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Alpha-Bisabolol: sustainable alternatives for the catalytic oxidation with cobalt-based heterogeneous catalyst

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Terpenes are a class of natural compounds found in essential oils widely used in the chemical industry. These compounds have several interesting biological properties and may be used in different ways, such as analgesic, fragrances and anti-inflammatory [1]. Alpha-Bisabolol (α-bis) is a mono-cyclic sesquiterpene present in candeia oil, which can be obtained from Candeia tree (*Eremanthus erythropappus*), a vegetal species easily found in Brazil [2]. Besides the aforementioned applications, the catalytic functionalization of the double bonds could expand the uses of α-bis by oxidation reaction, giving rise to epoxidation products which may have different physical-chemical properties. Catalytic processes for the oxidation of terpenes are usually carried out with toxic reagents that are not environmentally friendly, such as peroxides and halogenated solvents [3,4]. Furthermore, the majority of reported processes use high temperature and high pressures of molecular oxygen, making these processes not nearly sustainable and with high energetic demand. In this study, our efforts have been focused on the development of "greener" solvent alternatives to optimize the obtaining process of these oxidation products under mild conditions using environmentally friendly molecular oxygen as a final oxidant, isobutyraldehyde as a sacrificial reagent and a robust solid material based on a non-noble metal as a heterogeneous catalyst. Silica-supported cobalt material showed excellent catalytic performance allowing to obtain several potentially useful epoxides starting from bio-renewable alkene. The reactions were carried in a round bottle flask at room temperature employing solvents with good sustainability ranks as propylene carbonate, diethylcarbonate, dimethylcarbonate and methyl-ethyl-ketone. The investigation showed promissing results: full conversion and selectivity of the desired epoxide products in ca. 95% combined yield.

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