

1. INTRODUCTION

The use of medicinal and aromatic plants is well known since many centuries. The development of synthesized drugs in this century caused negligence to the use of these plants in perfumery or therapy. But after many years of using these substances many complaints and side effects appeared, i.e. liver and renal failures, malformations and unknown diseases. The return to medicinal and aromatic plants for treatment of diseases or in cosmetics and perfumery become a necessary. The production of these plants is affected by many factors, e.g. genetic, environmental, cultural practices etc....

Fennel (*Foeniculum vulgare*, Miller) belongs to Family Umbelliferae, is one of the drug and condiment crops and has a special importance among the medicinal plants in some parts of the world as in Egypt. It is used as a popular culinary preparations, bread, pastry confectionery, liqueurs and it is an ingredient of compound powder of liquorices. Furthermore, fennel is used in medicinal preparations flavoring and a carminative. Fennel volatile oil has many pharmaceutical uses, i.e. increasing milk secretion, facilitate birth, flatulent dyspepsia, anorexia, carminative distending pain in the epigastrium with anorexia, dysmenorrhea with lower abdominal pain, vomiting, diarrhea, diuretic, appetizer, cold sensation and flatulent colic in children. Moreover, fennel volatile oil had an antimicrobial, antiviral and antioxidant activities.

Caraway (*Carum carvi* L.), belongs to the family Umbelliferae .It is one of the drug and condiment crops, and has

a special importance among the medicinal plants in some parts of the world as Egypt.

The plant is an annual in Egypt, it grows both wild and cultivated and native to Europe, western Asia, and northern Africa. The seeds and seed oil of caraway are used traditionally in ice cream, candy, baked goods, meat, cheese, pickles, condiments, soft drinks, and alcoholic beverages. In addition, caraway is used in medicinal preparations flavouring and as a carminative. It is also used for correcting less pleasant odour and flavours in oral and medical preparations. The essential oil also used as disinfectant, digestive, mildly expectorant, and relieves spasms and flatulence. Also, caraway volatile oil had an antimicrobial, antiviral and antioxidant activities.

For plants, the importance of the vegetative growth is simply to produce a large enough photosynthetic factory to obtain maximum yield and a sturdy plant to support the fruit. Amount of vegetative growth is therefore important. Root growth and penetration are also important for increasing use efficiency of fertilizers and water.

The use of ionizing radiation for aromatic plants and other biochemical applications depends more on understanding of the basic biochemical effects of radiation. It is clear that the use of radiation, particularly gamma-rays, in the field of agriculture and radiobiology in order to stimulate the plant growth, to induce a highly developed herbage which contains higher essential oil content.

Recently, interest has increased considerably in finding naturally occurring antioxidant for use in foods or medicinal

materials to replace synthetic antioxidants, which are being restricted due to their side effects such as carcinogenicity. Natural antioxidants can protect the human body from free radicals and retard the progress of many chronic diseases as well as retard lipid oxidative rancidity in foods.

The present study aimed to:

- 1- Investigate the effect of different doses of gamma irradiation and /or foliar application of ATP, kinetin and tryptophan on the productivity of fennel and caraway plants.
- 2- Study the chemical composition of fennel and caraway volatile oils.
- 3- Evaluate the activity of fennel and caraway volatile oils as natural antioxidant agents.