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Determination of suitable fertilizer and spacing level for *Ocimum tenuiflorum* in terms of physical and chemical yield in different plant parts

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Ocimum tenuiflorum L. (Lamiaceae) is therapeutically important medicinal plant used in traditional systems of medicine. The present study was undertaken to determine the optimum spacing level and type of fertilizer in terms of physical and chemical parameters of leaves, roots, stem and bark of *Ocimum tenuiflorum*. Total Antioxidant Capacity (TAC), Total Phenolic Content (TPC), Total Flavonoid Content (TFC) and growth parameters of leaf, root, stem and bark were recorded at three different maturity stages of the plant (just before flowering, just after flowering, and full maturity stage). TPC, TFC and TAC were determined by the colorimetric Folin-Ciocalteu method, Aluminum Nitrate method, and Ferric Reducing Antioxidant Power (FRAP) assay respectively. Nine treatment combinations consisting of three levels of space (S1: 30 cm × 30 cm; S2: 30 cm × 45 cm; and S3: 30 cm × 60 cm), and three types of fertilizer (F1: Organic, F2: Inorganic, and F3: Control) were used for the field experiment in a completely randomized block design with three replicates.

An overall increase of TAC with maturity was recognized in all the plant parts. Similarly, TAC of all the plant parts in all treatments increased with the spacing, except S1F2 (132.1 ± 1.7), S2F2 (97.4 ± 2.2) and S3F2 (113.3 ± 2.0) which used inorganic fertilizer. Leaf and flower extract resulted significantly higher TAC compared to the root and stem extracts. The order of increase of TAC was just before flowering < just after flowering < fully maturity for all the treatments. S1F1 treatment resulted the highest TPC (14.85 ± 0.12) in leaf extract. TPC in all the treatments in all plant extracts increased with the spacing irrespective of the treatments. TFC of leaf, root, stem and flower was higher just after flowering stage. Treatment S3F1 resulted in significantly higher values for dry weight in all the plant parts. The presence of marked TAC and TPC in leaves at fully maturity stage scientifically validates the harvesting of leaves of *O. tenuiflorum* at full maturity stage. The presence of higher dry matter content and chemical yield in organic fertilizer with higher spaces suggest that organic fertilizer and 30cm×60cm spacing level be used for commercial scale cultivation of *O. tenuiflorum*

Keywords: Antioxidant capacity, growth parameters, *Ocimum tenuiflorum*, Total phenol, Flavonoid content, secondary metabolites.

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