13th MULTINATIONAL CONGRESS ON MICROSCOPY

september 24-29, 2017
rovinj, croatia

BOOK OF ABSTRACTS

Ruđer Bošković Institute

Croatian Microscopy Society

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Editors

Andreja Gajović, Igor Weber, Goran Kovačević, Vida Čadež
Suzana Šegota and Ana Vidoš

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Zagreb 2017

ISBN 978-953-7941-19-2

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The Multinational Congress on Microscopy 2017 has been designated an EMS Extension meeting by the European Microscopy Society.

Glandular trichomes and essential oil characteristics of *in vitro* propagated *Micromeria croatica* (Pers.) Schott (Lamiaceae)

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Keywords: capitate trichomes, micropropagation, peltate trichomes, phytochemical analysis

Morphology and structure of *Micromeria croatica* glandular trichomes in relation to the secretory process were characterized using scanning electron microscopy (SEM) and light microscopy, and their secretion was histochemically analyzed. SEM and histochemical analysis revealed that leaf indumentum of *in vitro* grown *M. croatica* consisted of non-glandular and glandular trichomes (Figure 1a). The main types of glandular trichomes observed in *M. croatica* leaves were peltate and capitate (Figure 1b-d). Peltate trichomes consisted of a broad basal cell embedded in the epidermis, a single-celled stalk, and a large round multicellular head (Figure 1e, h). Two types of capitate trichomes, differing in size and structure, could be distinguished. Type I capitate trichomes were positioned at an angle to the leaf surface and composed of one basal epidermal cell, short cutinized stalk and unicellular ellipsoidal head (Figure 1f). Type II capitate trichomes comprised of one basal cell, unicellular stalk and one apical secretory cell (Figure 1g). Apical cell of mature type II capitate trichomes had well developed round subcuticular space (Figure 1d). Plant extracts secreted from glandular trichomes are a valuable source of biologically active compounds. Phytochemical analysis identified up to 37 compounds in the essential oils (EOs) of wild-growing and micropropagated plants, and revealed differences in both content and the composition of the EOs obtained from different samples. EOs from both native plant material and *in vitro* cultivated plants showed very high percentages of total monoterpenoids, dominated by oxygenated monoterpenes.

Borneol was the main essential oil component detected in wild-growing plants (25.28%) and micropropagated plants grown on plant growth regulator-free medium (20.30%). Micropropagated plants cultivated in the presence of 0.3 μM kinetin had the highest yield of the EO, with geranial (33.53%) and *cis*-*p*-mentha-1(7),8-dien-ol (23.69%) being the main EO components. The percentage of total sesquiterpenoids in micropropagated plant material was considerably lower than in wild-growing plants. Sesquiterpene hydrocarbons accounted for the majority of detected sesquiterpenoids and were dominated by alpha-cadinene and beta-vetivenene. Some of the volatiles were found only in plant material obtained by micropropagation but not in wild-growing plants. Differences in both content and the composition of the essential oils obtained from different samples indicated that *in vitro* culture conditions and plant growth regulators significantly influence the essential oils properties.

Acknowledgements:

This research was financially supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia, Grant № 173015, 173021 and 173030.

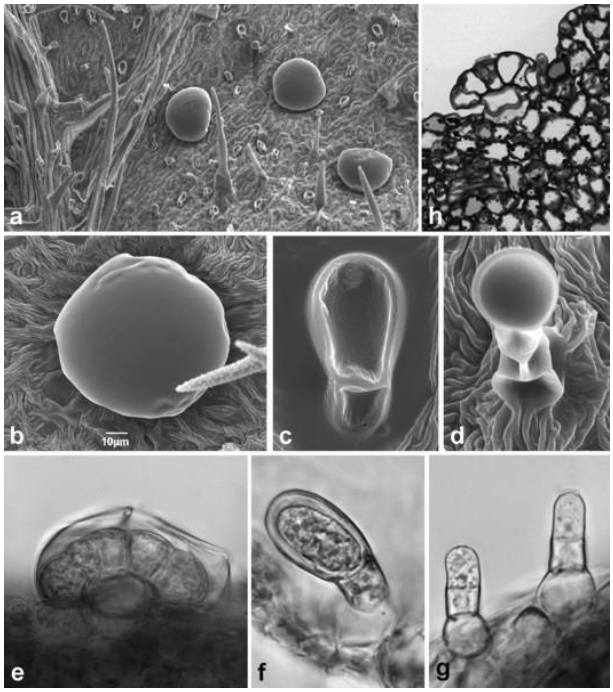

Figure 1. SEM and light micrographs of *in vitro* leaf trichomes of *M. croatica*. (a) Abaxial surface of leaf lamina. (b) Upper view of peltate trichome. Capitate trichome type I (c, f) and type II (d, g). (e,h) Longitudinal sections of immature peltate trichome.