New monoterpenoid by biotransformation of thymoquinone using Aspergillus niger

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Microorganisms have been used extensively for hydroxylation of terpenoids since their enzymes catalyze reactions with high regio- and stereospecifity. Their ability to oxidize terpenoidal compounds has an immense synthetic and commercial importance. The hydroxylation of a large number of substances, including terpenoids, has been studied by employing a variety of microorganisms. However, no studies on the transformation of thymoquinone, by fungi have been reported in the literature. Thymoquinone (2-Isopropyl-5-methyl-[1,4]benzoquinone, C10H12O2) (1), a monoterpenoid isolated from the seeds of Nigella sativa, has been shown to have anti-tumor activity against liver, prostate, colon, breast, lung and pancreatic cancer. Thymoquinone (1) has been also shown to have antioxidant, analgesic and anticonvulsant effects. Microbial transformation of thymoquinone (1) by suspended cell-cultures of the plant pathogenic fungus Aspergillus niger resulted in the production of three metabolites. These metabolites were identified as 5-isopropyl-2-methyl-2,4-cyclohexenone lactone (2), hydroxythymoquinone (3), and 4-hydroxy-2-isopropyl-5-methylphenol (4) by different spectroscopic methods. Metabolite 2 was found to be a new compound. Compound 4 showed potent antioxidant activity.

Speaker Biography

Mohammad Yasin Mohammad has obtained his BSc degree (Chemistry) in 2004 from the University of Jordan in Amman, Jordan, MSc degree (Organic Chemistry) in 2008 from the University of Karachi, Karachi, Pakistan, and PhD degree (Organic Chemistry) recently in 2013 from HEJ Research Institute of Chemistry, International Center for Chemical and Biological Sciences, Karachi-75270, Pakistan. He is currently working as Assistant Professor at the Faculty of Pharmacy, Middle East University, Amman-11831, Jordan. His research interests are in natural products chemistry and in microbial biotransformation of steroids as well. His future plan is to establish a research in the field of Natural Products Chemistry. He wishes to contribute in raising standards of education and research in Jordan.

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