Words- Vermicompost, Chemical fertilizer, Onion Crop.

Introduction

Onion (Alliumcepa) is an important spice crop and herbaceous bulb which belongs to the family Alliaceae. This crop is commercially grown in the world and considered as the most important vegetable crop. The onion is popularly referred to as the “Queen Of Kitchen”. Onion is liked due to the presence of the volatile oil allyl propyl disulphide, an organic compound rich in sulphur. It is also used in several ways, like frozen, fresh, dehydrated bulb and green bunching type (Hernandez AH et al., 2010). Onion has good medicinal value. Recently, onion is being used by the processing industry to a greater extent for preparing dehydrated forms like flake and powder. Onions contain protein (1.2 gm), carbohydrate (11.0 gm), fibre (0.6 gm), moisture (86.8 gm), and several vitamins like vitamin A (0,0012 mg), vitamin C (11 mg), thiamin (0.08 mg), riboflavin (0.01mg), and niacin (0.2mg), calcium (27 mg), iron (0.7 mg), sodium (1.0 mg) and potassium (157 mg) per 100 gm. (Rahman MA et al., 2013).

The fertilizers are either organic or inorganic in nature. They have several deleterious effects on the environment and human health. Leaching in drainage water or agricultural runoff enters into the aquatic ecosystem and leads to degradation of the quality of water and environmental pollution (Aisha AH et al., 2007). It is a fact that use of inorganic fertilizer is not so good for crops' health because of residual effects, but in the case of organic fertilizer, such a problem does not arise and, on the other hand, it not only increases the productivity of soil but also increases crop quality and yield (Tindall M. 2000). Organic manure contains nutrient elements that help to enhance the quality of soil and support production of crops.

Application of organic fertilizers to the soil promotes plant uptake and nutrient availability, which increases the crop yield and quality (Sheeded SI et al., 2014 and Shaheen AM et al., 2007). Organic manure can save the environment by transforming waste material into valuable resources that can be used to supplement soil nutrients (Anonymous 2009).

For conservation of soil moisture, organic manure helps and soil moisture also helps in taking other nutrients for the plant. Manure like poultry, cow dung manure, mustard oil cake, vermicompost is becoming popular and they are also available locally. Vermicompost is a product of interaction between earthworms and micro-organisms by degradation of organic waste to convert it into organic manure (Arancon NQ et al., 2005). Several researchers have reported that vermicompost contains a substance which helps in stimulation of plant growth, building soil structure, particularly growing roots, drilling mud and emulsifiers. Vermicompost stimulates to increase the availability of oxygen, influences the microbial activity of the soil, maintains normal soil temperature, increases soil porosity and infiltration of water, improves nutrient content and increases growth, quality and yield of the plant (Arora VK et al., 2011). The present study was carried out to study the effect of vermicompost and chemical fertilizer on the growth and yield of onion crop from drought-prone region Sangola region (MS).

Material And Method

In this experiment, the seedlings of onion (Allium cepa) were collected after sowing of three months for the transplantation. The parameters such as length of leaf , length of tuber, diameter of tuber were considered for the study of the impact of vermicompost prepared from waste pomegranate and chemical fertilizers on the onion crop, weekly. Randomly, 100 onion crop plants were selected for the study. The leaves of hundred crop plants were cut down and measured the initial reading before transplantationInitial measurements of different parameters are

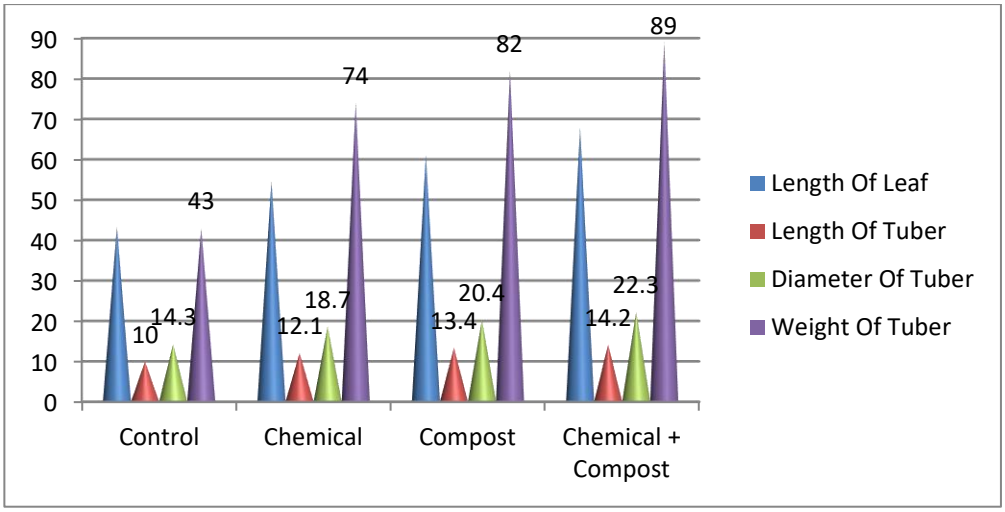
1) Length of leaf – 11.5cm (Leaves cut down before transplantation)
2) Length of tuber -3.5 cm
3) Diameter of tuber – 2.5 cm
4) Weight of tuber – 1 gm

The 04 plots were prepared accordingly to study the impact of vermicompost and chemical fertilizer on different parameters of onion crop as control plot, chemical fertilizer plot, vermicompost plot, and chemical + vermicompost plot.

Result and Discussion

Table No.1 : Impact of vermicompost and chemical fertilizer on various parameters of onion crop after 12th week.

Sr. No	Week	Parameter	Control	Chemical	Compost	Chemical + Compost
1	12th Week	Length Of Leaf	43.4	54.7	61.2	68
2		Length Of Tuber	10	12.1	13.4	14.2
3		Diameter Of Tuber	14.3	18.7	20.4	22.3
4		Weight Of Tuber	43	74	82	89



Graph No. 1 Showing impact of vermicompost and chemical fertilizer on various parameters of onion crop

After the twelfth week, the average length of leaf in control, chemical, vermicompost and chemical + vermicompost were found to be 43.4 cm, 54.7 cm, 61.3 cm, 68 cm, respectively. The average length of tubers in control, chemical, vermicompost and chemical + vermicompost was found to be 10 cm, 12 cm, 13.4 cm and 14.2 cm respectively. The average diameter of tubers in control, chemical, vermicompost and chemical+vermicompost, was found to be 14.3 cm, 18.7 cm, 20.4cm, 22.3 cm respectively. And the average weight of tubers in control, chemical, vermicompost and chemical + vermicompost, was found to be 43 gm, 74 gm, 82 gm and 89 gm respectively.

In the present study, there was significant variation found in plant height, tuber height, tuber diameter and tuber weight influenced by different levels of application.

Shirajum Monira et al., 2019 observed plant height growth was significantly influenced by the earthing up of onion. Highest plant height (50.52cm), whether lowest plant height observed was (47.00cm) found in control. Similar results were also reported by Ali et al., 2007 and support the present study. Reddy KC., Reddy KM. 2005 and Kaswan PK. et al.,2013 observed highest plant height was 53.80cm and the lowest plant height was recorded at 43.60 cm. Variation of tuber/ bulb length was also observed and influenced by different levels of vermicompost application. The highest bulb/ tuber length was observed at 3.15 cm from vermicompost treatment, which was followed by the lowest bulb length was 2.5cm found from treatment. This result was also similar to the findings of Gopakkali P.2014 and Zedan GI. 2011. The tuber/bulb length was 3.35 cm due to from the treatment combination followed by the lowest bulb length 2.46 cm observed which was found from a control treatment and combination, respectively.

In the present study, drastic and considerable changes were observed on tuber/bulb diameter which occurs due to different levels of vermicompost application. The highest bulb/tuber diameter 4.38cm was found from the treatment V3 (8t/ha vermicompost) which occurs significantly different from treatment of vermicompost and lowest diameter 3.42cm was observed from t control treatment 0 t/ha vermicompost). Similar result was also observed by Kaswan et al., (2013). Variation was identified on bulb diameter because of earthing up on onion crop highest diameter was found 4.04cm from three times earthing up treatment was similar with two times earthing up and the lowest bulb diameter found was 3.79cm from the control treatment. Bulb diameter was influenced by the combination of the effect of earthing up and vermicompost on onion and the highest diameter of bulb found was 4.55cm from the treatment of combination which was similar with another treatment V3E1, combination and lowest bulb diameter was found 3.22cm found from the control treatment. Dhaker et al., 2017; Ali et al., 2007.also reported similar observations of the application of vermicompost on onion crops.

Conclusion

From the above data it is cleared that the vermicompost and chemical fertilizers has givern good results as compare to the only vermicompost or only chemical fertilizer It is concluded that, the efficient production of onion is increased by application of vermicompost and chemical fertilizer (Urea) in combination is more suitable for onion production.

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