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Biomass and centelloside production kinetics in an elite germplasm accession of Centella asiatica under field, hydroponics and in vitro environments

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Ventella asiatica L. (Family - Apiaceae) is an important medicinal herb used in traditional and modern pharmacopeia's for the reatment of Alzheimer, leprosy, varicose veins, ulcer, lupus, certain eczemas and mental disorders. The medicinal properties of this herb are attributed to triterpene glycosides collectively known as centellosides, i.e. asiaticoside, madecassoside, asiatic acid and madecassic acid that are present in the plant leaves. The raw herb and its extracts are today known to be the important constituents of more than 100 herbal formulations in the trade. The triterpene components of the plant are highly influenced by geographical location, morphological and environmental factors that eventually affect its pharmaceutical efficacy. Therefore, in the present study, an attempt has been made to optimise growth and centelloside production in elite germplasm accession of C. asiatica under three different growing environment viz. field, hydroponics and in vitro condition. In vitro shoot cultures showed maximum growth with 9.5 mg g⁻¹ DW centelloside content during 35 days of culture cycle. Hydroponically grown plants attained maximum growth and centelloside content of 55.6 mg g⁻¹ DW after 42 days of establishment and under field condition highest centellosides (52.7 mg g⁻¹ DW) and biomass was observed after 120 days of cultivation. The details pertaining to biomass and metabolite production kinetics under three different growth environments will be discussed.