

IMPACT OF VERMICOMPOST EXTRACTS ON STRAWBERRY PRODUCTION AND SUSTAINABILITY OF AGROECO SYSTEMS

Pešaković M.¹, Tomić J.¹, Milenković S.², Cerović R.³, Karaklajić Stajić Ž.¹, Glišić I.¹, Paunović M.S.¹, Lukić M.¹

¹Fruit Research Institute Čačak, Čačak, Republic of Serbia

²Faculty of Biofarming, Megatrend University, Bačka Topola, Republic of Serbia

³Innovation centre of Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Republic of Serbia

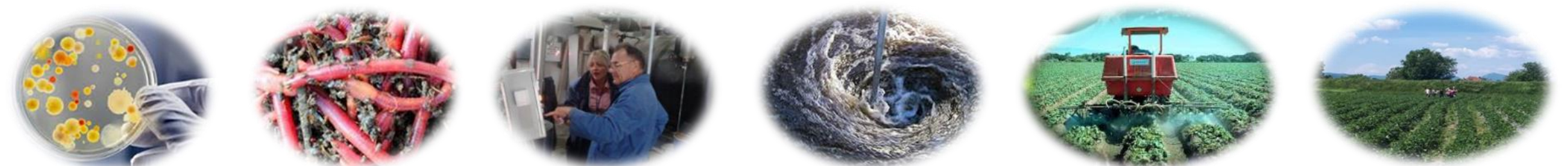
*Corresponding author: mpesakovic@institut-cacak.org

ABSTRACT

Quality and balanced fertilization is one of the most important orchard management practices in fruit production. However, fertilization in conventional production systems is mainly focused on obtaining the highest yield. This usually requires increased utilization of synthetic nitrogen fertilizers, which significantly contributes to a series of undesirable effects and results in excessive environmental pollution. Since organic production system is considered as an important factor of the strategy for the development of agricultural sector, it is necessary to increase this kind of production. To find a way to overcome the mentioned problems, the use of vermicompost extracts is appeared as potential solution. Therefore, we conducted a study on the effects of vermicompost extract on yield-related characteristics (yield per plant, yield per unit area), physical (fruit weight, length, breadth, and firmness) and chemical fruits properties (total phenolics and antioxidant capacity) of 'Senga Sengana' strawberry cultivar, as well as microbiological properties of strawberry rhizosphere (total microbial count, numbers of soil fungi, actinomycetes, aminoheterotrophs, oligonitrophilic bacteria and *Azotobacter*). The obtained results indicate that application of vermicompost extracts in organic strawberry production had a positive effect on plant yield and fruit quality. Positive effects on soil biogenicity have also been observed. Therefore, vermicompost extract application can be considered as an appropriate practice in production of healthy and environmentally safe strawberries with satisfying basic postulates of sustainable agriculture.

EXPERIMENTAL

An open field trial was conducted on 'Senga Sengana' strawberry plants at the experimental plantation located near Čačak, Republic of Serbia (43° 53' N latitude, 20° 20' E longitude, 225 m altitude) during the two consecutive seasons (2016–2017 and 2017–2018). The experiment was set up at a randomized block design, in three replications. The frigo strawberry plants were planted in a single row system. The rows were spaced about 80 cm apart, and the plants were set 15 cm apart in the rows. Treatments contained vermicompost-based product (vermicompost extracts) prepared at the Fruit Research Institute Čačak, whereas untreated soil and plants served as control.



Production of biopreparation is based on a specially obtained liquid extract of vermicompost enriched with various strains of useful microorganisms (bacteria strains of the genus *Azotobacter* sp., *Bacillus* sp. and *Pseudomonas* sp. as well as *Trichoderma* sp. fungus). Its application was carried out in three ways: rhizobial (R), foliar+rhizobial (F+R) and foliar (F). Treatments were carried out five times during vegetation period in the amount of 400 l ha⁻¹ of the respective preparation.

The effect of the applied preparation was followed by identification of yield-related characteristics, physical and chemical fruits properties, as well as microbiological properties of strawberry rhizosphere.

RESULTS

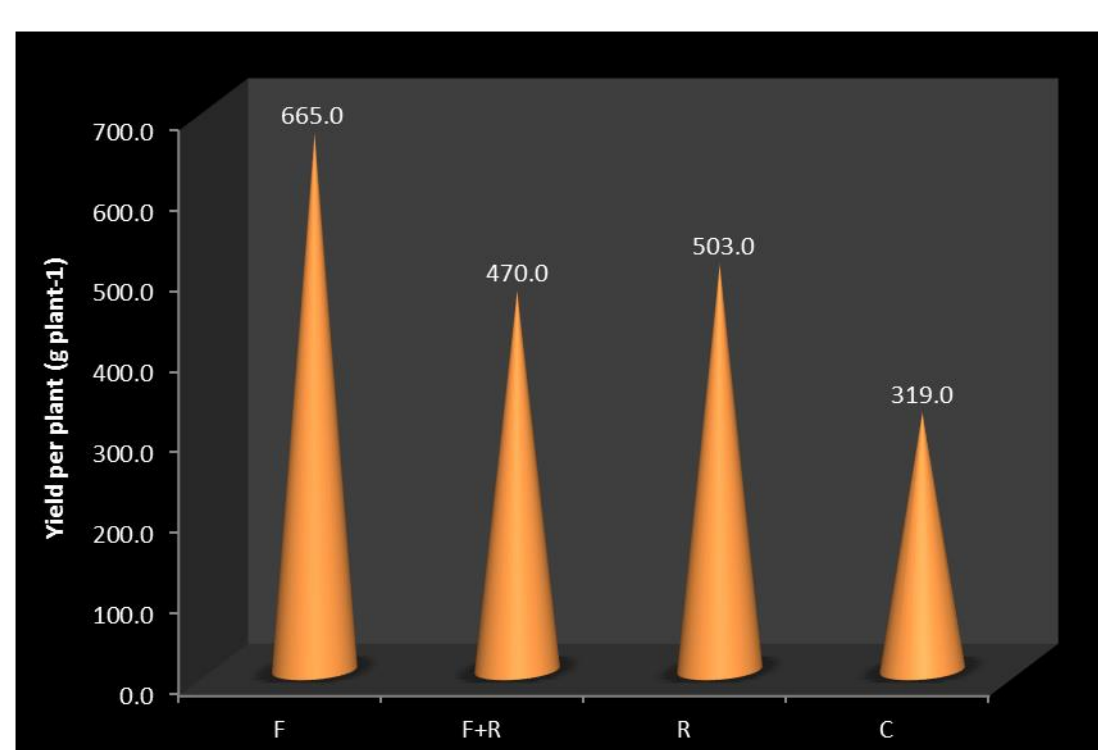


Figure 1. The influence of vermicompost extract applications on yield per plant

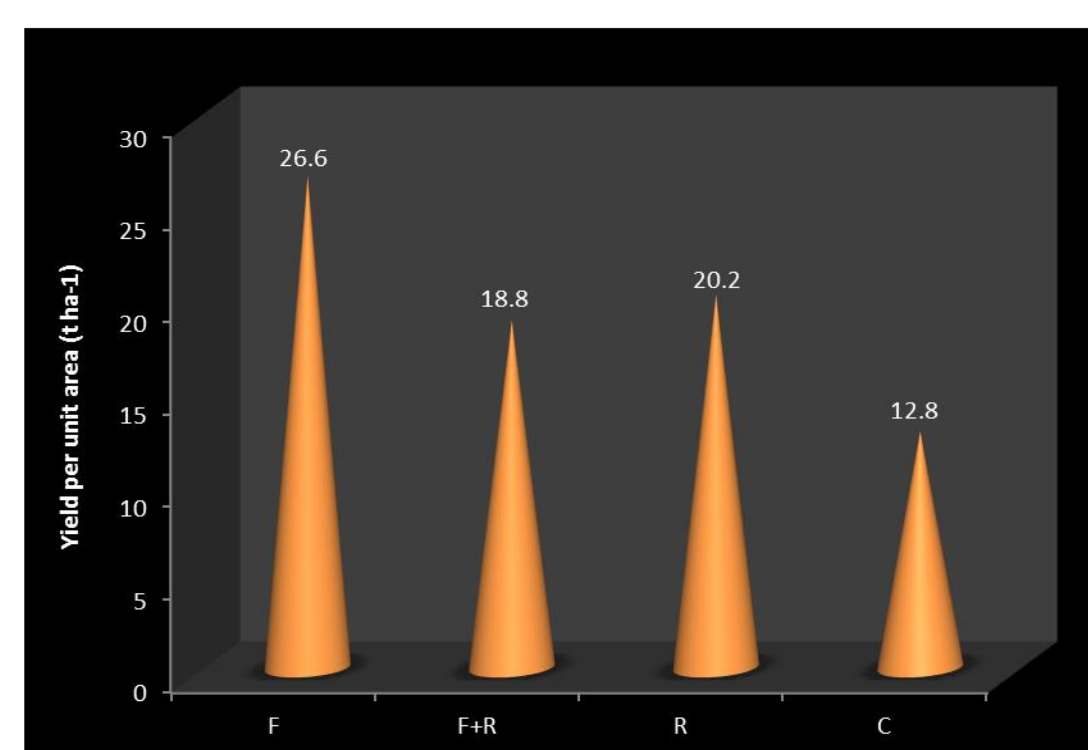


Figure 2. The influence of vermicompost extract applications on yield per unit area

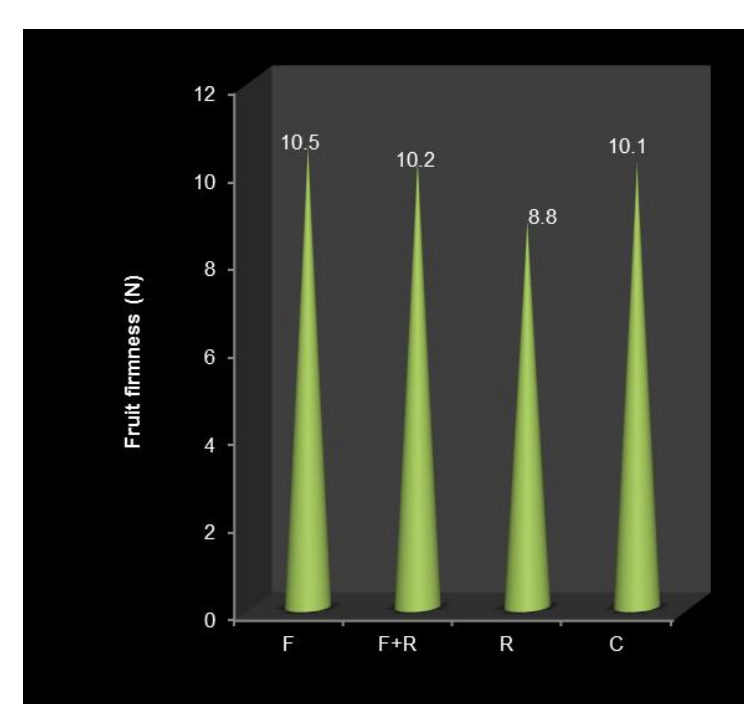
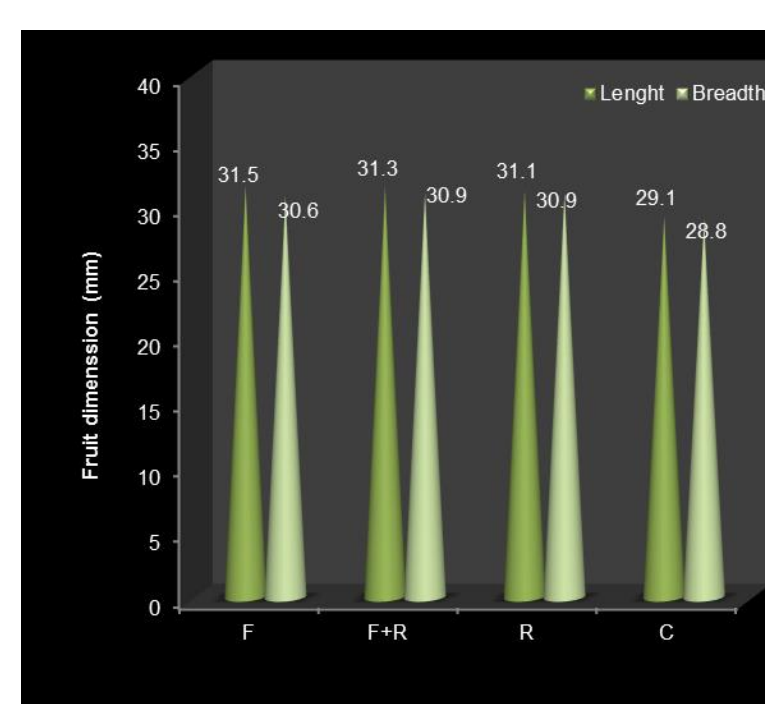
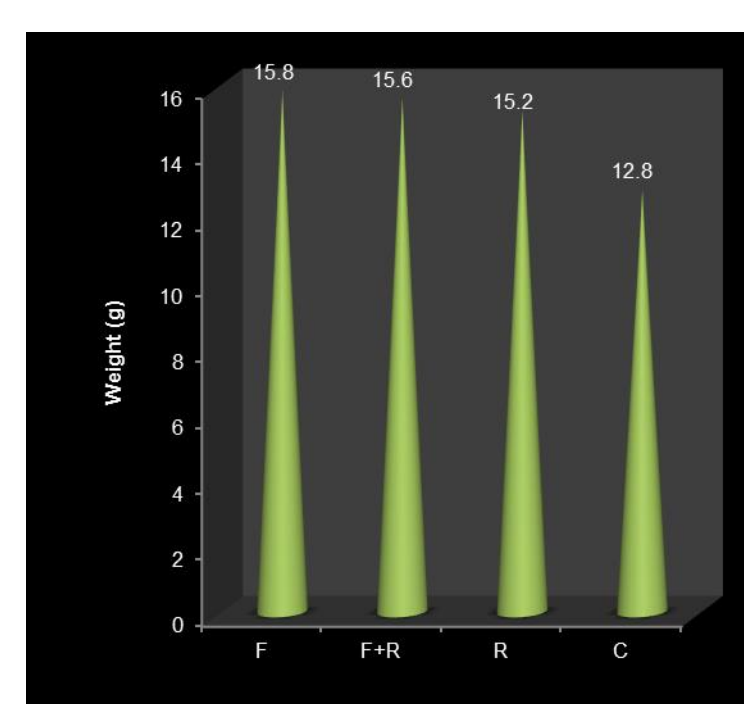


Figure 3. The influence of vermicompost extract applications on fruit physical properties

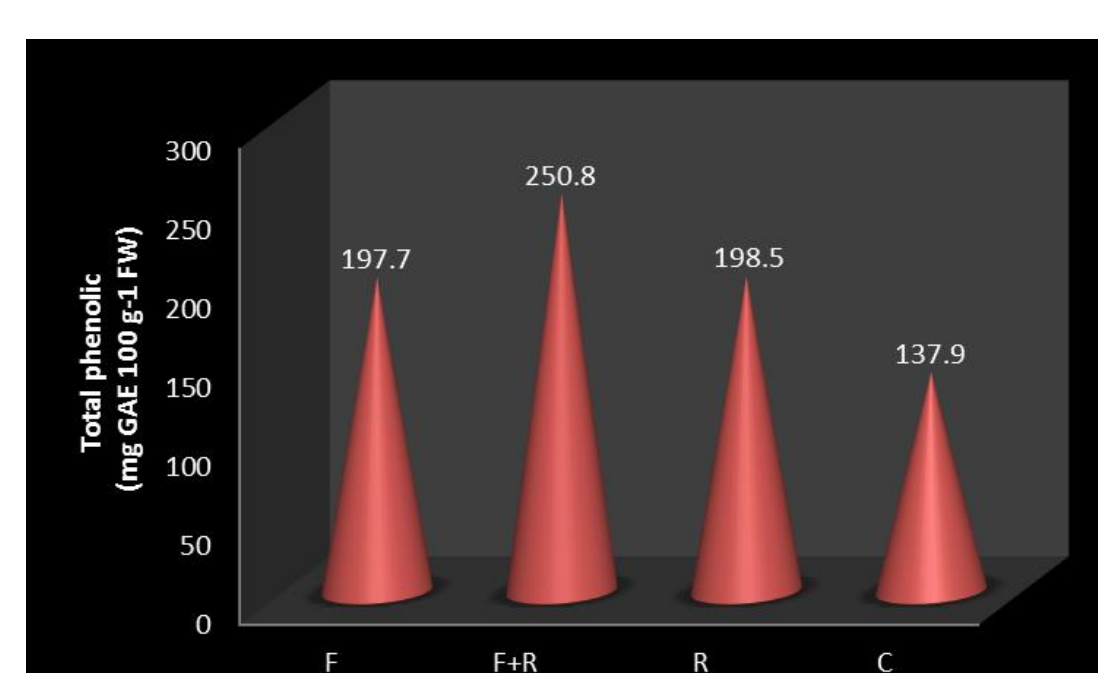


Figure 4. The influence of vermicompost extract applications on Total Phenolic Content

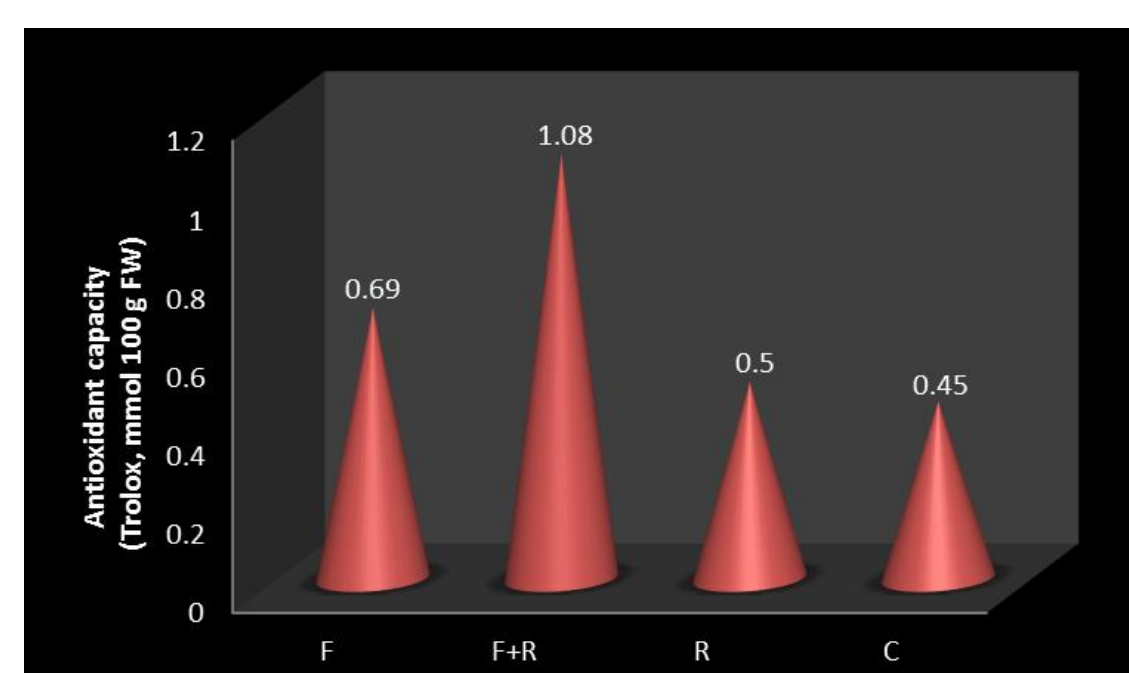


Figure 5. The influence of the vermicompost extract applications on Antioxidant Capacity

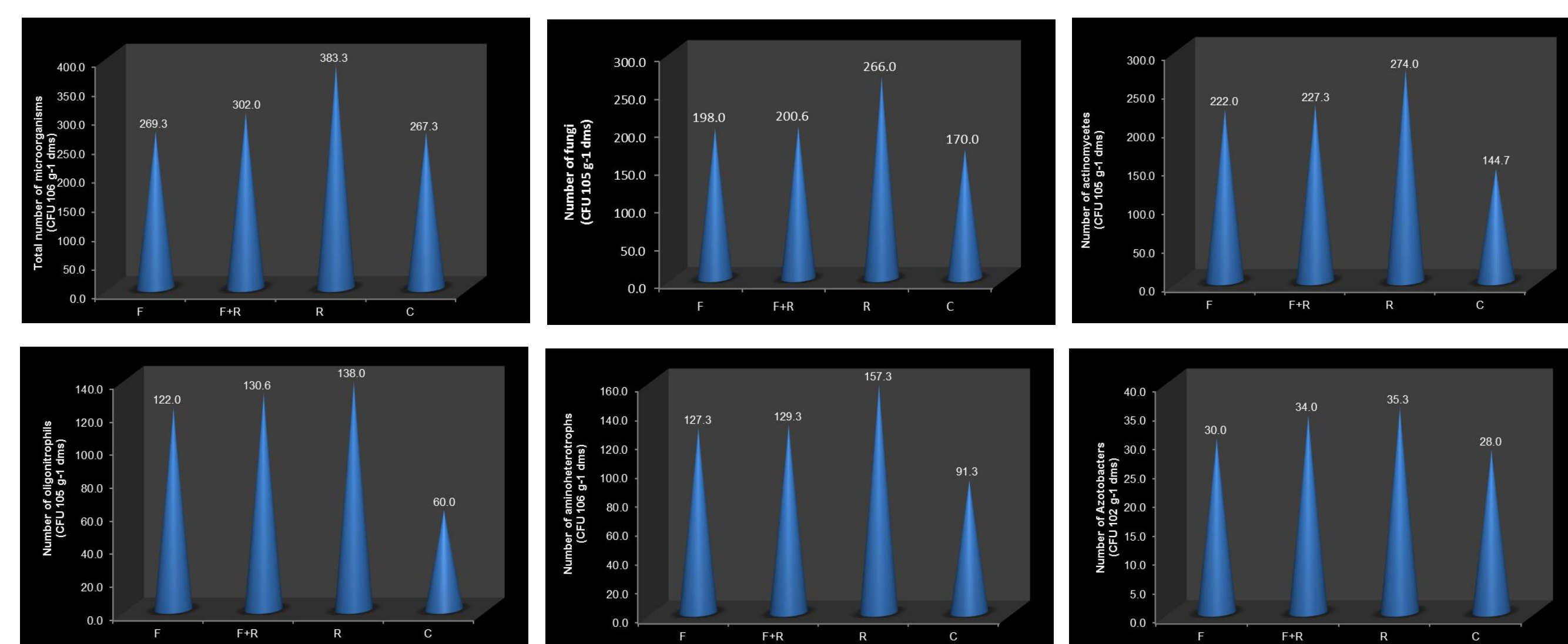


Figure 6. The influence of the vermicompost extracts application on the soil microorganisms number

CONCLUSION

Based on the obtained results, vermicompost extract application can be recommended for sustainable strawberry production, with satisfying basic postulates of sustainable agriculture

