

## Depolymerised Natural Polysaccharides Enhance the Production of Medicinal and Aromatic Plants and Their Active Constituents

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**Abstract :** Recently, there has been a rapidly expanding interest in finding applications of natural polymers in view of value addition to agriculture. It is now being realized that radiation processing of natural polysaccharides can be beneficially utilized either to improve the existing methodologies used for processing the natural polymers or to impart value addition to agriculture by converting them into more useful form. Gamma-ray irradiation is employed to degrade and lower the molecular weight of some of the natural polysaccharides like alginates, chitosan and carrageenan into small sized oligomers. When these oligomers are applied to plants as foliar sprays, they elicit various kinds of biological and physiological activities, including promotion of plant growth, seed germination, shoot elongation, root growth, flower production, suppression of heavy metal stress, etc. Furthermore, application of these oligomers can shorten the harvesting period of various crops and help in reducing the use of insecticides and chemical fertilizers. In recent years, the oligomers of sodium alginate obtained by irradiating the latter with gamma-rays at 520 kGy dose are being employed. It was noticed that the oligomers derived from the natural polysaccharides could induce growth, photosynthetic efficiency, enzyme activities and most importantly the production of secondary metabolite in the plants like *Artemisia annua*, *Beta vulgaris*, *Catharanthus roseus*, *Chrysopogon zizanioides*, *Cymbopogon flexuosus*, *Eucalyptus citriodora*, *Foeniculum vulgare*, *Geranium sp.*, *Mentha arvensis*, *Mentha citrata*, *Mentha piperita*, *Mentha viridis*, *Papaver somniferum* and *Trigonella foenum-graecum*. As a result of the application of these oligomers, the yield and/or contents of the active constituents of the aforesaid plants were significantly enhanced. The productivity, as well as quality of medicinal and aromatic plants, may be ameliorated by this novel technique in an economical way as a very little quantity of these irradiated (depolymerised) polysaccharides is needed. Further, this is a very safe technique, as we did not expose the plants directly to radiation. The radiation was used to depolymerize the polysaccharides into oligomers.

**Keywords :** essential oil, medicinal and aromatic plants, plant production, radiation processed polysaccharides, active constituents

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