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Analysis of ergosterol conversion into vitamin D2 in *Cordyceps sinensis* Cs-HK1 under UV-B irradiation by high performance liquid chromatography

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Vitamin D, also known as "sunshine vitamin", is a fat-soluble hormone which plays an important role in maintaining bone health. Vitamin D is the general name for a group of vitamins having similar biological activities with cholecalciferol (vitamin D3). Ergocalciferol (vitamin D2) is the synthetic form of vitamin D from ergosterol (provitamin D2). Mushrooms that are cultivated in dark environment, without exposure to UV light, usually contain a negligible amount of vitamin D2 but an abundant amount of ergosterol naturally. Ergosterol can be eventually converted to vitamin D2 under UV irradiation with a series of reaction steps. In this study, the UV-B irradiation effects on the conversion of ergosterol into vitamin D2 and ergosterol contents in the extract solution was analyzed by high performance liquid chromatography system with a reversed phase at 282 nm, using acetonitrile/ methanol (75:25) as mobile phase, qualitatively and quantitatively. The results showed that an increase in UV-B irradiation time had a positive effect on the conversion of ergosterol to vitamin D2, ranging from 145.8µg vitamin D2 to 406.8 µg vitamin D2 per gram sample when compared to the original (14.7 µg vitamin D2 per gram sample). The optimum irradiation time was found to be 60 minutes. Moreover, an increase in irradiation temperature also had a positive effect on the above conversion. At the optimum UV-B irradiation time (60 minutes), the vitamin D2 content in the Cs-HK1 mycelia at irradiation temperature 20°C was analyzed to be 230.3 µg vitamin D2 per gram sample, which was only about 56.6% of that at irradiation temperature 35°C (406.8µg vitamin D2).



Figure 1: Vitamin D2 and ergosterol content of Cordyceps sinensis Cs-HK1 mycelia before and after UV-B irradiation.

Biography

Jian-Yong Wu is an Associate Professor in the Department of Applied Biology and Chemical Society in the Hong Kong Polytechnic University. His research mainly focuses on biotechnology and bioprocesses with medicinal fungi and plant tissue cultures; food science and engineering on functional foods (natural and bioactive polysaccharides; dietary fiber, prebiotics and microbiota) and ultrasound-assisted extraction and processing of food and medicinal products.

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