

Analogy in Microclimatic Parameters, Chemometric and Phytonutrient Profiles of Cultivated and Wild Ecotypes of *Origanum vulgare* L., across Kashmir Himalaya

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Abstract : Background and Aims: Climatic and edaphic factors immensely influence crop quality and proper development. Regardless of economic potential, Himalayan Oregano has not subjected to phytonutrient and chemometric evaluation and its relationship with environmental conditions are scarce. The central objective of this research was to investigate microclimatic variation among wild and cultivated populations located in a microclimatic gradient in north-western Himalaya, Kashmir and analyse if such disparity was related with diverse climatic and edaphic conditions. Methods: Micrometeorological, Atomic absorption spectroscopy for micro elemental analysis was carried for soil. HPLC was carried out to estimate variation in phytonutrients and phytochemicals. Results: Geographic variation in phytonutrient was observed among cultivated and wild populations and among populations diverse within regions. Cultivated populations exhibited comparatively lesser phytonutrient value than wild populations. Moreover, our results observed higher vegetative growth of *O. vulgare* L. with higher pH (6-7), elevated organic carbon (2.42%), high nitrogen (97.41Kg/ha) and manganese (10-12ppm) and zinc contents (0.39-0.50) produce higher phytonutrients. HPLC data of phytonutrients like quercetin, betacarotene, ascorbic acid, arbutin and catechin revealed direct relationship with UV-B flux ($r^2=0.82$), potassium ($r^2=0.97$) displaying parallel relationship with phytonutrient value. Conclusions: Catechin was found as predominant phytonutrient among all populations with maximum accumulation of 163.8 ppm while as quercetin exhibited lesser value. Maximum arbutin (53.42ppm) and quercetin (2.87ppm) accumulated in plants thriving under intense and high UV-B flux. Minimum variation was demonstrated by beta carotene and ascorbic acid.

Keywords : phytonutrient, ascorbic acid, beta carotene, quercetin, catechin

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