

Supplementary information

**Double Blind Placebo Controlled Randomised Study of Sporopollenin
Exine (SpECS) Fragrance Encapsulation**

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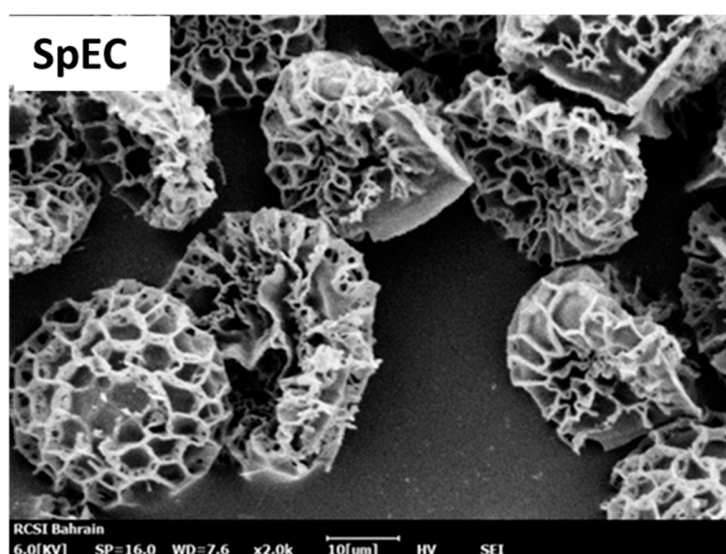


Figure S1. Scanning electron micrograph of SpECs, showing the highly uniform spherical structure of *Lycopodium clavatum* with characteristic serrated coronate features (Micrograph acquired at 2000x magnification).

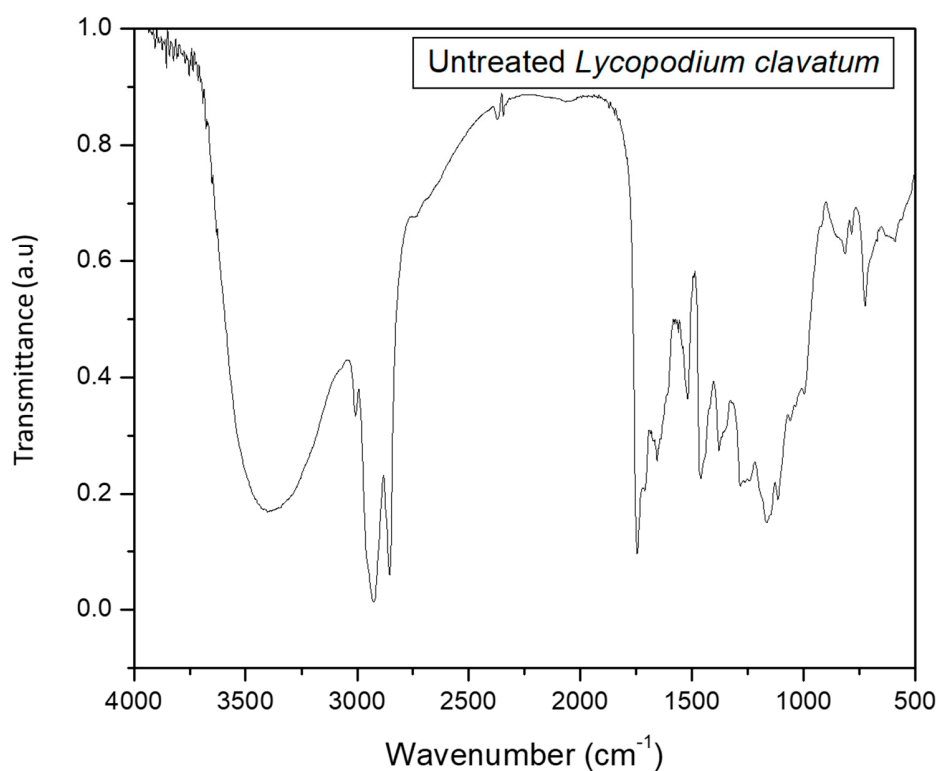


Figure S2. FTIR spectrum of untreated (raw) *Lycopodium clavatum* spores. A broad absorption band at 3400-3300 cm⁻¹ is attributed to O-H stretching vibrations of hydroxyl groups. C-H bands are observed at 2925 and 2854 cm⁻¹. These indicate the presence of long-chain aliphatic structures. The prominent absorption at 1735 cm⁻¹ is assigned to ester carbonyl (C=O) stretching vibrations. The bands at 1650 and 1540 cm⁻¹ are due to amide I and amide II vibrations.

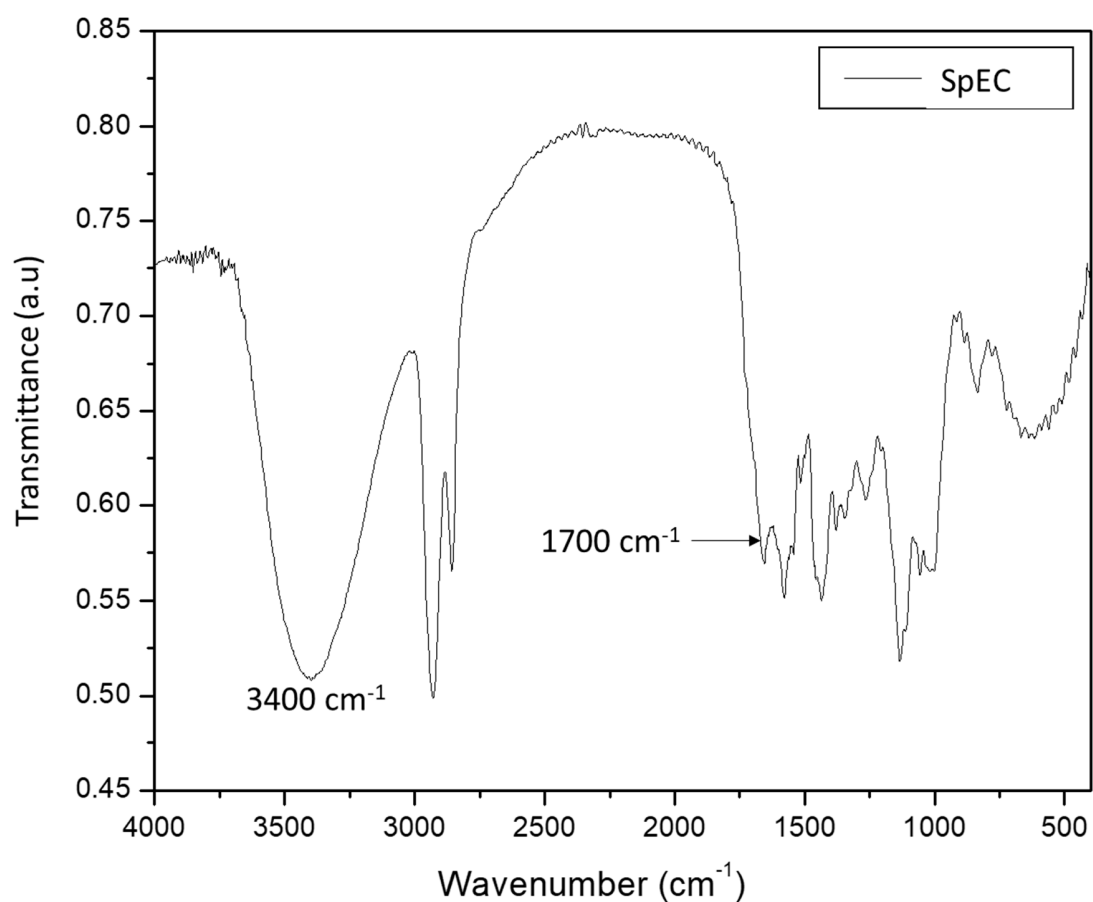


Figure S3. FTIR spectrum of SpEC. The treated spores show reduced intensity of the carbonyl stretching at 1700 cm⁻¹ indicating removal of ester-containing compounds, fatty acids, proteins or pigments. The OH stretching band at 3400 cm⁻¹ is more intense indicating increased exposure of hydroxyl groups due to hydrolysis and removal of surface biomolecules. Despite these significant changes other characteristic sporopollenin-associated bands remain preserved indicating that the chemically resistant exine framework is retained after the chemical treatment.