بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY

YIELD AND SEED QUALITY OF COMMON BEAN UNDER ORGANIC FARMING SYSTEM

By

MAHMOUD SHAHAT AMIN
B.Sc. Agric. Sc. (Horticulture), Fac. Agric. Ain Shams University, 2013

A Thesis Submitted in Partial Fulfillment

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ABSTRACT

Mahmoud Shahat Amin Ebeid, Yield and Seed Quality of Common Bean under Organic Farming System. Unpublished M.Sc.Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2020.

In this study, the field experiment was carried out during the two growing seasons of 2016 and 2017, at the Experimental Farm, Faculty of Agriculture, Ain Shams University, Qaliobia Governorate, Egypt, in order to investigate the effect of biofertilizer inoculation (BIO: rhizobium inoculation (RHI), arbuscular mycorrhizal fungi (AMF), RHI+AMF and control) and seaweed extract (SWE, 0, 1, 2, 4 g/l) on vegetative growth, productivity and quality of common bean seed *(Phaseolus vulgaris* l.). Seeds of common bean "Nebraska" cultivar were sown on the 1st of March 2016 and 2017 seasons. The experiment was laid out in a split plot design with three replicates. The applied biofertilizer treatments were assigned in the main plots and foliar applications of seaweed extract were devoted in the sub plots. The obtained results clearly indicated that bean seeds soaking in AMF plus inoculated in RHI with foliar application of SWE at a concentration of 2 or 4 g/l showed the highest number of leaves per plant, leaf area, stem and leaf dry weight, chlorophyll reading. Moreover, stem diameter of the inoculated plants with RHI and foliar application of 1 g/l SWE showed the highest values in 2016 and 2017 seasons. Seeds soaked in AMF plus inoculated with RHI and foliar application of SWE at a concentration of 2 or 4 g/l showed the highest flower number. Moreover, fruit setting percentage produced with AMF treatment plus foliage applied of 2 g/l SWE showed the highest values. Seeds soaked in AMF plus inoculated with RHI and foliar application of SWE at 2 or 4g/l produced the highest total protein and N. While, seeds soaked in AMF plus inoculated with RHI and foliar application of SWE at 2 g/l only, gave the highest total carbohydrates and P %. Bean seeds soaked in AMF plus inoculated in RHI with foliar application of SWE at

2 g/l gave the highest number of seeds per pod and harvest index. But, seeds soaked in AMF plus inoculated in RHI with foliar application of SWE at 4 g/l showed the highest hundred-seed size, pod number per plant, seed yield per plant and feddan. While, foliar application of SWE at 2g/l without BIO treatment (control) showed the highest seed weight per pod and hundred-seed weight. Electrical conductivity of seeds was reduced significantly with BIO plus SWE treatments compare of with the control treatment. While, data showed that the tested combination treatments did not significantly affect germination percentage. Finally, it can be concluded that added AMF plus inoculated in RHI with foliar application of SWE at 2g/l can help to improve the vegetative growth, productivity and quality of common bean seed under organic system.

Key words: Common bean, Mycorrhizae, Organic farming, Rhizobium, Seaweed extract, Seed organic production.

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INTRODUCTION

Common bean (*Phaseolus vulgaris* L.) is a member of the Fabaceae family. Main products of beans are dry beans (seeds are harvested at complete maturity), shell beans (seeds are harvested at physiological maturity), and snap or green beans (pods harvested before the seed development stage). Common bean is an important fabacea vegetable which it is provable a high protein content and being widely consumed in all continents (**Zewail, 2014**), and many countries are turning to organic cultivation.

Organic farming is safe, environmentally friendly and promotes sustainable agriculture. Therefore, countries tend to encourage organic farming to reduce the spread of disease, but the farmers are concerned about the lack of yield from organic farming. Therefore, research has spread in organic agriculture with the aim of increasing productivity with some biological treatments and spraying natural materials.

Seaweed extract (SWE) is a natural organic fertilizers containing highly effective nutritious and promotes faster seed germination and increases yield and resistant ability of many crops (**Zewail, 2014**). Unlike, chemical fertilizers and extracts derived from SWE are biodegradable, nontoxic, nonpolluting and non-hazardous to plants (**Dhargalkar and Pereira, 2005**). Exogenous application of SWE has already been shown to enhance plant growth, yield and its quality, as reported by **Abdel Mawgoud et al. (2010)** on celeriac plant and **Abou El-Yazied et al. (2012) on Snap Bean.**

Arbuscular mycorrhizal fungi (AMF) colonize most of agricultural crops and also play an important role in phosphorus supply to plants in phosphorus-deficient farming systems. The importance of AMF in phosphorus supply may be comparable to that of root hairs. Their hyphae can extend further from roots than the root hairs, which resulted in a higher soil volume that a colonized root can explore (**Smith and Read,**