ascenion Technology transfer for academic research
A company of the LifeScience Foundation

REFERENCE NUMBER TO 42-00097

WATER-SOLUBLE PINE RESIN EXTRACT: A DUAL-ACTION ANTI-INFLAMMATORY AND CYTOPROTECTIVE AGENT FOR DERMATOLOGY

Keywords: pine resin extract, water-soluble, anti-inflammatory, (-)-borneol, myrtenol, topic application, dermatological formulation

INVENTION NOVELTY

A water-soluble extract derived from Scots pine (Pinus sylvestris) resin combines a unique chemical profile – notably enriched in myrtenol and (-)-borneol – with clearly demonstrated, synergistic inhibition of key keratinocyte inflammatory pathways. Unlike traditional resin preparations that are lipophilic and formulation-limited, the innovative extract is obtained via a targeted workflow yielding an aqueous fraction that retains potent monoterpene biomolecules while enabling cosmetic and pharmaceutical dosage forms such as serums, gels and light lotions. Mechanistically, the extract directly interferes with NF-κB activation by preventing IκBα degradation and suppressing p65 S536 phosphorylation, while simultaneously modulating RIPK1 phosphorylation states to reduce inflammation-associated signaling and RIPK1-dependent cell death. The combination of water solubility, defined bioactive composition, and dual anti-inflammatory plus cytoprotective modes of action distinguishes the extract from existing pine resin derivatives and essential oils and positions it as an innovative candidate for safer, long-term dermatological use.

VALUE PROPOSITION

The extract offers a natural, formulation-friendly alternative to steroidal and calcineurin-based topical agents, addressing unmet needs in chronic inflammatory dermatology where long-term safety and patient comfort are priorities. The demonstrated synergy between myrtenol and (-)-borneol enables lower active concentrations to achieve therapeutic effects, potentially reducing irritation and off-target effects compared with single-compound lotions or high-potency pharmacologics. The extract is suited for management of atopic dermatitis flare reduction, mitigation of UVB-induced epidermal damage, and local immune modulation to decrease pro-inflammatory cytokine secretion.

Pine resin and its harvest, Source: MUI.

TECHNOLOGY DESCRIPTION

The technology comprises a reproducible extraction and fractionation process converting Pinus sylvestris resin into three fractions with fraction E3 defined as the heavy aqueous fraction obtained after organic solvent pre-extraction, aqueous extraction, lyophilization and reconstitution. Analytical characterization identifies myrtenol, (-)-borneol, α-terpineol and other minor constituents as principal actives, potency and synergy were quantified using a NF-κB reporter assay. Functional assays demonstrate that E3 as well as its constituent monoterpenes inhibit TNFα-induced NF-κB signaling, reduce RIPK1 phosphorylation and autophosphorylation events linked to cell death, and protect keratinocytes from UVB-induced PARP1 cleavage. Cytokine secretion and mRNA profiling confirm attenuation of pro-inflammatory mediators.

COMMERCIAL OPPORTUNITY

Licensing, joint development or formulation partnerships are sought to translate E3 into consumer and prescription dermatology products that leverage its natural origin, mechanistic specificity and formulation advantages.

DEVELOPMENT STATUS

Successfully engineered a proprietary extraction process that enables the conversion of hydrophobic pine resin into a water-soluble, bioactive and stable substance. In vitro testing and lab-scale extraction processes have been successfully completed. Initial analytical profiling identified key terpenoid constituents within the pine resin extract, with subsequent evaluations confirming their water solubility, anti-inflammatory and cytoprotective efficacy, and synergistic mechanism.

PATENT SITUATION

A priority EP patent application has been filed in June 2026.

MEDIZINISCHE UNIVERSITÄT INNSBRUCK

Ascenion GmbH
Herzogstraße 64
D-80803 München
info@ascenion.de
www.ascenion.de

Licensing Contact
Dr Hubert Müller
Technology Manager
T: +49 89 318814-32
mueller@ascenion.de