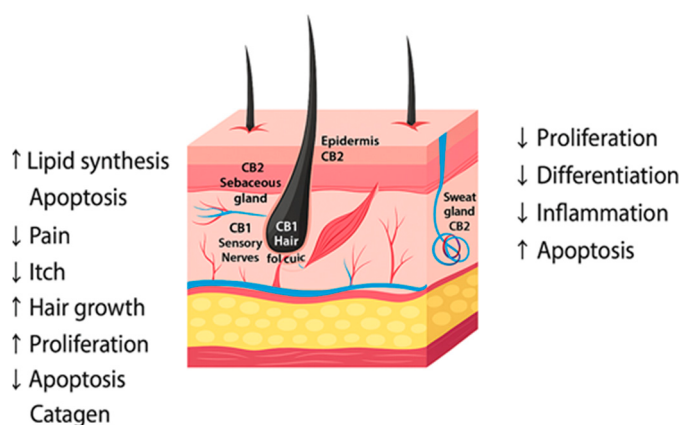
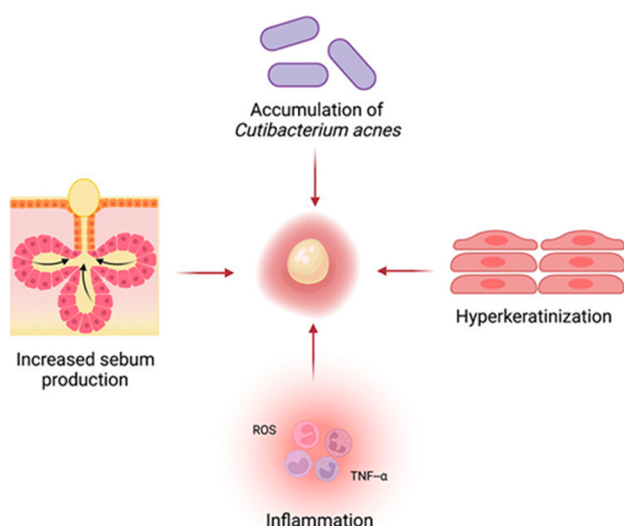


Supplementary Table S1. Full-text studies excluded after eligibility assessment and reasons for exclusion

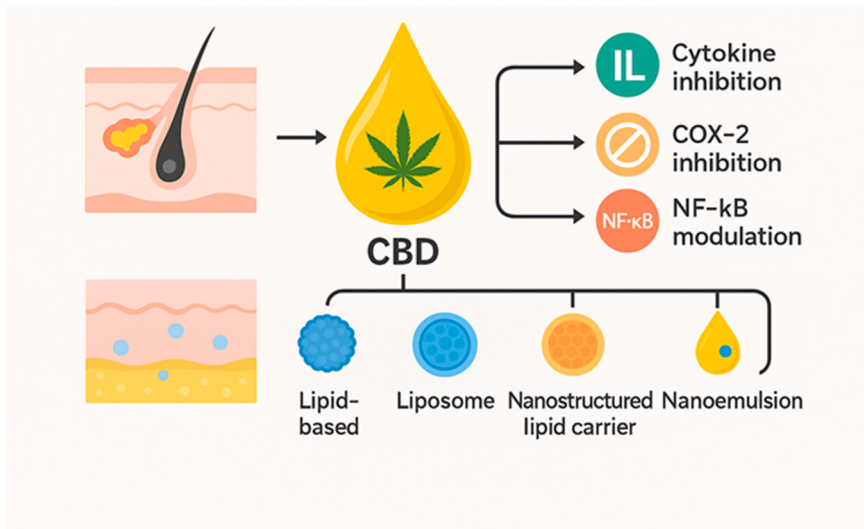
Citation	Reason for exclusion	Notes
Thammasat University, 2021	Hemp seed extract; no quantified cannabinoids	Split-face cosmetic study; outside CBD efficacy scope
MDPI Cosmetics, 2025	Non-CBD hemp seed extract; skincare endpoint only	Oxygenating mask; no acne or cannabinoid analysis



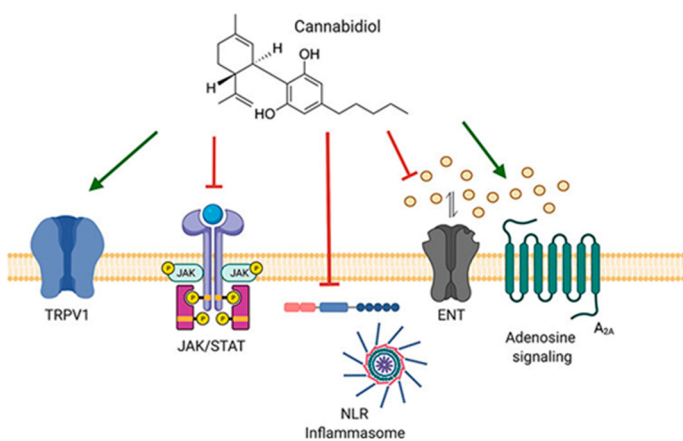
Supplementary Figure S1. Distribution of endocannabinoids in the skin



Supplementary Figure S2. Acne pathogenesis. Increased sebum production, accumulation of *C. acnes*, hyperkeratinisation and inflammation resulting in the formation of comedones.



Supplementary Figure S3. A Schematic illustration of lipid-rich hemp seed–derived extract penetration, modulation of barrier lipids and support of non-comedogenic sebum flow.



Supplementary Figure S4. Molecular pathway diagram highlighting ECS receptor targets and down-stream effects specific to cannabinoid-containing hemp extracts.