Geraniol content enhancement in *Cymbopogon martinii* essential oil

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Cymbopogon martinii belongs to the Poaceae family. It is native to Southeast Asia. It is grown mainly in India, Brazil, Paraguay, Madagascar, Guatemala, and Indonesia. The essential oil (EO) of *Cymbopogon martinii* (palmarosa) has over 70 constituents, among which geraniol (78-85%) and geranyl acetate (3-12%) are the most abundant (1). Geraniol is an acyclic monoterpenic alcohol. It is one of the most important molecules in the flavor and fragrance industries and is a common ingredient in consumer products of these industries. This project seeks to increase the geraniol concentration in palmarosa EO using catalytic hydrolysis of geranyl acetate. Geranyl acetate hydrolysis was tested in treatments (reflux, 2 h) whit hydrochloric acid (5 N), sulfonated silica (5 N), potassium hydroxide (5 N), and calcium hydroxide (5 N). Compound identification was performed on a gas chromatograph (Agilent Technologies, AT, 7890A) coupled to a quadrupole mass spectrometer (AT, 5975C). DB-5MS (60 m) and DB-Wax (60 m) capillary columns were used, with oven temperatures programmed from 50 to 280 °C and 50 to 200 °C, respectively. A 30: 1 split injection (1 µL) was employed. Quantification was based on chromatographic areas obtained with a gas chromatograph (HP 5890 series II) with FID and a DB-Wax (60 m) column. Calibration curves were made with certified standards of geraniol and geranyl acetate. The hydrolysis in acid medium (HCl and sulfonated silica) had no selectivity for the formation of geraniol. The hydrolysis in heterogeneous phase with $CaOH_2$ permitted a conversion of 11% and a selectivity of 88%. One reason for the limited use of heterogeneous basic catalysts is the rapid deactivation in the presence of air. The calcium-based catalysts have strong basic sites, but need a pretreatment at a high temperature to remove adsorbed CO_2 from the atmosphere (2). Though, the selectivity was high towards the formation of geraniol. Calcium-based catalysts have been used in the production of biodiesel for their low cost and ease of preparation (2). The highest conversion (34%) and selectivity (96%) were obtained with the potassium hydroxide treatment. Further improvements of basic catalyst materials results are under way.

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