Original Research Article

Effect of Vermicompost and Moisture Conservation Practices on Yield and Economics of Sesame (*Sesamum indicum* L.)

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Abstract

A field experiment was conducted at Agronomy farm, S.K.N. College of Agriculture, Jobner (Rajasthan) during kharif, 2016 on loamy sand soil. The experiment comprising of four levels of vermicompost (Control, 1.5, 3.0 and 4.5 t/ha) and four moisture conservation practices (control, dust mulch, straw mulch and plastic mulch), thereby making 16 treatment combinations was laid out in randomized block design and replicated thrice. Results indicated that every increase in level of vermicompost from control to @ 3.0 t/ha fetched significantly higher yield viz., seed (834 kg/ha), stalk (2073 kg/ha) and biological yields (2907 kg/ha) over preceding levels, application of @ 4.5 t/ha provided the gross returns (Rs. 82082/ha) and net returns (Rs. 43964/ha) over @ 3.0 t/ha, @ 1.5 t/ha and control. Application of straw mulch the significantly higher yield viz., seed (810 kg/ha), stalk (2022 kg/ha) and biological yields (2832 kg/ha), gross returns (Rs. 72900/ha) and net returns (Rs. 45979/ha) over plastic mulch, dust mulch and control.

Keywords

Sesame, Vermicompost, Mulch, Economics and Yield

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Introduction

India is one of the four major players in the global oilseeds/vegetable oils scenario, being one of the important oilseed grower, producer, importer, and exporter (De and Sinha, 2011). Sesame is the key edible oilseed crop in India and cultivated on 15.98 lakh hectares with production of 8.20 lakh tonnes (Anonymous, 2014-15a). This crop is having high quality of oil and meal and also sows wide adaptability for varied agro-climatic conditions. Due to soil and climatic adversities in rainfed ecosystems, the crop suffers from several biotic and abiotic stresses, particularly moisture stress and multi-nutrients deficiency, resulting in poor and unpredictable crop yields. Vermicompost is a prime source of macro and micro nutrients in chelated form and fulfills the balanced nutrient requirement of crops for longer period. Besides this, it also helps in maintaining soil fertility and precious eco-friendly environment of the soil. Organic mulch has been found to increase the nutrient content of soil following decomposition and mineralization, hence, can increase the vegetative growth of plants, which ultimately results in high yield (Singh *et al.*, 2007;
Ahamefule and Peter, 2014). Attributable to the reduction in soil temperature and improved moisture holding capacity of the soil (Lal, 1974). Looking to the above facts, an experiment entitled “Effect of vermicompost and moisture conservation practices on growth parameters, yield attributes and yield of sesame” was undertaken.

**Materials and Methods**

The experiment was conducted at Agronomy Farm, S.K.N. College of Agriculture, Jobner. Jobner is situated 45 km west of Jaipur at 26°05’ N- latitude and 75°28’ E longitudes and at an altitude of 427 metres above mean sea level in Jaipur district of Rajasthan. The region falls in Agro-climatic zone III-a (Semi-arid Eastern Plain). The soil of the experimental field was loamy sand in texture with low in organic carbon (0.18%), low in available nitrogen (132.4 kg/ha), medium in available phosphorus (18.25 kg/ha) and potassium (144.26 kg/ha) and slightly alkaline in reaction with pH 8.2.

**Results and Discussion**

**Effect of vermicompost**

A perusal of data (Table 1 and 2) further indicated that application of vermicompost from control to @ 3.0 t/ha fetched significantly higher yield viz., seed (834 kg/ha), stalk (2073 kg/ha) and biological yields (2907 kg/ha) over preceding levels, application of @ 4.5 t/ha provided the gross returns (Rs. 82082/ha) and net returns (Rs. 43964/ha) over @ 3.0 t/ha, @ 1.5 t/ha and control. The significant increase in seed yield under the influence of vermicompost was largely a function of improved growth and consequently increase in different yield attributes as mentioned above. Further, vermicompost increased the efficiency of added chemical fertilizer in soil and increased rate of humification. Humic acid present in vermicompost enhance the availability of both native and added micronutrients in soil and thus plant growth, yield attributes and ultimately yield increased. These results are in close conformity with those of Raghawendra and Kedar (2008) in chickpea, Sherin and Ahuja (2009) and Ramawtar et al., (2013) in Clusterbean, Meena et al., (2014) in cowpea. The net returns decrease with the each increasing dose of vermicompost, because of the fact the cost involved in each addition of higher dose of vermicompost increase the cost of cultivation whereas the addition in term of returns was low. Similar results were also reported by Kadam et al., (2014) in blackgram.

**Effect of moisture conservation practices**

A perusal of data (Table 1 and 2) further indicated that Application of straw mulch the significantly higher yield viz., seed (810 kg/ha), stalk (2022 kg/ha) and biological yields (2832 kg/ha), gross returns (Rs. 72900/ha) and net returns (Rs. 45979/ha) over plastic mulch, dust mulch and control. The significant increase in seed yield under the influence of mulching was largely a function of improved growth and consequent increase in different yield attributes as mentioned above. The beneficial effect of organic mulch on seed yield might be due to favourable soil moisture regime and its better utilization in production of large number of seeds possibly by reducing floral abortion, maintenance of a steady flux of assimilates during grain filling, reducing the rate of leaf senescence and maintenance of photosynthetic activity of surviving leaves and enhanced remobilization of pre anthesis assimilates to seed during seed filling. Extended period of moisture availability and lower weed incidence due to organic mulch resulted in a higher dry matter accumulation and thereby, higher stover and biological yield.
**Table 1** Effect of vermicompost and moisture conservation practices on seed, stalk and biological yield and harvest index of sesame

| Treatments                  | Seed yield (kg/ha) | Stalk yield (kg/ha) | Biological yield (kg/ha) | Harvest Index (%) |
|-----------------------------|-------------------|--------------------|--------------------------|-------------------|
| **Vermicompost (t/ha)**    |                   |                    |                          |                   |
| Control                     | 557               | 1514               | 2071                     | 26.9              |
| 1.5                         | 712               | 1784               | 2496                     | 28.5              |
| 3.0                         | 834               | 2073               | 2907                     | 28.7              |
| 4.5                         | 912               | 2264               | 3176                     | 28.7              |
| SEm+                        | 28                | 66                 | 94                       | 0.7               |
| CD (P = 0.05)               |                   |                    |                          |                   |
| **Moisture conservation practices** |       |                    |                          |                   |
| Control                     | 655               | 1697               | 2352                     | 27.8              |
| Dust mulch                  | 760               | 1916               | 2676                     | 28.3              |
| Straw mulch                 | 810               | 2022               | 2832                     | 28.5              |
| Plastic mulch               | 790               | 2000               | 2790                     | 28.2              |
| SEm+                        | 28                | 66                 | 94                       | 0.7               |
| CD (P = 0.05)               | 81                | 192                | 271                      | NS                |
| CV (%)                      | 13                | 12                 | 12                       | 9.11              |

**Table 2** Effect of vermicompost and moisture conservation practices on gross return and net returns

| Treatments                  | Gross return (Rs./ha) | Net returns (Rs./ha) |
|-----------------------------|-----------------------|----------------------|
| **Vermicompost (t/ha)**    |                       |                      |
| Control                     | 50130                 | 34014                |
| 1.5                         | 64080                 | 40464                |
| 3.0                         | 75060                 | 43944                |
| 4.5                         | 82080                 | 43964                |
| SEm+                        | 1986                  | 1161                 |
| CD (P = 0.05)               | 5736                  | 3353                 |
| **Moisture conservation practices** |       |                      |
| Control                     | 58950                 | 33529                |
| Dust mulch                  | 68400                 | 40699                |
| Straw mulch                 | 72900                 | 45979                |
| Plastic mulch               | 71100                 | 42179                |
| SEm+                        | 1986                  | 1161                 |
| CD (P = 0.05)               | 5736                  | 3353                 |
| CV (%)                      | 10                    | 10                   |
Similar findings were reported by Verma (2002) in pearlmillet, Sekhon et al., (2005) in soybean and Yadav (2005) in mustard, Chhetri et al., (2015) in blackgram.

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