

Antimicrobial polyhydroxybutyrate submicron fiber mat loaded with extract of *Hypericum perforatum*

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Abstract

The aim of this work was to prepare a new biodegradable polyhydroxybutyrate (PHB) submicron fiber mat loaded with hypericin-rich *Hypericum perforatum* raw extract by centrifugal spinning technology, an alternative approach to the traditional method of electrospinning to fabricate nanofibers or microfibers from solutions at high speed and low cost. Hypericins in methanol/acetone extract of *H. perforatum* were determined by UHPLC-MS/MS and HPLC/PDA. Submicron fiber mats composed of pure PHB or PHB enriched with *H. perforatum* extract were prepared using a pilot plant demonstrator for the centrifugal spinning technology and characterized by SEM. Singlet oxygen production was quantified by the 1,3-diphenylisobenzofuran (DPIBF) method in hexane. The results proved a significant production of singlet oxygen by the prepared submicron fiber mat. We also found a significant antibacterial activity against the bacterial strain *Escherichia coli* CCM 5417 by a method in accordance with JIS Z 2801/ISO 22196 standards. The *H. perforatum* extract-enriched PHB submicron fiber mats showed potential for the development of self-cleaning and antimicrobial air filters.

Keywords: *Hypericum perforatum*, Hypericin extract, Polyhydroxybutyrate, Submicron fiber, Singlet oxygen, Antimicrobial air filter

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