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## Effect of nutrition and harvesting time on phenolic compounds and antioxidant properties of peppermint (*Mentha piperita* L.)

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### Abstract

The effect of  $\text{NH}_4\text{NO}_3$  (۳۳٪),  $\text{P}_2\text{O}_5$  (۴۵٪) and  $\text{K}_2\text{SO}_4$  (۵۰٪) fertilizers alone and in combination and of Agrimel complete fertilizer in two harvesting times on the total phenolic, rosmarinic acid (RA) and antioxidant content of peppermint (*Mentha piperita* L.) was investigated.

The experiment was carried out with split plot based on randomized complete design with three replications at the greenhouse of Bojnourd municipality in North Khorasan province. Main plots consisted of two harvesting times before the flowering stage and sub-plots included eight nutritional level. About ۵۰ mg of fertilizer was used per kg of soil (۱۰۰ kg/ha). The amounts of fertilizer used was ۱۵۱.۵ mg/kg for ammonium nitrate, ۱۰۸.۷ mg/kg for triplex supersafe, ۱۰۰ mg/kg for potassium sulfate and ۲۵۰ mg/kg for complete fertilizer in ۹ kg of soil. The order of ۱۳۶۳.۵, ۹۷.۹, ۹۰۰ and ۲۴۰۰ mg/kg of soil was calculated and applied. The total phenol content of the plant was measured by the colorimetric method. The RA (Rosmarinic acid) by HPLC (High performance liquid chromatography) and the antioxidant capacity of the extract was evaluated by removal of DPPH (۲, ۲-diphenyl-۱-picrylhydrazyl) and ABTS (۲, ۲'-azino-bis (۳-ethylbenzothiazoline-۶-sulphonic acid) free radicals, which were observed by spectrophotometer and. results showed that fertilizer application, harvesting time and fertilizer application  $\times$  harvest time had an effect on the total phenolic content and antioxidant capacity. The best results were recorded in the second harvest, the combined fertilizer and complete fertilization treatments.

More research is needed to identify active plant chemistry and more comprehensive phytochemical evaluations are required.

**Keywords:** "Peppermint", "Total phenol", "Fertilizer", "Time harvesting", "Rosmarinic acid", "Antioxidant capacity".