

Castanea sativa shells: Is cosmetic industry a prominent opportunity to valorise this agro-waste?

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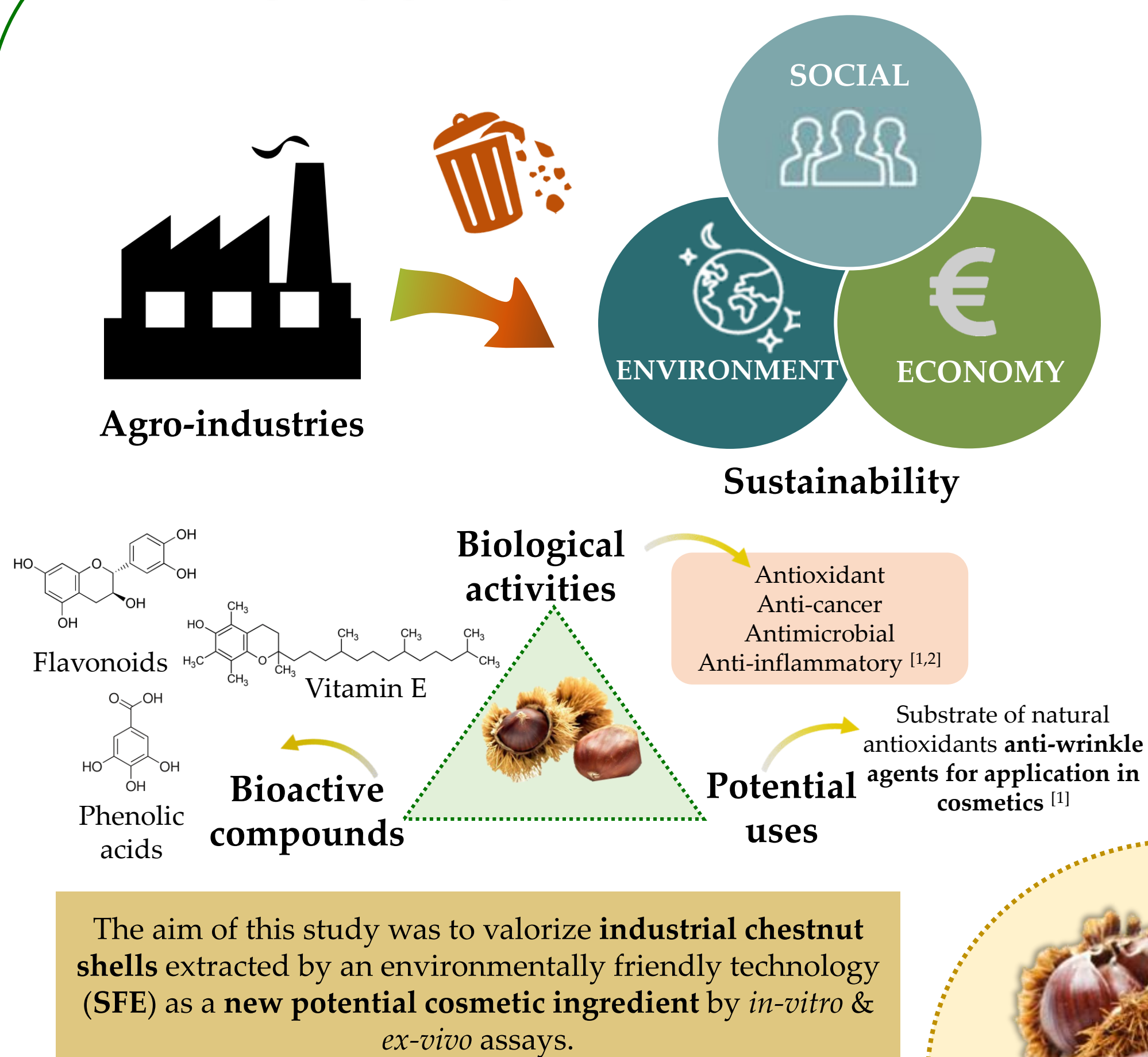
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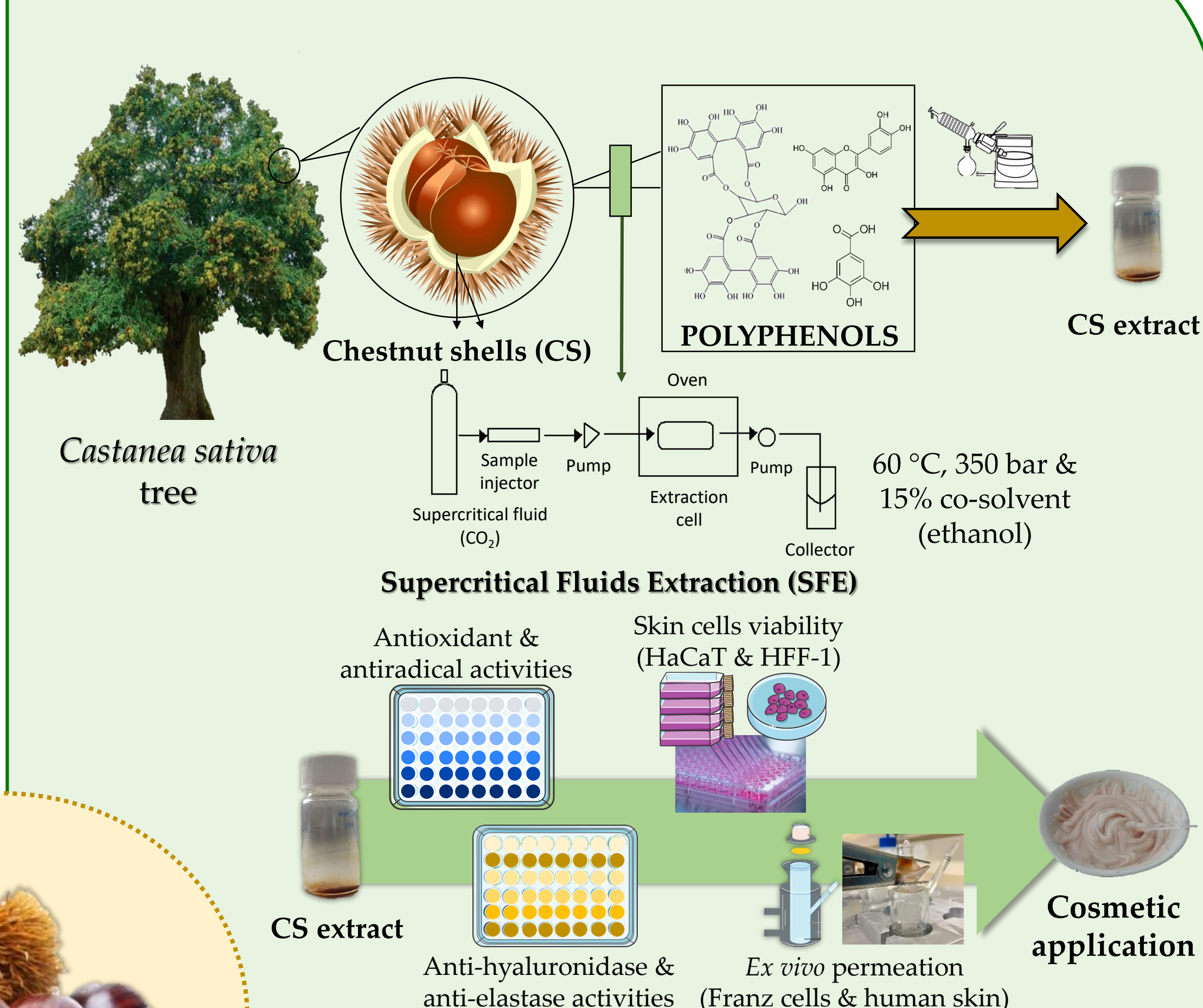
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INTRODUCTION



MATERIALS & METHODS



RESULTS

1. In-vitro antioxidant/antiradical activities

Table 1. In-vitro antioxidant/antiradical activity & radicals scavenging capacity of CS extract prepared by SFE ($n = 3$).

	FRAP (IC ₅₀ µg/mL)	DPPH (% Inhibition)	ABTS (mg AAE/g dw) ¹	O ₂ [•] (IC ₅₀ µg/mL)	HOCl (IC ₅₀ µg/mL)	NO [•] (IC ₅₀ µg/mL)
CS extract	204.79 ± 4.33	53.04 ± 6.75	124.84 ± 4.53	49.42 ± 0.41 ^{2a}	1.57 ± 0.10 ^a	0.76 ± 0.11 ^b
Catechin	-	-	-	48.99 ± 0.75 ^b	0.18 ± 0.01 ^c	0.95 ± 0.04 ^a
Gallic acid	-	-	-	5.18 ± 0.19 ^c	1.25 ± 0.05 ^b	0.20 ± 0.03 ^c

Different letters in the same column indicate significant differences ($p < 0.05$).

2. Hyaluronidase & Elastase inhibitory activities

Hyaluronidase

IC₅₀ = 54.36 mg/mL

Elastase

33.56% inhibition (0.4 mg/mL)

3. Skin cells viability

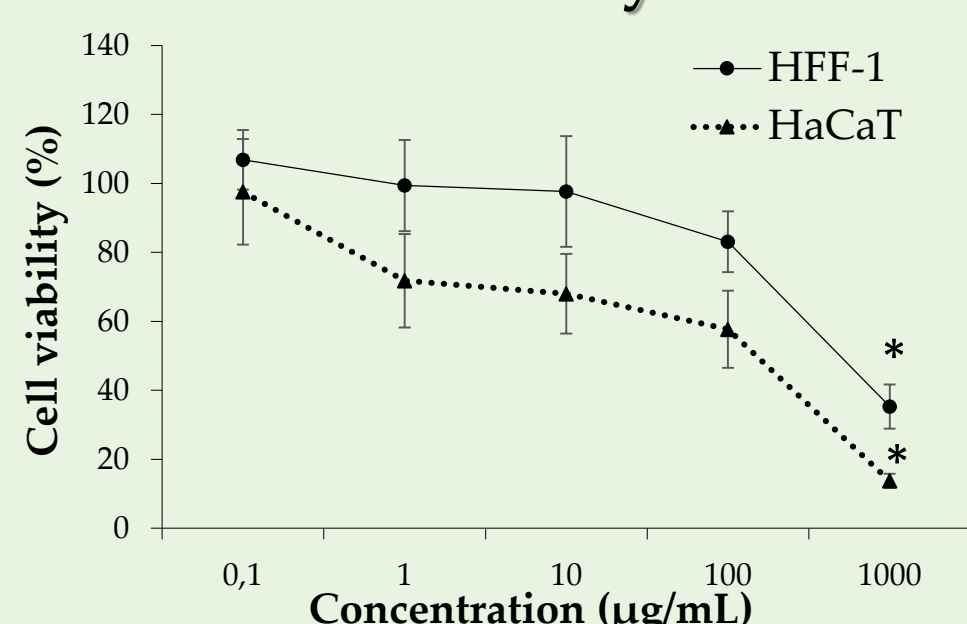


Figure 1. Effects of CS extract towards skin cells evaluated by MTT assay. * $p < 0.05$

4. Ex-vivo skin permeation of phenolic compounds

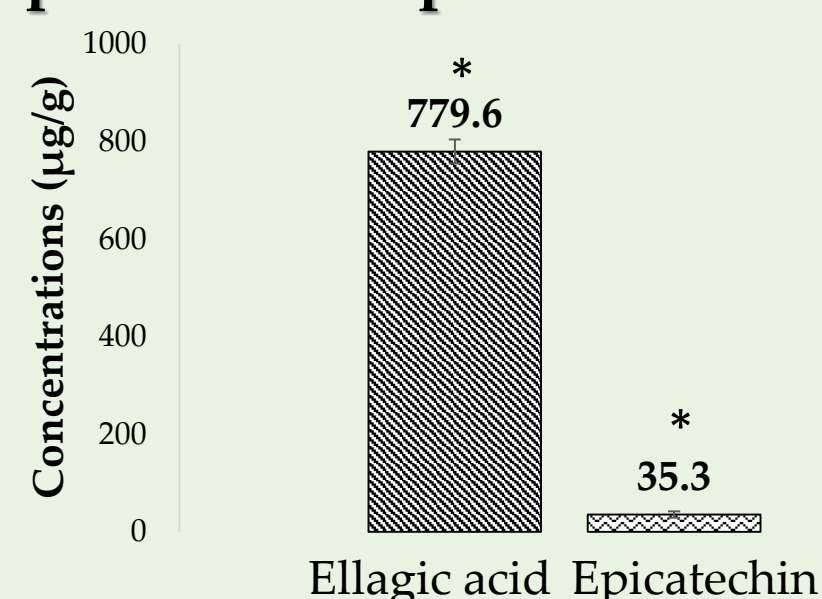
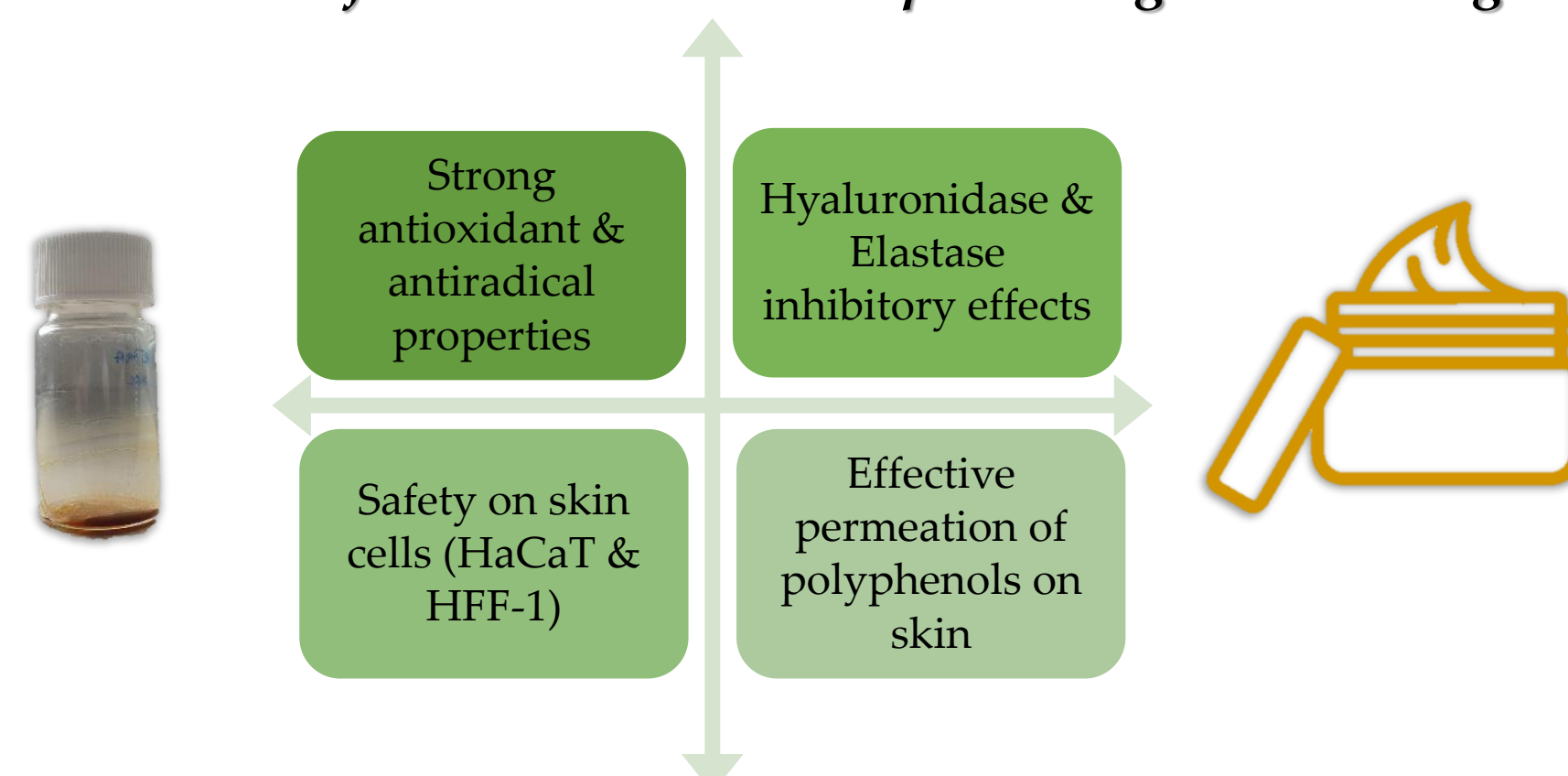


Figure 2. Permeation of polyphenols from CS extract through human skin. * $p < 0.05$

DISCUSSION

Valorisation of chestnut shells as a promising cosmetic ingredient



- The antioxidant & antiradical properties, as well as anti-hyaluronidase & anti-elastase effects suggest that CS extract may be a potential source of anti-aging ingredients probably due to the phenolic composition, mainly ellagic acid, caffeic acid derivative, catechin, epicatechin & epigallocatechin [3].
- The best scavenging efficiencies were achieved for NO[•] & HOCl.
- CS extract is safe for skin application in a concentration range of 0.1-100 µg/mL.
- The promising skin permeation outcomes revealed a slow penetration of polyphenols, namely ellagic acid & epicatechin, from CS extract into the skin, inducing a prolonged cosmetic effect.

CONCLUSIONS

This study appraised a new cosmetic ingredient emphasizing its potential to be incorporated in cosmetic formulations as **anti-aging ingredient**, answering to the **sustainable development goals** of agenda 2030 of the United Nations & **European Regulation n.º 1223/2009**.

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