Potential use of Avocado seed extracts for the *Acne vulgaris* Treatment: Antibacterial and immunomodulatory effect.

Poster ID

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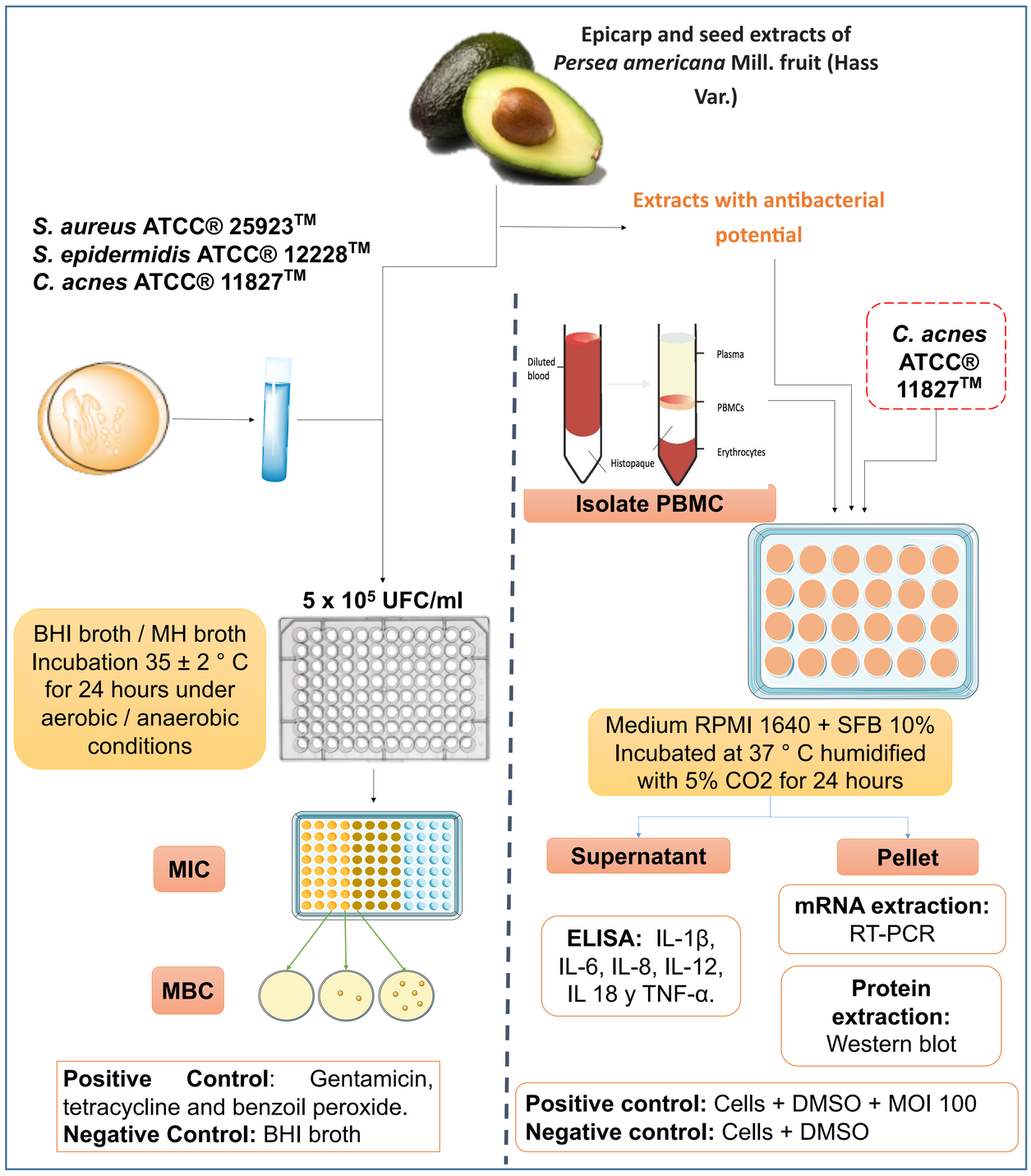
Introduction:

Acne is a chronic inflammatory condition of the pilosebaceous units, characterized by a multifactorial etiology with microbiological, hormonal, and immunological implications (Dreno et al., 2017). The main factor of inflammatory immune response is alterations in the skin microbiota. Which is represented by the growth of *C. acnes*; these play an essential role in the acne clinical manifestation (Burkhart et al., 1999; Tanghetti, 2013).The acne treatment includes topical drugs and formulations, oral antibiotics, and hormonal medication aimed at growth inhibition of *C. acnes*. Nevertheless, some factors such as antibiotic resistance, side effects, and cost-effectiveness of therapy options have a negative impact on patients, co-promising efficacy and limiting their use (Lee & Son, 2018). This fact has allowed dermatological treatments to include complementary and alternative medicines considered by patients as a more natural and safer therapeutic option than conventional drugs. In particular, some natural extracts are effective against acne bacteria while reducing the side effects of existing treatments (Lall, 2017).In this context, the fruit of *Persea Americana* Mill. (Lauraceae), commonly-known as avocado, it is a native tropical plant to Central America recognized for its nutritional properties and beneficial health effects (Idris et al., 2009; Rodríguez-Carpena et al., 2011), but the action on the growth of dermal microorganisms and the immune response modulation associated with infection of pilosebaceous follicles of extracts obtained from some fruit parts (seed and epicarp) is unknown. This study was aimed to determine the antibacterial and immunomodulatory activity of seed and epicarp extracts obtained from P. Americana fruit to propose acne-fighting innovative alternatives.

Materials & Methods:



Results & Discussion:

Bacterial activity. (**Table A**) Bacterial sensibility of the skin strains in response to *P. americana* extracts (1000 µg/mL concentration). (**Table B**) MIC and MBC of ethyl acetate extracts.

A.

Code	Inhibition percentage (%)		
	C. acnes	S.aureus	*S.epidermidis*
EHE	0	0	88.57 ± 2.05
EHS	0	12.91 ± 2.67	50.29 ± 8.21
EAE	60.04 ± 1.91	97.05 ± 1.35	93.20 ± 1.36
EAS	95.93 ± 1.04	97.14 ± 1.34	87.63 ± 2.76
ECE	79.79 ± 3.28	93.78 ± 1.95	87.29 ± 2.96
ECS	15.25 ± 3.54	0	91.78 ± 1.62
Gentamycin (16 µg/mL)	99,67± 0,06	99,20 ± 0,11	94,99 ± 0,66
Tetracycline (4 µg/mL)	97,78 ± 0,83	99,24 ± 0,14	92,32 ±1.07
Benzoyl Peroxide (5 %)	96,69 ± 1,50	92,36 ± 1,59	90,26 ± 0,30

B.

Code	Effect	*C. acnes*	*S. aureus*	*S. epidermidis*
EAE	MIC	>1000	1000	500
	MBC	>1000	>1000	500
EAS	MIC	500	1000	>1000
	MBC	>1000	>1000	>1000

Data represent the $\bar{x}$ ± SEM of at least three independent experiments (n = 9) . *EAE: Ethyl acetate epicarp extract; EAS: Ethyl acetate seed extract. MIC Y MBC in µg/mL.*

Inmmunomodulatory activity:

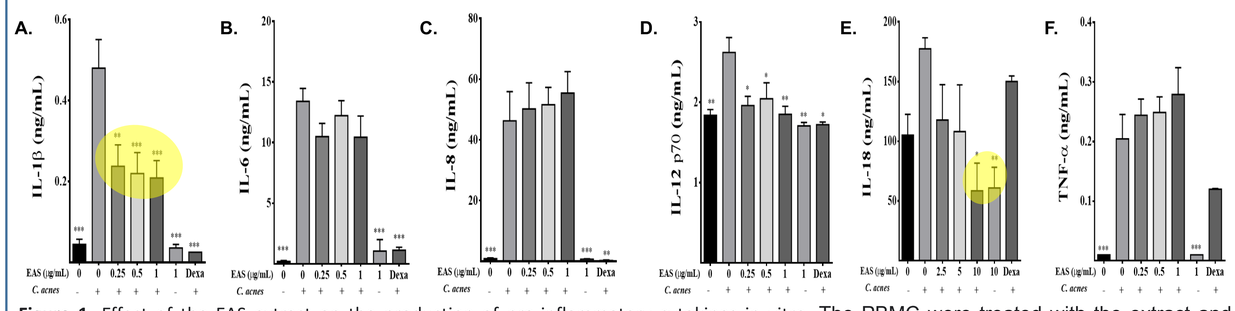


Figure 1. Effect of the EAS extract on the production of pro-inflammatory cytokines in vitro. The PBMC were treated with the extract and activated with C. acnes (MOI = 100, +) to determine the production of: (A) IL-1β, (B) IL-6, (C) IL-8, (D) IL-12 (p70), (E) IL-18 and (F) TNF-α using ELISA. Data are presented as the mean ± standard error of the mean (n = 6-24) of at least three independent experiments. * P <0.05, ** P <0.01, *** P <0.001 compared to the control group

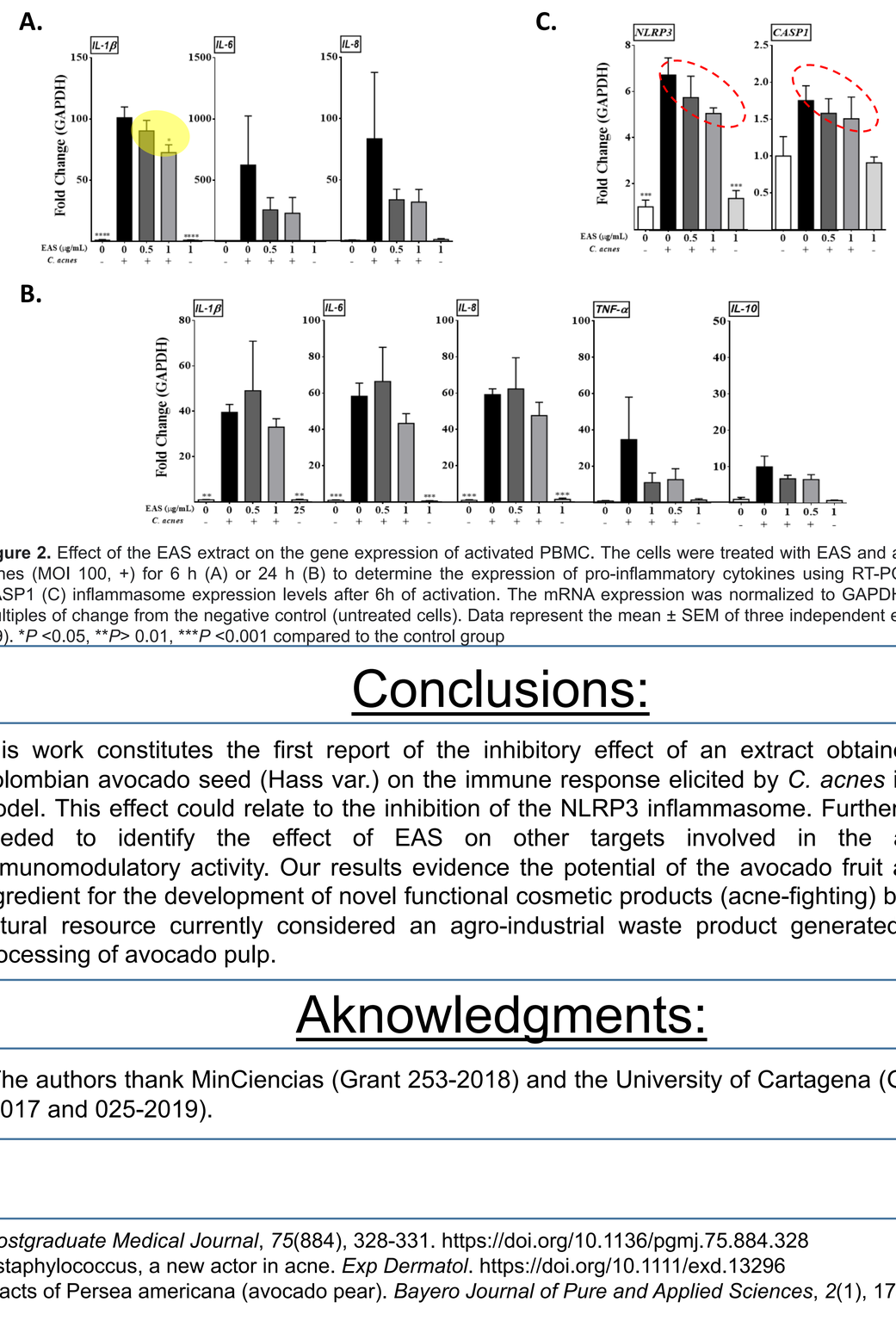


Figure 2. Effect of the EAS extract on the gene expression of activated PBMC. The cells were treated with EAS and activated with C. acnes (MOI 100, +) for 6 h (A) or 24 h (B) to determine the expression of pro-inflammatory cytokines using RT-PCR. NLRP3 and CASP1 (C) inflammasome expression levels after 6h of activation. The mRNA expression was normalized to GAPDH and shown as multiples of change from the negative control (untreated cells). Data represent the mean ± SEM of three independent experiments (n = 6-9). *P <0.05, **P> 0.01, ***P <0.001 compared to the control group

Conclusions:

This work constitutes the first report of the inhibitory effect of an extract obtained from the Colombian avocado seed (Hass var.) on the immune response elicited by *C. acnes* in an *in vitro* model. This effect could relate to the inhibition of the NLRP3 inflammasome. Further studies are needed to identify the effect of EAS on other targets involved in the acne-related immunomodulatory activity. Our results evidence the potential of the avocado fruit as an active ingredient for the development of novel functional cosmetic products (acne-fighting) based on this natural resource currently considered an agro-industrial waste product generated during the processing of avocado pulp.

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