

## **BioWILL - Characterising Willow Bark Bio-actives for Skin Therapies**

### **Abstract**

Willow bark is considered as a disposable by-product when processing willow for biomass. Willow (*Salix*) is known to contain high value bioactive compounds which include salicin and its derivatives, and other phytochemicals of interest such as polyphenols and flavonoids. The plant is historically known as the primary source of salicylates to which the well-known drug aspirin is derived from. The work forms part of the Interreg project BioWILL, which is focused on integrated “Zero Waste” biorefinery utilising all fractions of willow feedstock for the production of biochemicals and renewable energy. This project aims to investigate the crude and processed bark extracts from various varieties of willow for their potential capability as beneficial antioxidants, anti-inflammatory, wound healing, skin barrier and disease arrest agents in skin health care.

There was an observed significance ( $p < 0.05$ ) in wound healing effects of the *S. dasyclados* and *S. endeavour* bark extracts at a concentration range of 0.01 to 0.0001 mg/ml, with 52.2% to 87.2% gap closure, respectively, against 40.8% gap closure of the untreated control on human keratinocytes. The extracts also elucidated a positive healing effect in human dermal fibroblasts. This is a promising result for the application of both of these *Salix* crude extracts for skin wound healing applications. The bark extracts for *S. dasyclados* and *S. endeavour* were shown to offer desirable antioxidant effects in human keratinocytes at concentration ranges of 0.1 to 0.0001 mg/ml. The mechanisms to which these extracts offer these benefits are complex and will be further explored in this project.

**Keywords:** willow bark, phytochemicals, keratinocytes, dermal fibroblasts, skin care