

**EFFECT OF RADIATION AND ORGANIC FERTILIZATION ON GROWTH OF
 LOVAGE (*LEVISTICUM OFFICINALE* KOCH.)**

BY

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ABSTRACT

The effect of radiation and farm yard manure (FYM) on growth of lovage plants (*Levisticum officinale*) was studied in two successive seasons (2003/2004 and 2004/2005). Five doses of gamma rays (0, 20, 40, 60 and 80 Gy) were applied to lovage seeds, and four rates of farmyard manure (0, 20, 30 and 40 m³/fed.) were added to the soil before sowing. In both seasons, when radiation treatments were applied separately, all the tested doses significantly increased plant height, number of branches, stem thickness and shoot dry weight (except the dose of 80 Gy), compared to the control. Also, the organic fertilization (FYM) treatments significantly increased growth characters of lovage plants in both seasons. Combining gamma radiation at 60 Gy with FYM at 40 m³/fed. gave the best results in terms of plant height, number of branches, stem thickness and shoot dry weight of lovage plants (in both seasons).

INTRODUCTION

Medicinal and aromatic plants play an important role as a source of national income, due to the continuous demand for their active products in both foreign and local markets, and also for their application in pharmaceutical preparations. Medicinal and aromatic plants have proven to be an important resource of natural active compounds, useful in the medicine, food and cosmetics industries, as well as plant protection, and many other purposes.

Lovage (*Levisticum officinale* Koch.), a member of the *Apiaceae* family, is a perennial herb native to the Mediterranean region. It is widely grown as a garden ornamental plant. All parts of lovage plants (fruits, herb and roots) are odorous and strongly aromatic (Hornok, 1992).

Manure and other waste products of plants and livestock have been used as soil amendments for centuries. These materials were the only way of quickly improving soil

fertility before the advent of chemical fertilizers (Lupwayi *et al.*, 2000). Organic manures are a vital resource not only for supplying plant nutrients but also for replenishing organic matter content of most agricultural soils. This would further emphasize the need to use organic manures alone or in conjunction with chemical fertilizers in soil fertility maintenance for sustainable crop production (Reddy *et al.*, 2000). The addition of manure to fields can improve soil pH, cation exchange capacity, water-holding capacity and soil structure. Manure breaks down more slowly in soil than do inorganic fertilizers. It acts as a slow-release fertilizer which provides nutrients over the whole growing season and often has a residual effect which lasts for one or two further growing seasons (Harris, 2002).

Pre-sowing seed irradiation is one of the most effective methods of improving plant production, yield components and chemical composition of medicinal and aromatic plants. The use of ionizing radiation (gamma rays)