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Scaling up using cobalt catalyst: innovation in the candeia oil production chain

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α-Bisabolol (1), a natural unsaturated sesquiterpene found in various essential oils, can be extracted from cadeia tree (*Eremanthus erythropappus*). This compound has numerous commercial uses in cosmetic and therapeutic formulations, due to your healing and anti-inflammatory properties [1, 3]. Furthermore, the catalytic oxidation of α-bisabolol, which contains two olefinic bonds, can open new application perspectives. In this work, we present a scale up process for the epoxidation of α-bisabolol, forming a new compound with high added value, following the essence of green chemistry, using of the renewable biomass-based substrate, low-cost and non-corrosive solvent, becoming commercially interesting route [2]. Through heterogeneous catalysis, the substrate under study interacts with the surface of the cobalt catalyst supported on mesoporous silica via the phenomenon of adsorption, allows for multiples reuses cycles catalyst and maintaining its efficiency. The objective is to obtain poly-functionalized epoxides on a large scale starting from research carried out in the laboratory until the development of the pilot plant on an industrial scale. The catalytic process efficiently operates under atmospheric pressure, room temperature with quantities almost 100 times greater than bench procedures, in which it was possible to reproduce the mass balance. The technical feasibility of increasing laboratory scale to greater proportions is being evaluated with the aim of advancing the level of maturity of the technology. Furthermore, the biological properties and stability of the epoxides (2) formed will be evaluated, as well as its cytotoxicity and healing capacity compared to other products such as *α*-bisabolol itself.

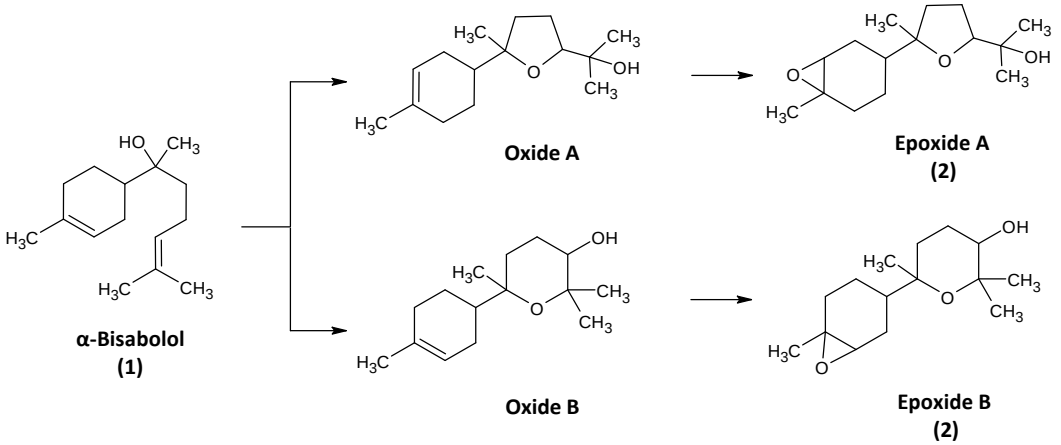

Figure 1. Oxidation reaction of *α*-bisabolol and epoxidation of its oxides

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References

[1] Guy P. P. Kamatou & Alvaro M. Viljoen, J Am Oil Chem Soc, **87**, 2 (2010).
[2] L.D. Almeida *et al.*, Molecular Catalysis, **527**, 4 (2022).
[3] Eddin, Lujain Bader, *et al.*, Nutrients, **14**, 1370 (2022).