Plant tissue culture applied biotechnology provides safe, effective and sustainable active ingredients for skin care applications

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The use of plants as a source of active ingredients for health care was a common practice in all the passed civilizations, and still plant derived products have been extensively used for many types of therapeutic applications. It has been evaluated that in the last 20 years around 40% of the newly developed compounds or extracts for human health care have been natural products or derived from products of plant origin. Skin care research is constantly looking for new plant ingredients, which can be guaranteed for quality and safety to final consumers, as these need to be utilized in unregulated quantities. Unfortunately, several plant derived products can be used limitedly because it contains potential allergenic compounds, and may be subjected to environmental contaminations, such as pollution, pesticides or agrochemical residues. To bypass these limitations, plant tissue culture techniques can provide alternative solutions for producing valuable metabolites with skin care applications. These systems allow to cultivate plant cells or tissues in sterile conditions, totally independent from geographical and climatic factors, and with no risk of biological nor chemical contamination. Starting from different plant species and adopting new biotechnological approaches, we developed different types of tissue cultures, including cell, hairy root and somatic embryo suspension cultures, and used them as sources of active ingredients for skin care applications. The obtained ingredients, tested on skin cell cultures *in vitro* and on human volunteers *in vivo*, showed a wide range of cosmetic and dermatological activities, ranging from UV protection, anti-inflammation, hydration to anti-ageing.

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Isolation and characterization of a new *Bacillus thuringiensis* strain with a promising toxicity against lepidopteran pests

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Bacillus thuringiensis is an aerobic, spore-forming, gram-positive soil bacterium. This microorganism produces at the sporulation stage of its growth an intracellular crystal composed of one or more δ-endotoxins. BLB459 is a new *B. thuringiensis* isolated in the laboratory of biopesticides from a Tunisian soil sample. In the present study, we focused on the screening of *B. thuringiensis* collection of 200 strains isolated from different variety of Tunisian soils and the characterization, using RFLP and molecular hybridization, of *B. thuringiensis* strain BLB459 having a distinctive plasmid profile. *Sma*I-PFGE typing confirmed the uniqueness of the DNA pattern of this strain, compared with BUPM95 and HD1 reference strains. PCR and sequencing assays revealed that BLB459 harbored three *cry* genes (*cry30, cry40* and *cry54*) corresponding to the obtained molecular sizes in the protein pattern. Interestingly, PCR-RFLP assay demonstrated the originality of the BLB459 cry30-type gene compared to the other published cry30 genes. Insecticidal bioassays showed that BLB459 spore-crystal suspension was highly toxic to lepidopteran comparing with that of the commercial strain HD1 used as reference. Important histopathological effects of δ-endotoxins on the tested larvae midgut were detected, traduced by the vacuolization of the apical cells, the damage of microvilli, and the disruption of epithelial cells. Such results indicated the interest of the new selected *B. thuringiensis* strain BLB459 and their cry toxins in the biological control of different lepidopteran insects such as lepidopteran and the possibility of its use for the formulation of new bioinsecticides.

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