

Antibacterial and Antifungal Properties of Composite Polyethylene Materials Reinforced with Neem and Turmeric

Thefye P. M. Sunthar ^{1,2}, Elia Marin ^{1,3,*}, Francesco Boschetto ^{1,2,3}, Matteo Zanocco ^{1,2}, Hirofumi Sunahara ⁴, Raviduth Ramful ^{5,6}, Kaeko Kamei ⁴, Wenliang Zhu ¹ and Giuseppe Pezzotti ^{1,2,7,8}

¹ Ceramic Physics Laboratory, Kyoto Institute of Technology, Sakyo-ku, Matsugasaki, Kyoto 606-8585, Japan; d0871502@edu.kit.ac.jp (T.P.M.S.); boschetto-cesc@kit.ac.jp (F.B.); d8871004@edu.kit.ac.jp (M.Z.); wlzhu@kit.ac.jp (W.Z.); pezzotti@kit.ac.jp (G.P.)

² Department of Immunology, Graduate School of Medical Science, Kyoto Prefectural University of Medicine Kamigyo-ku, 465 Kajii-cho, Kawaramachi dori, Kyoto 602-0841, Japan

³ Department of Dental Medicine, Graduate School of Medical Science, Kyoto Prefectural University of Medicine, Kamigyo-ku, Kyoto 602-8566, Japan

⁴ Department of Biomolecular Engineering, Kyoto Institute of Technology, Sakyo-ku, Matsugasaki, Kyoto 606-8585, Japan; m9674018@edu.kit.ac.jp (H.S.); kame@kit.ac.jp (K.K.)

⁵ Graduate School of Science and Technology, Kyoto Institute of Technology (KIT), Matsugasaki, Sakyo-ku, Kyoto 606-8585, Japan; r.ramful@uom.ac.mu

⁶ Mechanical and Production Engineering Department, Faculty of Engineering, University of Mauritius, Reduit 80837, Mauritius;

⁷ The Center for Advanced Medical Engineering and Informatics, Osaka University, Yamadaoka, Suita, Osaka 565-0871, Japan

⁸ Department of Orthopedic Surgery, Tokyo Medical University, Tokyo, 105-8461, Japan

* Correspondence: elia-marin@kit.ac.jp

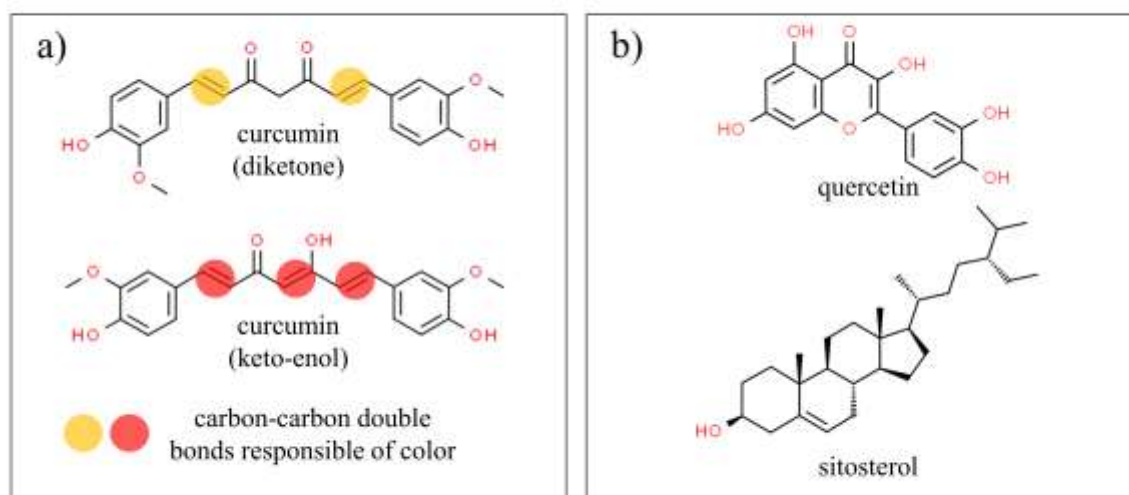


Figure S1. Molecular structure of the bioactive compounds of (a) turmeric, in both diketone and keto-enol form and (b) neem, quercetin and sitosterol.



Figure S2. Centrifuged pellet of *E. coli* bacteria exposed to 5% turmeric polyethylene composite showing the presence of curcumin inside the cell membranes.