

Supplementary Materials: Valorization of Thyme Combined with Phytocannabinoids as Anti-Inflammatory Agents for Skin Diseases



Figure S1. – GC-MS chromatogram of hydrodistillate of *Thymus mastichina* essential oil.



Figure S2. – GC-MS chromatogram of FA.

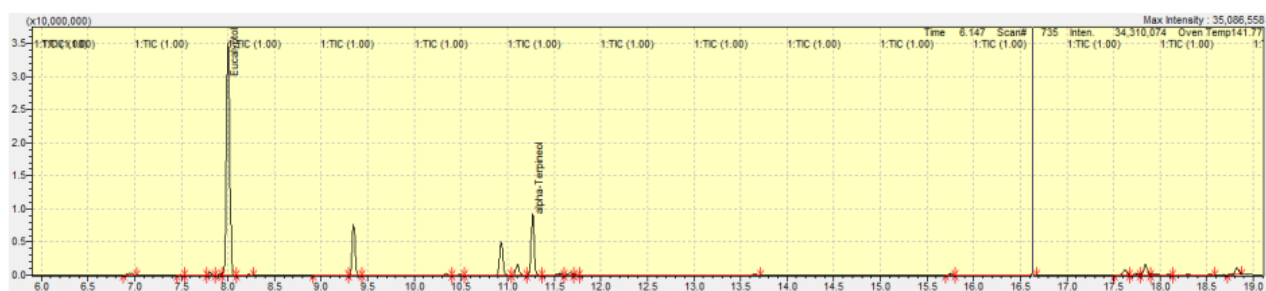


Figure S3. – GC-MS chromatogram of FB.

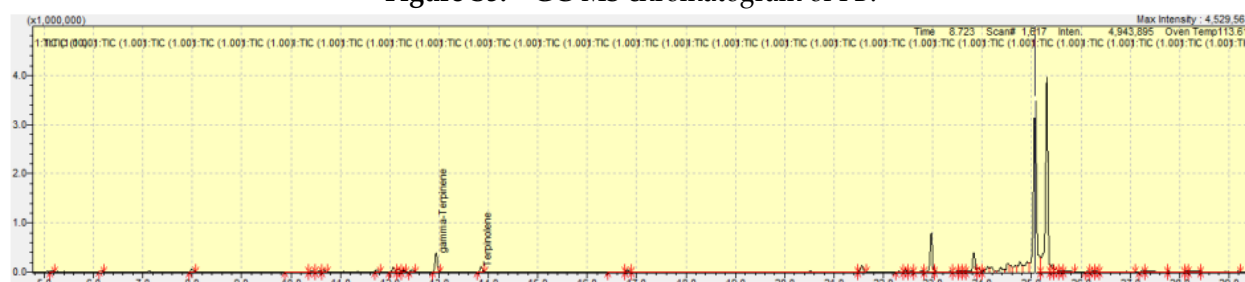


Figure S4. – GC-MS chromatogram of FC.

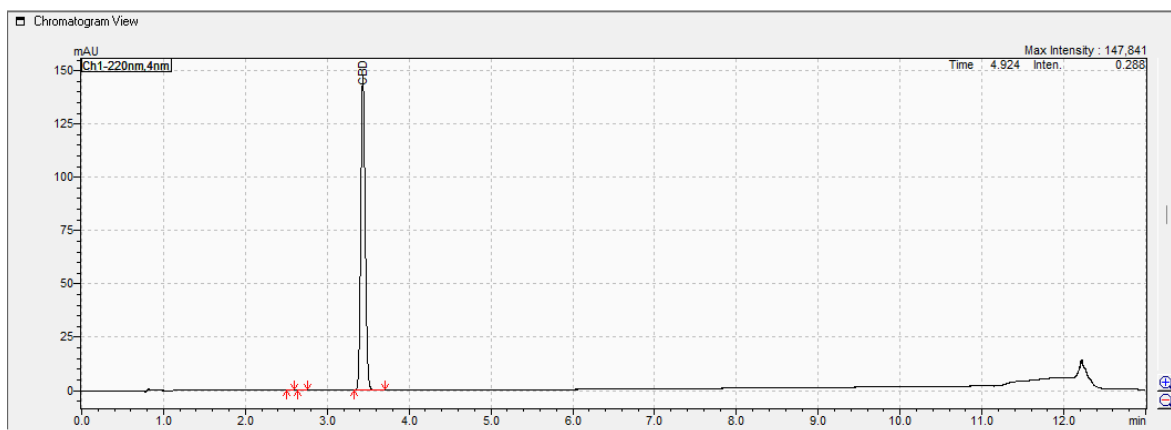


Figure S5. – HPLC chromatogram of pure Cannabidiol (CBD).

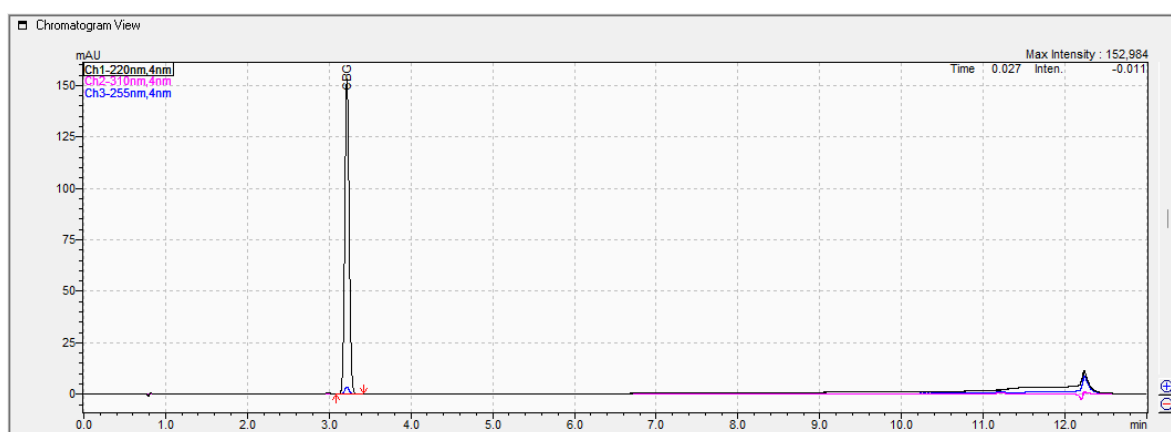


Figure S6. – HPLC chromatogram of pure Cannabigerol (CBG).

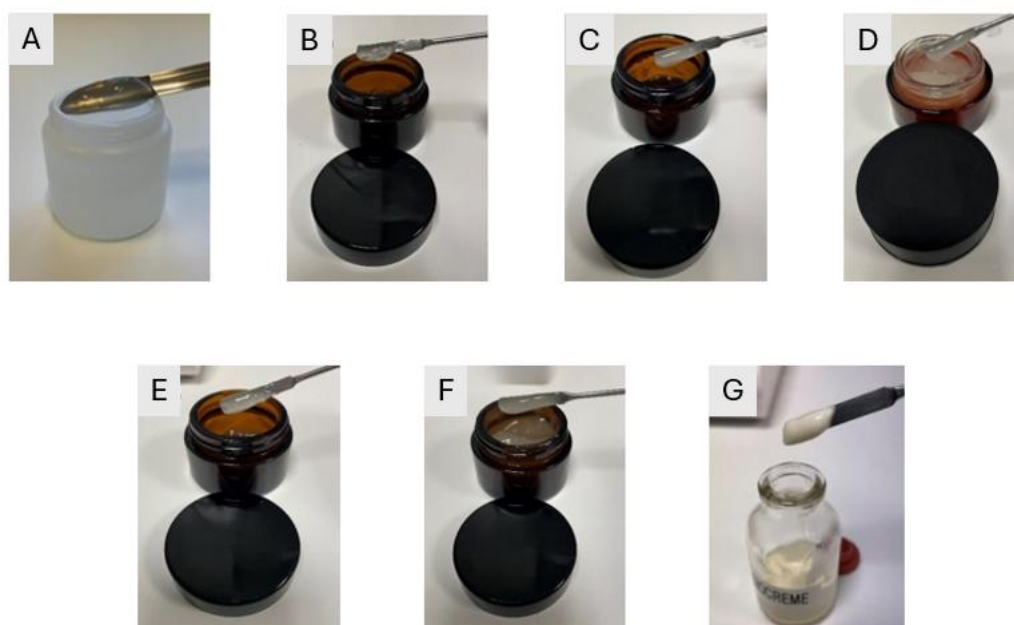


Figure S7. –Appearance of loaded and unloaded formulations based on gel A) Placebo Carbopol® 940 gel and containing B) mixture of cannabinoids (Cann); C); essential oil of FB; D) FB.Cann; E) essential oil of FC; F) FC.Cann; G) Positive Control 2 – commercial cream containing a cannabinoid.

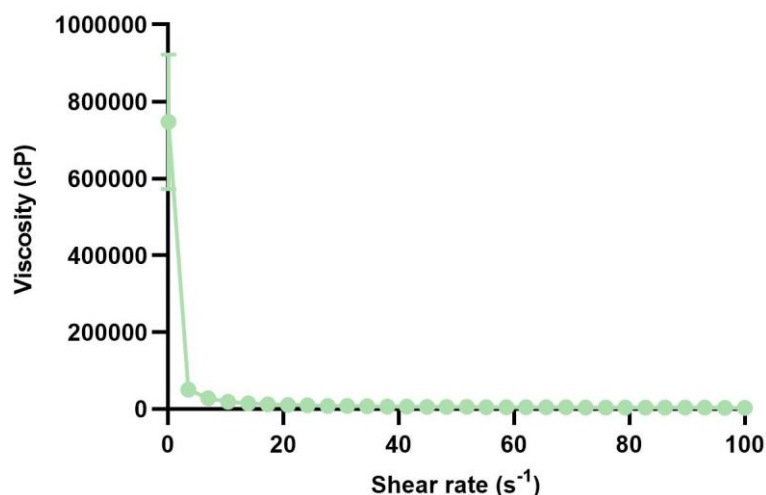


Figure S8. – Measurement of viscosity (cP) against the shear rate (s⁻¹) of Placebo Carbopol® 940 gel using the rheometer.

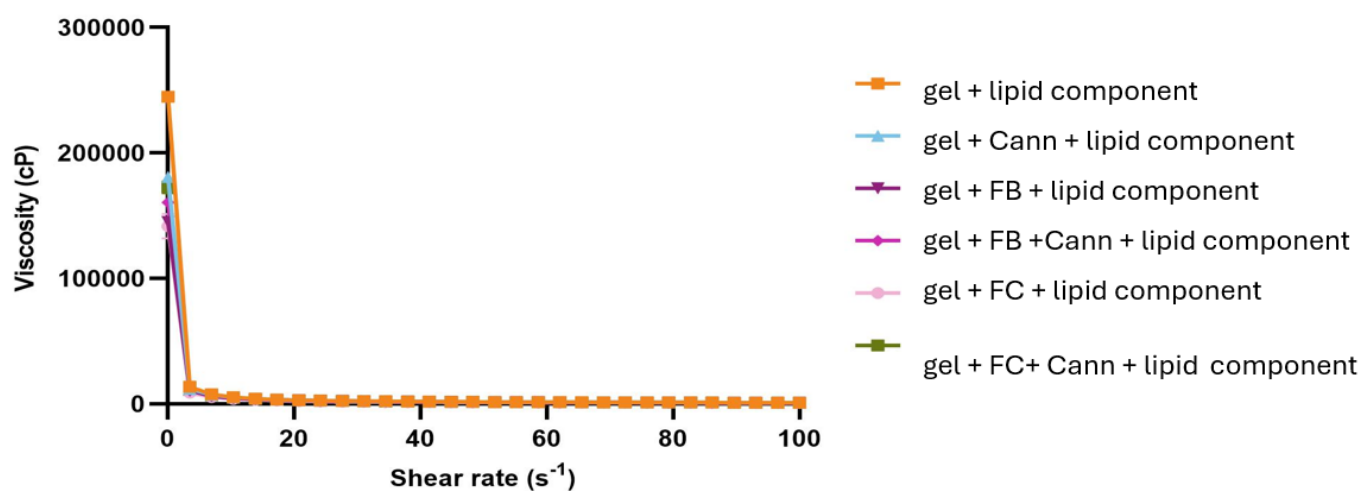


Figure S9 – Measurement of viscosity (cP) against shear rate (s⁻¹) of the gel + 1 % (w/w) of lipid component (n=1); gel + mixture of cannabinoids (Cann) + 1 % (w/w) of lipid component (n=1); gel + 5 % (w/w) of FB + 1 % (w/w) of lipid component (n=1); gel + 5 % (w/w) of FB + mixture of cannabinoids (Cann) + 1 % (w/w) of lipid component (n=1); gel + 5 % (w/w) of FC + 1 % (w/w) of lipid component (n=2); gel + 5 % (w/w) of FC + mixture of cannabinoids (Cann) + 1 % (w/w) of lipid component (n=3), using the rheometer.

Table S1. – Major terpenes present in fractions of interest, FA, FB and FC and the respective Relative Retention Indices (RRI) determined by GC-MS.

Fraction of interest	Major terpenes	RRI
FA	Thymol	1262
	Linalool	1082
FB	Eucalyptol	1059
	α -Terpineol	1143
FC	γ -Terpinene	998
	Terpinolene	1052

Table S2. Analysis of the loaded and unloaded formulations based on gel: Placebo Carbopol® 940 gel, Cann – gel + mixture of cannabinoids, FB – gel + FB; FB.Cann – gel + FB + mixture of cannabinoids; FC – gel + FC; FC.Cann – gel + FC + mixture of cannabinoids and Positive Control 2 – commercial cream containing a cannabinoid.

	Placebo Car- bopol® gel	Cann	FB	FB.Cann	FC	FC.Cann	Positive Control 2
Appearance*	Colorless	Translucent			Opaque		White
Homogeneity	Homogeneous						
Texture	Light weight						Thick
Odour	Odourless	Odour					
Adhesion	Robust and adherent to the skin						

Table S3. Preliminary Stability Testing carried out at 25 °C and - 5 °C (corresponding to the heating and cooling assay) and under centrifuge stress, with Placebo Carbopol® 940 gel, Placebo Carbopol® 940 gel + FB + mixture of cannabinoids (FB.Cann) and Placebo Carbopol® 940 gel + FC + mixture of cannabinoids (FC.Cann). The analysis was carried out through organoleptic characterization (OC), pH and percentage variation in terms of viscosity compared to day 0 and before being subjected to centrifugation. Data is represented as the average of the experiments carried out on each test day, per formulation (n=2).

Placebo Carbopol® gel				Carbopol® gel + FB.Cann				Carbopol® gel + FC.Cann			
Preliminary Stability Testing (Heating and Cooling)											
Days	OC	pH	Variation in viscos- ity vs time zero (%)	Days	OC	pH	Variation in viscos- ity vs time zero (%)	Days	OC	pH	Variation in viscos- ity vs time zero (%)
0	N	5 – 6	-	0	N	5 – 6	-	0	N	5 – 6	-
2	N	5 – 6	2.42	2	N	5 – 6	-13.93	2	N	5 – 6	-1.58
4	N	5 – 6	-3.08	4	N	5 – 6	-11.77	4	N	5 – 6	-16.85
7	N	5 – 6	0.50	7	N	5 – 6	-8.89	7	N	5 – 6	-9.26
Preliminary Stability Testing (Centrifugation Stress)											
Before	N	5 – 6	-	Be- fore	N	5 – 6	-	Before	N	5 – 6	-
After	N	5 – 6	-7.20	After	N	5 – 6	4.26	After	N	5 – 6	-8.69

N: normal physical appearance