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Poster Communication Abstract – 1.70

HARNESSING THE POTENTIAL OF BASIL AND PERILLA CELL CULTURE TECHNOLOGY FOR COSMETIC APPLICATIONS

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Plant cell cultures (PCCs) are gaining significant attention in the innovative cosmetics industry as valuable sources of bioactive compounds with immense potential for promoting health, beauty, and overall well-being. Culturing plant cells under controlled environment requires significantly less land, water, and energy, while maximizing, modulating, standardizing the production yield. This approach can reduce the reliance on traditional agricultural practices, optimizing resources, and mitigating the impact on biodiversity.

InnCoCells is a H2020 project (https://www.inncocells.org/) launched in 2021 aiming to develop innovative plant-based production processes for the commercial exploitation of scientifically validated cosmetic ingredients using profitable and sustainable cell cultures, aeroponic cultivation, and greenhouse/field cultivation.

In the realm of cosmetics, the extracts of two species of the Lamiaceae family, namely Ocimum basilicum and Perilla frutescens, fulfil the IECIC2021 and are considered as a source of phenylpropanoids, terpenoids and oils. The apolar fraction of these extracts is considered to have transdermal delivery, anti-oxidative, anti-inflammatory and anti-microbial capacities; while the phenolics show activities that counteract inflammation, oxidative processes, photo-ageing, skin carcinogenesis and melanogenesis. In addition, some of these extracts have properties that would be useful for the manufacturing process in itself having antifungal,

antimicrobial, natural preservation and dyeing properties.

Therefore, PCCs from these two species were established for innovative cosmetic applications and were optimized for metabolite accumulation using LED light-mediated elicitation.

PCCs polar extracts were subjected to LC-HRMS metabolomics analyses to highlight potential changes at global profiling level, with a particular regard to compounds with the above-mentioned cosmetic-related properties. Overall, a large extent of metabolic alterations were found, and the effects of the different conditions on metabolite accumulation were clearly elucidated.

Extracts turned out to be mainly non-toxic at the tested concentrations by in vitro assays. MERCK as a Project Partner evaluated the anti-inflammatory activity of PCCs extracts in fibroblasts (biomarkers: IL-6, PGE-2, IL-8), in monocytes (biomakers: TNF alpha, IL-6 and IL-1 beta; Table 5.17) and in keratinocytes (biomarkers: PGE2, IL-6 and IL-8; Table 5.16 and 5.17, respectively). The anti-aging potential of each extract was screened in different assays (autophagy, upregulation of epidermal differentiation marker filaggrin, COL1 induction in fibroblasts, anti-oxidative stress, Nrf2 activation and inhibition of MMP-1 or MMP9 in HaCat).