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Essential oils produced by in vitro shoots of sage (*Salvia officinalis* L.)

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Abstract

In vitro shoots of sage (*Salvia officinalis* L.) were established under eight different hormonal supplementations and proliferated by subculture of nodal shoot segments. The respective essential oils, obtained by hydrodistillation, were composed of more than 75 compounds, 65 of which were identified. The 10 major compounds were, by order of retention time, alpha-pinene (4.1-5.4%), camphene (6-7.1%), beta-pinene (9.3-14.5%), limonene (2-2.3%), 1,8-cineole (3.6-5.6%), (-)-thujone (13.2-16.1%), (+)-isothujone (6.6-7.4%), camphor (19.8-24%), alpha-humulene (5.1-6.8%), and manool (4.2-7.7%). Notwithstanding the eight different hormonal supplementations tested, the percentage composition of the shoot essential oils were kept in a narrow range of variation. However, the type and concentration of growth regulators apparently influenced the accumulation of essential oils. The highest accumulation of essential oils and the highest shoot biomass growth were obtained with 2.0 mg/L kinetin and 0.05 mg/L 2,4-dichlorophenoxyacetic acid.

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