

Improving the Growth, Biochemical Parameters and Content and Composition of Essential Oil of *Mentha piperita* L. through Soil-Applied N, P, and K

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Abstract : Aromatic herb, peppermint (*Mentha piperita* L.), is a natural hybrid (*M. aquatica* × *M. spicata*) with immense therapeutic uses, apart from other potential uses. Peppermint oil is one of the most popular and widely used essential oil (EO), because of its main components menthol and menthone. In view of enhancing growth, yield and quality of this medicinally important herb, a pot experiment was conducted in the net-house of the department. The experiment was aimed at studying the effect of graded levels of N, P, and K on growth, biochemical characteristics, and content and composition of EO in *Mentha piperita* L. Six NPK treatments (viz. N0P0K0, N20P20K20, N40P40K40, N20+20 P20+20 K20+20, N60P60K60, and N30+30 P30+30 K30+30) were tested. The plants were harvested 150 days after transplanting. The crop performance was assessed in terms of growth attributes, physiological activities, herbage yield and content as well as yield of active constituents of *Mentha piperita* L. Biochemical parameters were analyzed spectrophotometrically. The EO was extracted using Clevenger's apparatus and the active constituents of the oil were determined using Gas Chromatography. Split-dose application of N, P and K (N30+30 P30+30 K30+30) ameliorated most of the parameters significantly including, fresh and dry weight of plant, NPK content, chlorophyll and carotenoids content, and the activities of carbonic anhydrase and nitrate reductase in the leaves. It also enhanced the EO content (44.0%), EO yield (91.0%), menthol content (14.1%), menthone content (34.0%), menthyl acetate content (16.9%) and 1, 8-cineole content (43.7%) but decreased the pulegone content (36.8%). Conclusively, the fertilization proved useful in enhancing the EO content, yield and other EO components of the plant. Thus, the yield and quality of EO of peppermint may be improved by this agricultural strategy.

Keywords : mentha piperita, menthol, menthone, EO

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