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Euroorganicchemistry 2019: Thermal, Photooxidation and antifungal activity of Monoterpene: Geranyl acetate - Suzan A. Khayyat – University of Jeddah

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Abstract

Geranyl acetate (1) was epoxidated thermally and photochemically using (mcpba, H2O2) respectively to produce mixture of (E)-5-(3,3-dimethyloxiran-2-yl)-3-methylpent-2-enyl acetate (2) and 3-(2-(3, 3-dimethyloxiran-2-yl) ethyl) -3-methyloxiran-2-yl) methyl acetate (3) thermally. While produced epoxide (3) only photochemically. On the other hand, photooxygenation of (1) using tetraphenyl porphin (TPP) as photo sensitizer gave three hydroperoxide derivatives of Acitic acid 2,6-bis-hydroperoxy-7-methyl-3-methylene-oct-7-enyl-ester (4), Acitic acid 7-hydroperoxy-3,7-dimethyl-octa-2,5-dienyl ester (5) and Acitic acid 3- hydroperoxy-7-methyl-3,7-dimethyl-octa-1,6-dienyl ester (6). Studies on the antifungal activity especially Microsporum gypsum and Trichophyton vercossum showed that geranyl acetate, its epoxides and hydroperoxides derivatives have good antifungal action.
Keywords: Antifungal activity, epoxidation, geranyl acetate, photooxidation, medicinal plants.

General epoxidation procedures of geranyl acetate

Technique A: Photochemical epoxidation utilizing hydrogen peroxide

An arrangements of H2O2 (2.5 mL, half) was included circumspectly drop astute over 5 min to a blended arrangement of 1 (5 mmol) in C2H5OH (25 mL) at 0 °C. The blends were lighted utilizing sodium light in an air of nitrogen. The response blend dissipated and purged through segment chromatography by oil ether 60–80 °C and ether (8:2) as elution .

TechniqueB: Thermal epoxidation utilizing m-chloroperbenzoic corrosive

Arrangement of 1 (1.0 mmol) in CHCl3 (25 mL) was cool at 0 °C. mcpba (5.0 mmol, 80%) was added partition savvy to the response blends, at that point mixed at room temperature (TLC, peroxide test by KI, 10%). The response blend was washed with an immersed fluid arrangement of NaHCO3 (3 × 10 mL), at that point with refined water (3 × 10 mL). The natural layer was isolated, dried, vanished and filtered by section chromatography utilizing oil ether 60–80 °C and ether (8:2) gave the epoxide subordinates as thick oils (Elgendy and Khayyat, 2008) (Table 1).

Photooxygenation response of geranyl acetic acid derivation

One gram of 1 was occur in test tube, blended in with CHCl3 and TPP as a sensitizer, at that point presented to sodium light at −20 °C. stream of dry oxygen gas was passed into the blend of response all through the light. The dissolvable was dissipated at 20 °C. At that point the unrefined item was cleansed by segment chromatography on silica gel as adsorbent and a blend of oil ether and ethyl acetic acid derivation as elution to give the hydroperoxides items 4, 5 and 6, which were effectively isolated in unadulterated structure in the yields

Antifungal Activity

Very much cut dissemination strategy was completed to examine antifungal action (EL-Masry et al., 2000). The Sabaroud capable agar media was vaccinated with 1 mL from tried spore suspension, at that point wells were cut from the plate utilizing a clean 1 cm stopper borer. About 1.0 mL of the tried mixes were included into each well. All plates were brooded at 4 °C for 2 h to slow parasitic development and gives appropriate time for the antidermatophytic specialist to diffuse. The plates were later hatched at 28 °C for seven days (Mtolera and Semesi, 1996). After hatching, the breadth of the development hindrance zone was estimated in mm

It is realized that some monoterpenes and their subordinates have antimicrobial movement (Saddiq and Khayyat, 2010). In this way, a near test was taken of 1, its epoxide and hydroperoxide subordinates against Microsporum gypsum, Trichophyton vercossum and Candida tropicalis. These growths were acquired from American sort culture assortment (ATCC; Rockville, MD, USA). The antifungal exercises (zone restraint are summed up in Table 3, Fig. 2, all the mixes were at 1000 µg/ml fixations. The outcomes were indicated that geranyl acetic acid derivation and its subsidiaries repressed Microsporum gypsum Trichophyton vercossum and Candida tropicalis development, exceptionally epoxide 3 was more powerful than (4, 2, 6, 5, 1) individually. The most extreme antifungal action was against Microsporum gypsum.

Biography

Prof. Suzan A. Khayyat has completed her PhD in Organic Chemistry by Faculty of Education – Jeddah, Saudi Arabia. She has worked as professor of organic Chemistry at King Abdulaziz University and University of Jeddah in Saudi Arabia. She has published more than 35 papers in reputed journals and

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