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In vitro gastrointestinal digestion of *Coffea arabica* leaf tea and kombucha: effects on chemical composition and anti-inflammatory potential

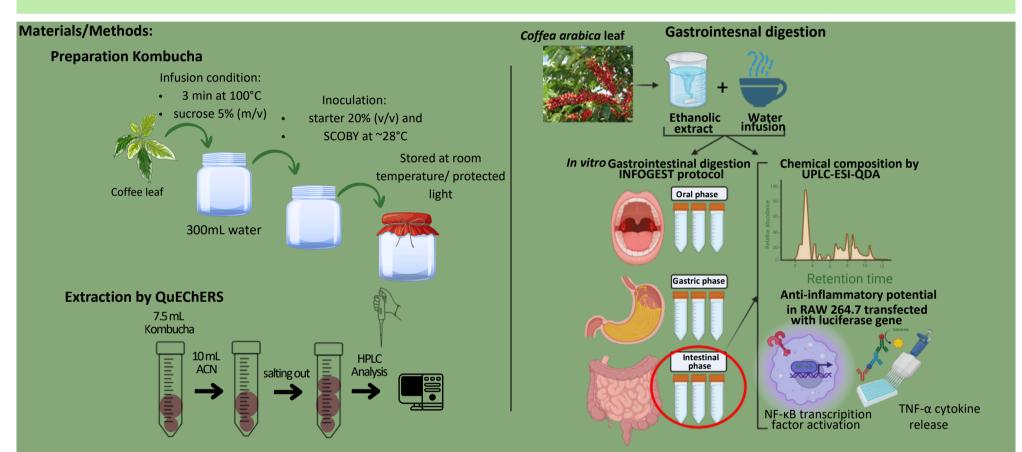
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Introduction:

Coffea arabica leaves are known for their rich phytochemical composition and high bioactive potential [1,2]. For over 200 years, infusions made from these leaves have been consumed as therapeutic beverages in many regions. Recently, coffee leaves have emerged as a promising alternative substrate for fermented drinks. One of the oldest examples of such beverages is kombucha, produced using a symbiotic culture of bacteria and yeast (SCOBY).





Results/Discussion

Table1. Quantification in extract (mg/g).							
Compound	Day						
	0	7					
Gallic acid	6.159	17.587					
Chlorogenic acid	17.715	18.706					
Caffeine	22.378	11.913					
Mangiferin	32.870	26.570					
Rutin	8.854	7.238					
Total	87.976	82.014					

 Table2. Chemical profile of the intestinal sample inESI negative mode.

Name	IF of Leaf tea	IF of Leaf extract	Rt	[M-H] ⁻	Molecular formula
Chlorogenic acid	+	+++	5.40	353	C ₁₆ H ₁₈ O ₉
Mangiferin	+	++	5.80	425	C ₁₉ H ₁₈ O ₁₁
Rutin	+	-	6.20	609	C ₂₇ H ₃₀ O ₁₆
Quercetin di-glucoside	+	-	6.40	625	C ₂₇ H ₃₀ O ₁₇
Dicaffeoylquinic acid 1	+	++++	10.70	515	C ₂₅ H ₂₄ O ₁₂
Dicaffeoylquinic acid 2	+	+++	15.50	515	C ₂₅ H ₂₄ O ₁₂
Dicaffeoylquinic acid 3	+	+++	16.30	515	C ₂₅ H ₂₄ O ₁₂

"+" indicates the concentration of the compound in each extract. IF: intestinal fraction.

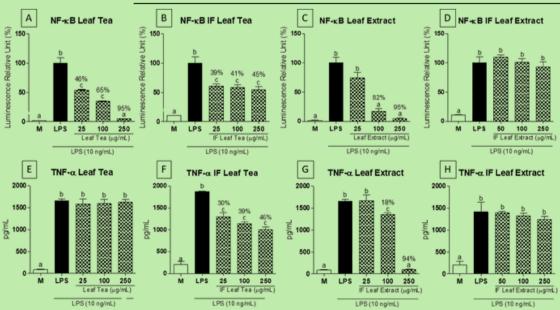


Fig 1. Activation of NF-κB (A-D), release of TNF- α (E-H). Results are expressed as mean (n = 3), with bars indicating the standard deviation. Different letters indicate statistical difference (p < 0.05), determined by the one-way ANOVA and Tukey test.

- As results, it was identified that the IF of extract showed more mangiferin compound than the IF of tea. Nonetheless, rutin and quercetin di-glucoside was identified just in IF of tea sample.
- Significant NF-kB inhibition in leaf tea, IF of leaf tea and leaf extract;
- Significant decrease in TNF-α release in the leaf tea, IF of leaf tea and leaf extract;
- 7 days of fermentation on yielded the best results (vinegar-like beverages was obtained after prolonged fermenta on), opmum temperature between 28-30 C and pH value during kombucha fermentation on was around 4.0. Chlorogenic acids, mangiferin and rutin had slight average decrease of ~10% and caffeine content decrease. Gallic acid high increase during fermentation.

Conclusion/Perspectives

As conclusion, there is evidence that leaf tea has high anti-inflammatory potential after the consumption, so, studies are encouraged to validate this potential after the compound's absorption, and other cytokines releases measurements. Therefore, further studies are recommended to evaluate the benefits of Kombucha beverages.

References:

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- 2. Trevisan et al., Food Analytical Methods, 2016, 2649-2655
- 3. Brodkorb et al., INFOGEST, Nature Protocols, 2019, 991–1014
- 4. Saliba et al., Food Chemistry, 2022, 134330 5. Ariff et al., Food Bioscience, 2023, 102714