

# Lusophone Plants as a Source of Therapeutic Lysyl Oxidase Modulators

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*Abstract:*

Plants have been used since antiquity as sources of compounds with therapeutic activity. Current knowledge allows an evidence-based use of drugs obtained from traditional plants. Wound healing is a pathology where medicinal plants are more commonly used. On the other hand, many drugs currently used in Oncology were obtained from medicinal plants.

LOXs (lysyl oxidase enzymes) catalise the crosslink of collagen and elastin in the extracellular matrix. While LOXs are essential for tissue regeneration and wound healing, excessive levels have been implicated in the pathogenesis of various pathologies including cancer, fibrosis, excessive scarring, and systemic sclerosis.

The vast biodiversity of flora from Lusophone countries constitutes a supply with enormous potential for novel compounds. These plants can be screened to search for new LOXs modulators. Research aiming to explore the relationship between molecular structures and the ability to modulate the activity of LOXs can help to identify the chemical groups more likely to interfere with their active center.

Breast cancer is the most common type of cancer in women and the prognosis depends largely on the development of metastases. Breast cancer tissues show increased LOXs expression. The specific targeting of this enzyme has been suggested as a promising therapeutic strategy. In this project, we will use human breast cancer cells to explore the impact of LOX modulators in cell processes related with tumor growth and metastases. In addition, the role of LOXs on breast cancer progression will be dissected using bioinformatic tools and biopsies of Portuguese patients. Such studies will give insights on the breast cancer subtypes and characteristics where LOX inhibitors could be more beneficial, contributing to personalised medicine strategies.

In Europe, the cost of wound management has been estimated to account for 3% of all health care expenditure, but currently available therapies are limited. Modulation of LOX activity is a promising strategy to promote skin wound healing, since its activation could be beneficial in wound healing, and its inhibition could help decrease scarring. Skin cell culture assays will be conducted to characterize the impact of LOX modulators. Nanoencapsulation strategies will be used to improve the bioavailability, efficacy and safety of the natural compounds extracted from Lusophone plants with LOX modulating capacity.

