

1. INTRODUCTION

Sweet pepper (*Capsicum annuum* L.) is one of the most important vegetable crops grown in Egypt for both export and local consumption. Among different vegetables the pepper fruits are rich in vitamin C and also a good source of vitamin A.

Pepper plants are cultivated in summer, fall and winter seasons. Most of the area, however, is planted during summer season due to the favorable prevailing climatic conditions for the growth and development of plants. The cultivated area of pepper was 38608, 11489 and 20566 feddans with a production of 266142, 69542 and 131749 tons with an average of 6.89, 6.05 and 6.41 tons per feddan for the summer, fall and winter season 2005*, respectively.

In the recent years, the safe agriculture is one of the main attitudes in the world (El-Kouny, 2002). Also, recently there has been an increasing awareness of the undesirable impact of mineral fertilizers on the environment, as well as the potentially dangerous effects of chemical residues in plant tissues on the health of human and animal consumers. As a result of this awareness, strict regulations and restrictions have been imposed in several countries, especially in the European, American and Japanese markets prohibiting the importation of "chemically-grown" products. This has led vegetable growers in many countries to adopt organic and biological agricultural methods for fertilization, pest controls, etc.

*As mentioned by Economic affairs sector –Ministry of Agriculture, Egypt.

Organic manure with its content of humic substances and microbial materials, has been shown to improve soil physical, chemical and microbiological conditions, enhance moisture content, and reduce leaching of nutrients, water run-off and soil erosion (Amin *et al.* 1999). Biofertilization is used in order to compensate a part of the mineral fertilizer doses, taking in consideration the complementary or synergistic effects of such combination between bio-and mineral fertilization. This could be of economic value from the applied point of view of minimizing the used doses of the mineral fertilizers and consequently reduce agricultural costs as well as soil pollution. Over the last two decades, the biofertilizers are increasingly used in modern agriculture due to the extensive knowledge in rhizosphere biology and the discovery of the promotive function of special groups of microorganisms such as *Azospirillum*, *Azotobacter*, *Bacillus* and *Pseudomonas* known as plant growth promoting rhizobacteria (PGPR). Such beneficial effects of (PGPR) could be attributed to the biological nitrogen fixation and production of phytohormones (gibberellins and cytokinins like substances as well as auxins) that promote root development and proliferation, resulting in efficient uptake of water and nutrients (Tein *et al.*, 1979, Hartmann *et al.*, 1983 and Haahtela *et al.*, 1990).

Many workers emphasized that garlic extract was noted to increase vegetation growth and fruit quality. The application of amino acids before, during and after the stress conditions can elevate such stress improve plant uptake of N & K and increase capsaicin content. Sucrose was reported to help plant growth in

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harsh environment, increase number of flowers and yield and fruits quality. The effect of micronutrients on chlorophyll formation and respiratory enzyme systems, metabolic reactions, germination, maturity and improving the availability of P & Ca was reported when it meets the requirements of the plant. Chilling seeds improve plants resistant to low temperature and enhance plants vegetative growth, stimulate reproductive organs, increase yield and fruits quality.

This study included two experiments, the first one aimed to produce high yields with the best fruit quality without contamination and less accumulation with heavy metals by using mineral and/or organic fertilizers as N-source, inoculation with biofertilizers within foliar sprays by Delfan (amino acids) and garlic extract in order to improve plant vegetative growth of sweet pepper during the summer seasons. The second experiment aimed to avoid the injury of low temperatures during winter season by using low plastic tunnel, chilling seeds before sowing and foliar spray by sucrose, Delfan (amino acids) or micronutrients (Fe, Zn, Mn) in order to enhance cold tolerance, increase early and total yield as well as improve fruit quality of sweet peppers.