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Effect of thermal processing on the antioxidant capacity, microbiological safety, and physicochemical properties for a controlled fermentation beverage from purple maize (*Zea mays* L).

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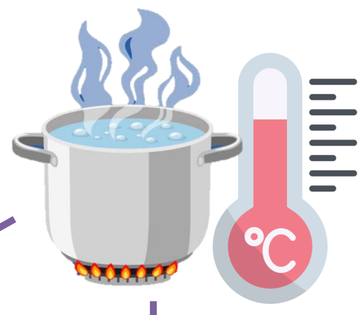
Introduction & Aim

Atole agrio beverage[1] → Spontaneous fermentation → Not standarized

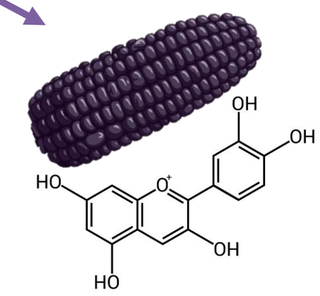
For controlled fermentation: **Thermal processing**[2]



Microbiological safety[3]

Viscosity[4]

Anthocyanin extraction[5]

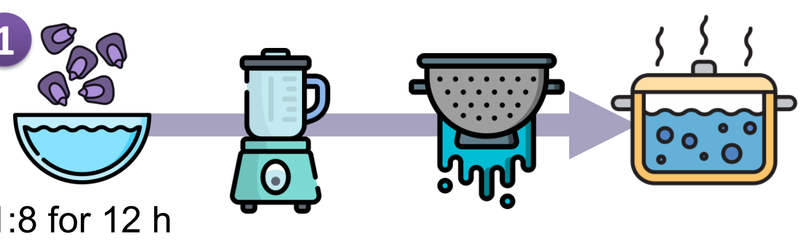


Losses[5]

To identify the adequate **thermal processing** for a purple maize beverage that maximizes **antioxidant capacity** while ensuring its **microbiological safety** prior to controlled fermentation.

Method

1



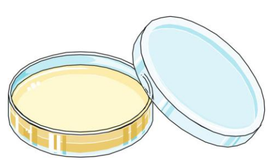
1:8 for 12 h

Ac: No-heat.
A1: 85 ºC for 5 min.
A2: 85 ºC for 10 min.
A3: 121 ºC for 15 min.

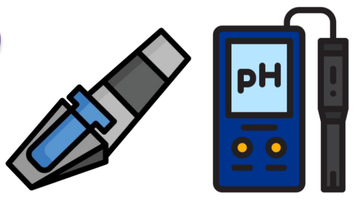
2

Plate count

- Total mesophilic bacteria.
- Total coliforms: VRB agar.
- Molds and Yeasts: PDA.

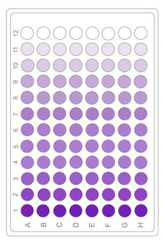


3



- pH.
- Total soluble solids (TSS).
- Color: CIELAB* parameters and color change (ΔE).
- Apparent viscosity at 4, 20 and 65 °C.

4



- Total phenolic compounds (TPC)- Folin Ciocalteu.
- Monomeric anthocyanins (MAA)- pH differential method.
- *In vitro* antioxidant activity- DPPH and ABTS.

Statistical analysis was performed using a one-way ANOVA followed by Tukey's test ($p<0.05$).

Results and Discussion

Ac

- Mesophilic: $3.2x10^5$ CFU / mL.
- Coliforms: $1.6x10^4$ CFU / mL.
- Molds and yeasts: $1.5 x10^5$ CFU / mL.

A1, A2, A3
<10 UFC / mL

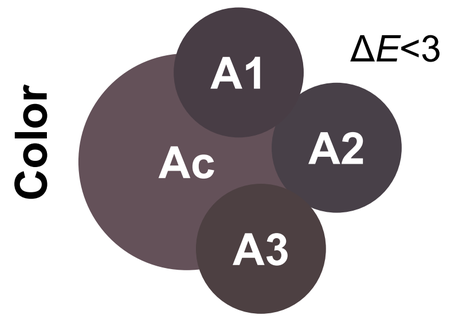


Table 1. pH and total soluble solids.

Parameter	Ac	A1	A2	A3
pH	5.9 ± 0.0[b]	6.0 ± 0.0[a]	6.0 ± 0.0[a]	5.9 ± 0.0[b]
TSS	0.2 ± 0.0[c]	2.7 ± 0.1[b]	4.7 ± 0.8[a]	3.2 ± 0.2[b]

Different subscript letters in a row mean differences among samples.

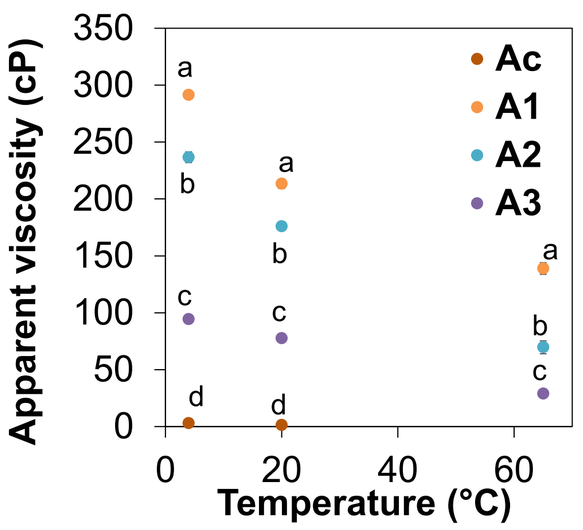


Fig 1. Changes in apparent viscosity.

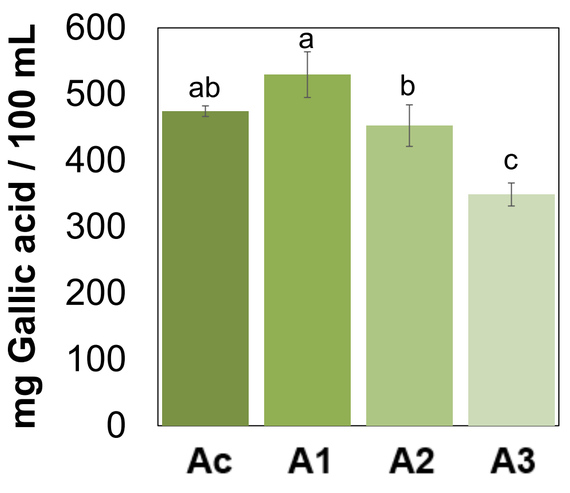


Fig 2. Total phenolic compounds.

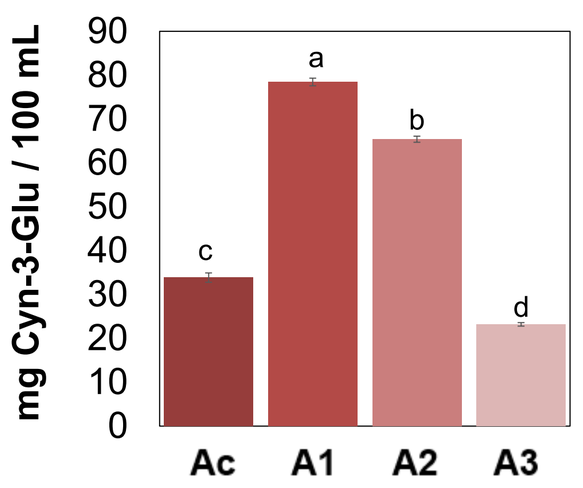


Fig 3. Monomeric anthocyanins content.

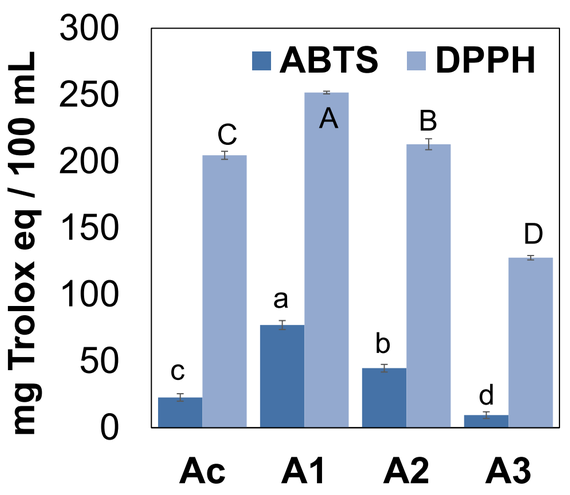


Fig 4. *In vitro* antioxidant capacity.

Conclusion

A1, A2 and A3 ensured microbiological safety prior controlled fermentation.

A1 treatment effectively enhanced the extraction of TPC and MAA, leading to the **highest antioxidant capacity**, and **color** intensity. Its viscosity was similar to other cereal-based beverages.

References

Aknowlegments

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