Cashew Apple Valorization

Experiences, Lessons Learnt from Brazil and Recommendation for Africa

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MINISTÉRIO DA AGRICULTURA E PECUÁRIA
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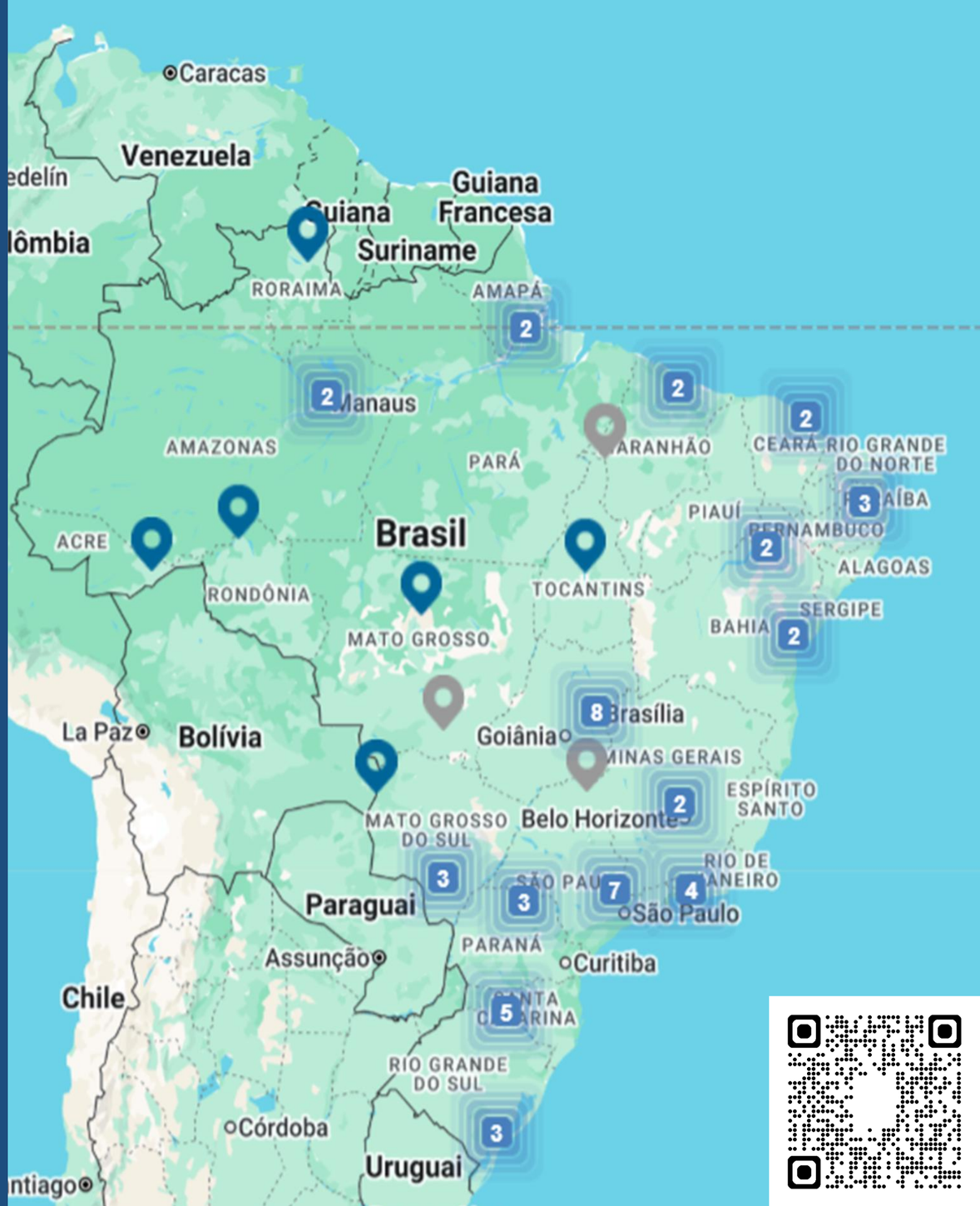
Vegetables are
grown from
North to South

50

Research units in Brazil



92.5%

The majority of national cashew **production is concentrated the three states:** Ceará, Rio Grande do Norte, and Piauí.

35.000

direct jobs in the field

15.000

direct jobs in the industry

250.000

indirect jobs in both sectors

Cashew nut production by country (2024)

Country	Production (T)
1. Ivory Coast	944,673
2. India	794,910
3. Tanzania	528,262
4. Vietnam	306,185
5. Ghana	**218,576**
5. Benin	212,624
6. Brazil	**159,212**
7. Burkina Faso	147,617
8. Mozambique	142,250
9. Indonesia	141,305
10. Guinea-Bissau	90,229

Cashew apple products commercialized in Brazil

Beverages

US$ ~1-2

US$ ~10-15

US$ ~ 5-10

Food

Scientific publication on cashew by country (1934 - 2026)

Country	Publications
1. Brazil	1,807
2. India	1,779
3. United States	703
4. Nigeria	412
5. China	328
5. United Kingdom	247
6. France	218
7. Spain	174
8. Germany	174
9. Indonesia	173
10. Italy	171

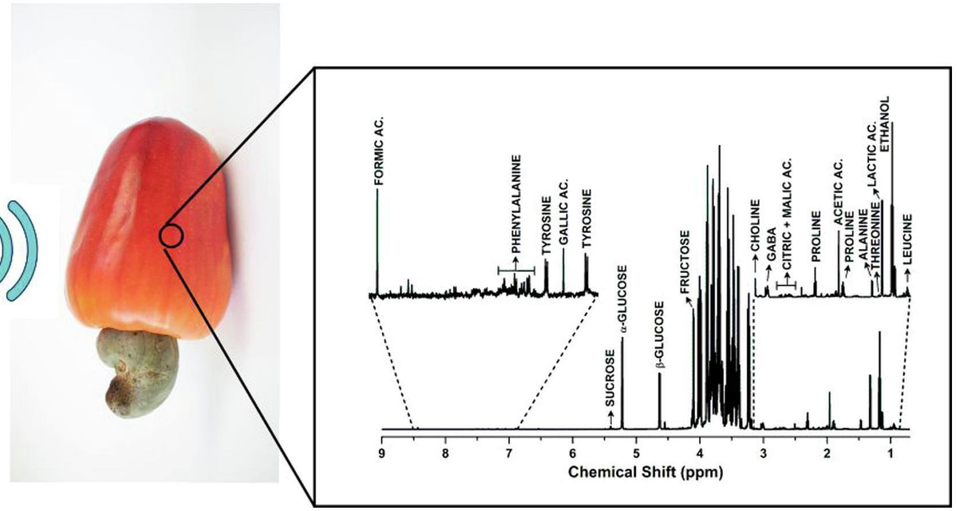
406 publications from Embrapa

Cashew apple **juice**

Plasma and ultrasound-treated cashew apple juices

Ultrasound

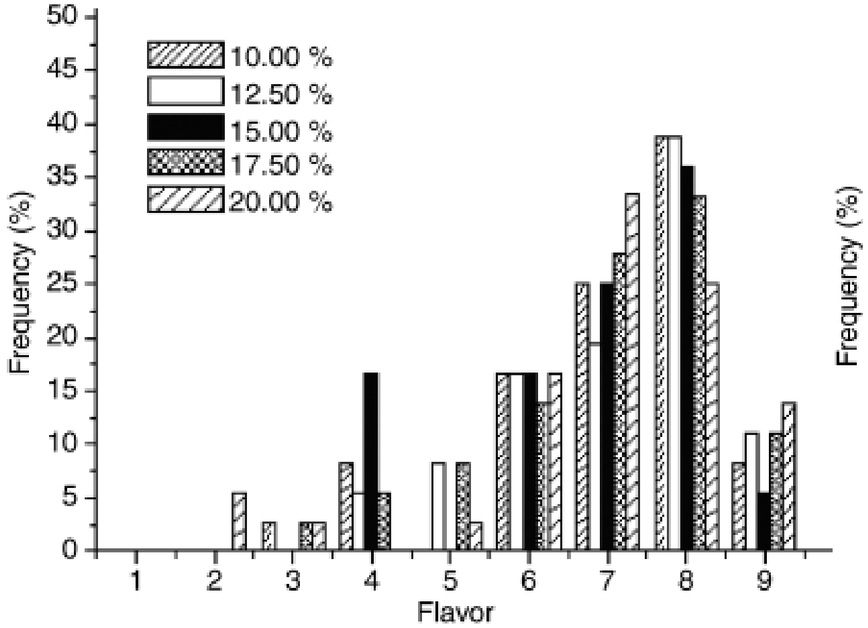
Plasma

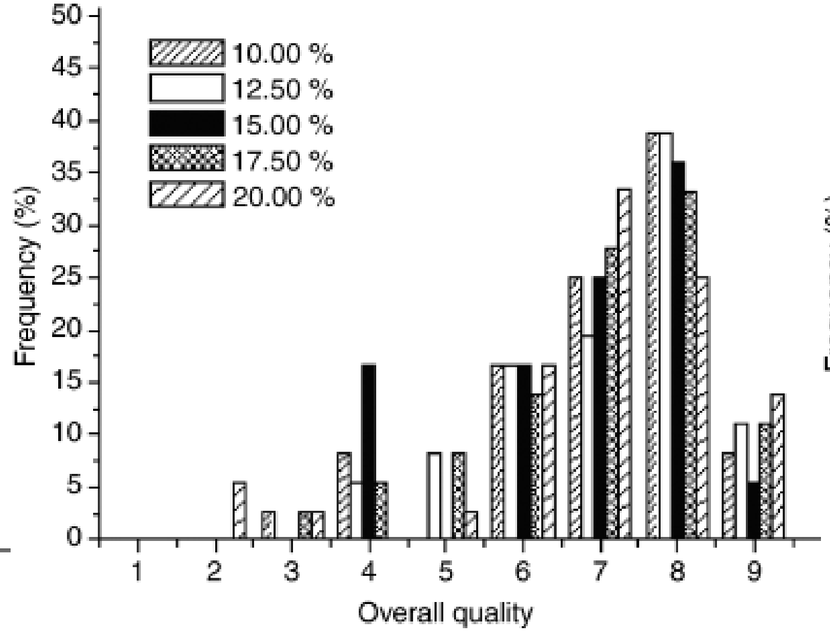


- **<u>Cold plasma</u> increased** the organic and **amino acid** concentration, but it did **not change** significantly the **sugar content** of the juice;
- **<u>Ultrasound</u> reduced** the **concentration of sugars** by 21%, but **without changing** significantly the **sweetness** perception.

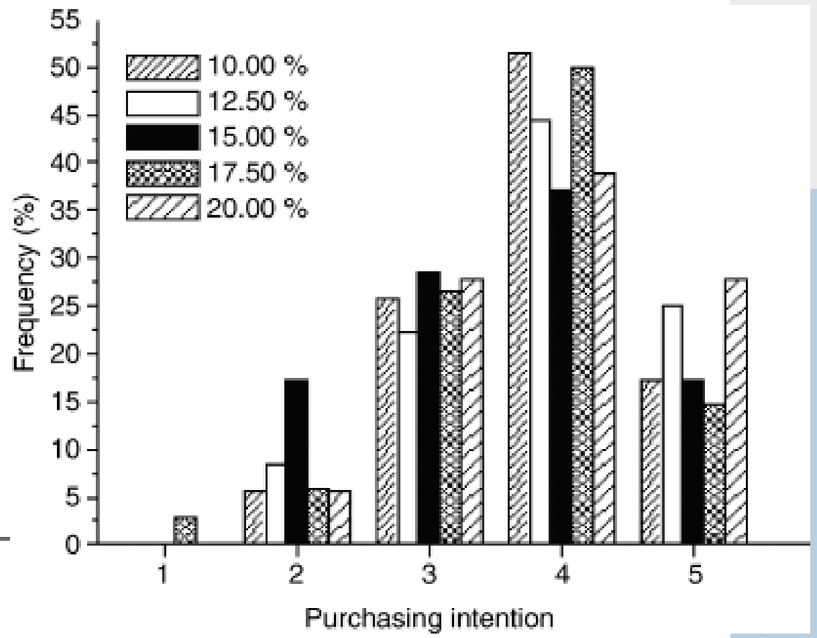
Cashew apple **juice**

As a nutritional additive in coconut water





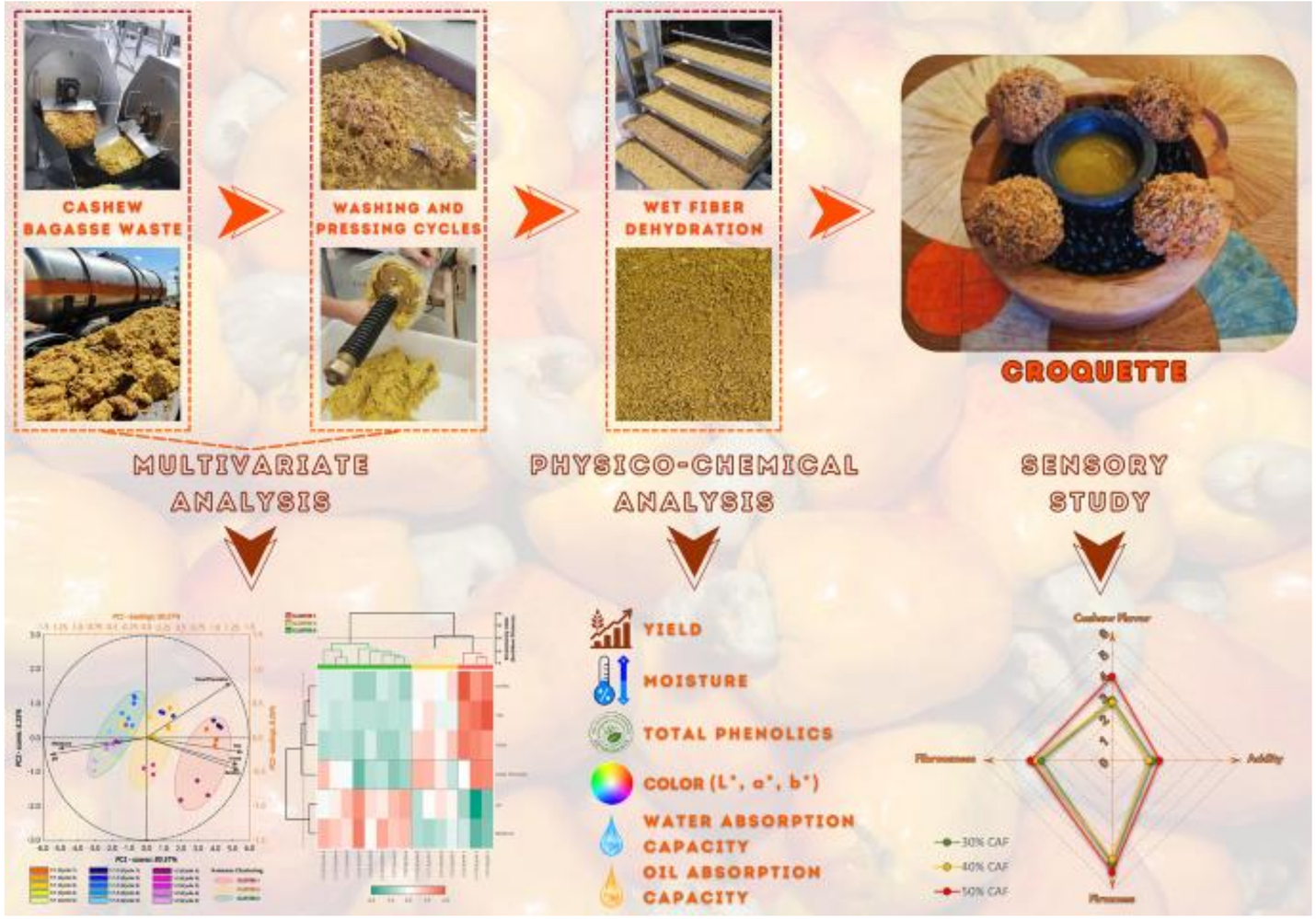
Frequency of panellist's response concerning the overall quality of the blended beverage. Percentage of cashew juice content is indicated in the graph legend. Hedonic scores: 1, dislike extremely; 2, dislike very much; 3, dislike moderately; 4, dislike slightly; 5, neither like nor dislike; 6, like slightly; 7, like moderately; 8, like very much; 9, like extremely.



Frequency of the consumer's purchasing intention for the blended beverage. Percentage of cashew juice content is indicated in the graph legend. Scores: 1, probably would not buy; 2, probably would not buy; 3, maybe/maybe not; 4, probably would buy; 5, definitely would buy.

Cashew apple **bagasse**

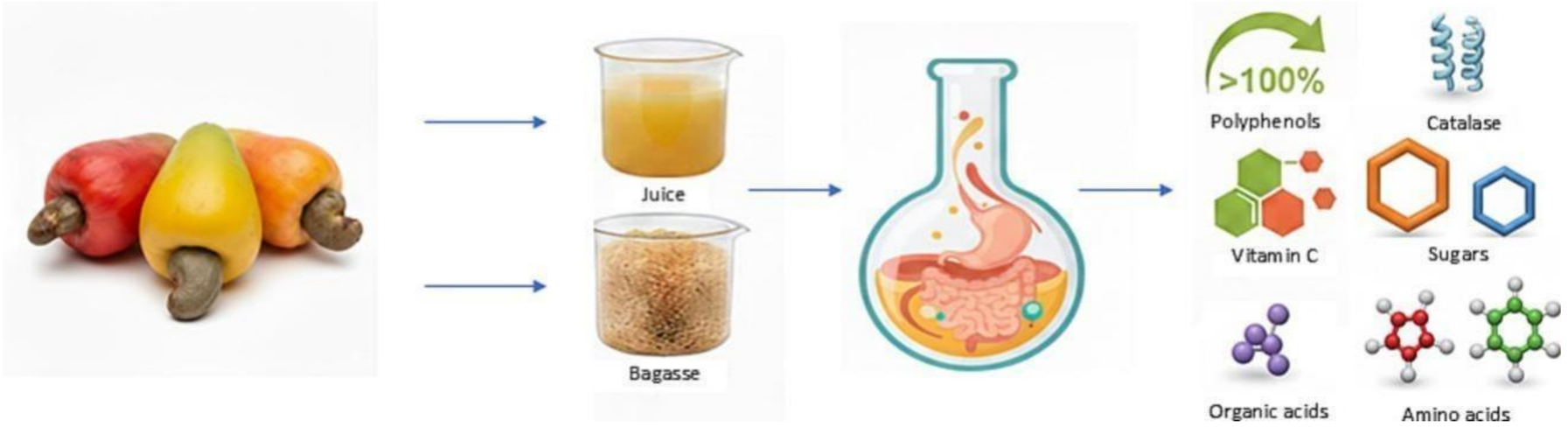
For plant-based food formulations



- A cashew fiber content of up to **40% is suitable for use** in plant-based croquettes;
- **50%** cashew fiber had a **pronounced cashew** flavor, which **limited** its **appeal**.

Cashew apple **juice** and **bagasse**

Bioaccessibility, antioxidant activity, and metabolomic profile

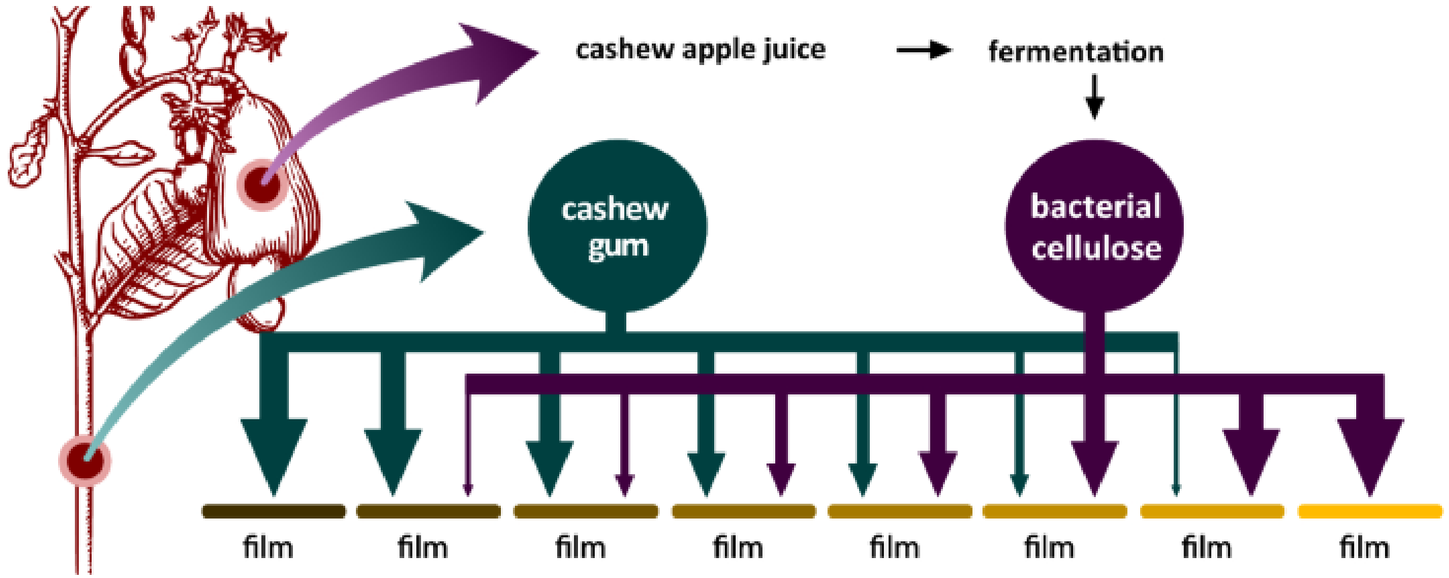


- Both cashew apple **juice** and **bagasse** retain bioactive compounds with **antioxidant activity**;

- Cashew apple **juice** exhibited **higher vitamin C** content, although **bagasse** exhibited **greater bioaccessibility**.

Cashew apple **juice**

For the formulation of edible films



- The films containing at least 25% bacterial cellulose presented remarkably **higher strength** (even similar to some conventional petroleum-derived polymers).

Cashew apple **bagasse**

For the formulation of sunscreen

Table 2. Antioxidant activity and SPF of emulsion base and sunscreen commercial lotions incorporated with lignin, lignin nanocomposites, zinc commercial oxide, or titanium commercial oxides.

Material	Scavenging (%)	SPF (base lotion)[a]	SPF (sunscreen)[b]
Control	–	0.0±0.0	12.6±0.3
Lignin	94.5±0.9	0.94±0.0	11.9±0.3
ZnO commercial	9.4±1.8	1.03±0.0	13.0±0.6
TiO_2 commercial	9.2±2.0	0.71±0.0	13.9±0.6
LigZnO	31.8±1.1	0.55±0.0	15.9±0.3
$LigTiO_2$	28.9±1.1	1.10±0.0	15.7±0.5

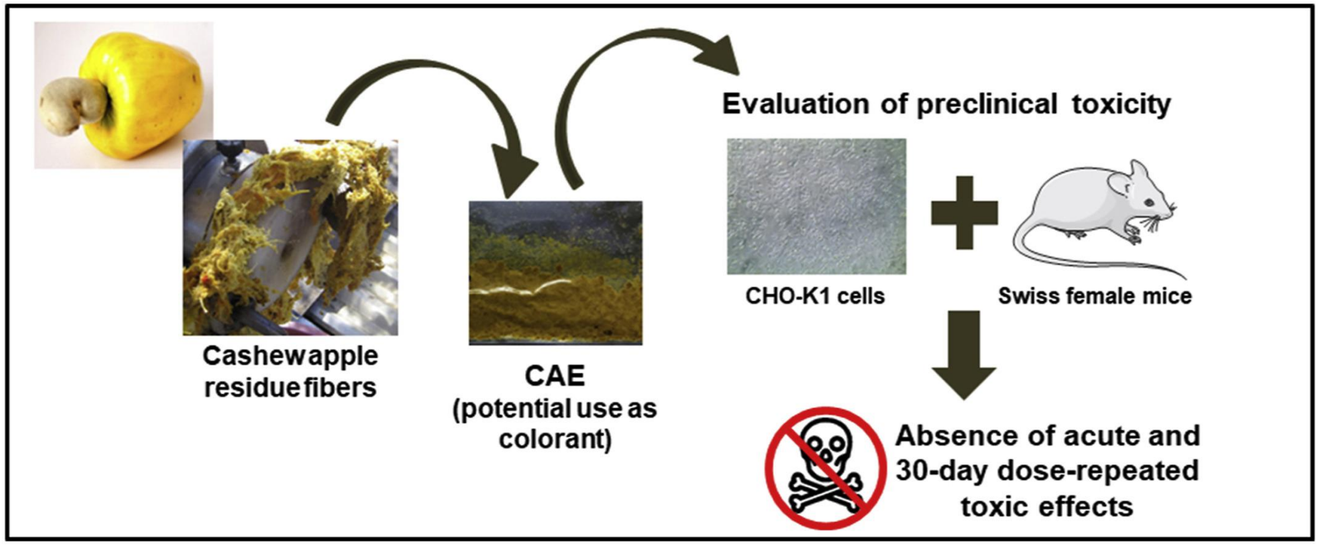
[a]Formulations with 5% (w/w) of lignin, nanocomposites and commercial oxides in emulsion base lotion.
[b]Formulations with 5% (w/w) of lignin, nanocomposites and commercial oxides in sunscreen lotion.

- **LigZnO** (15.9) and **$LigTiO_2$** (15.7) boosted the effectiveness of commercial UV absorbers **outperforming** formulations with **lignin** alone or commercial **ZnO** and **TiO_2**.

US$ ~100

Cashew apple **bagasse**

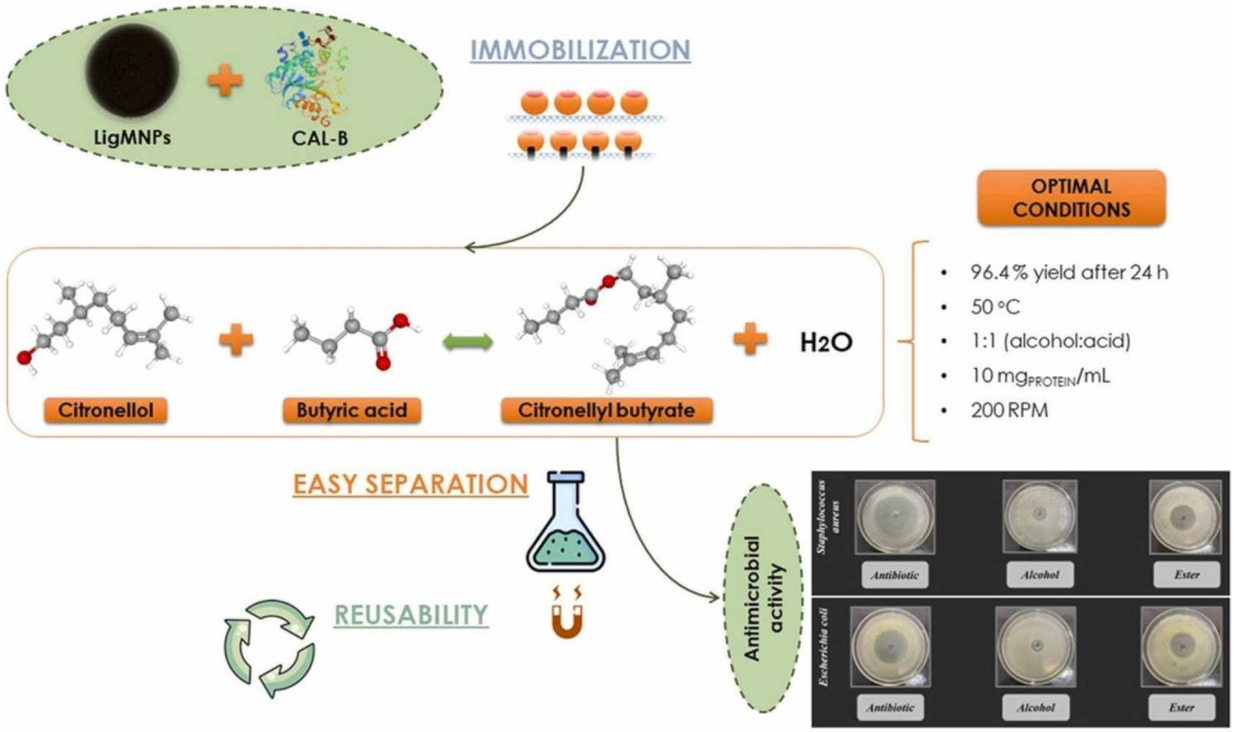
For the formulation of colorants



- The yellow-colored extract prepared from cashew apple showed **nontoxic or mutagenic effects** in female mice after 30 days of treatment;
- The yellow-colored extract may be a safe **source of carotenoids** as an industrial dye.

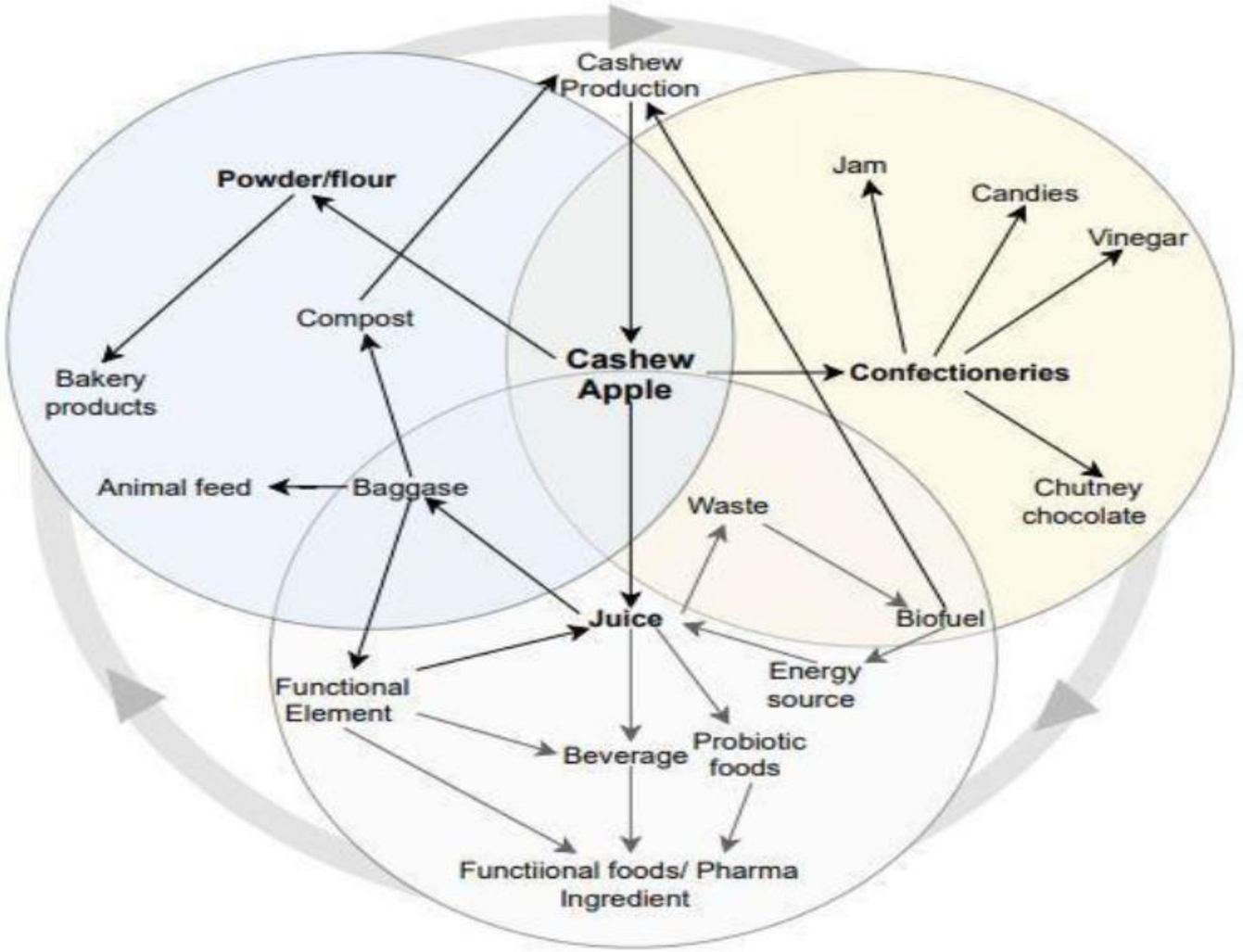
Cashew apple **bagasse**

For the preparation of biocatalysts

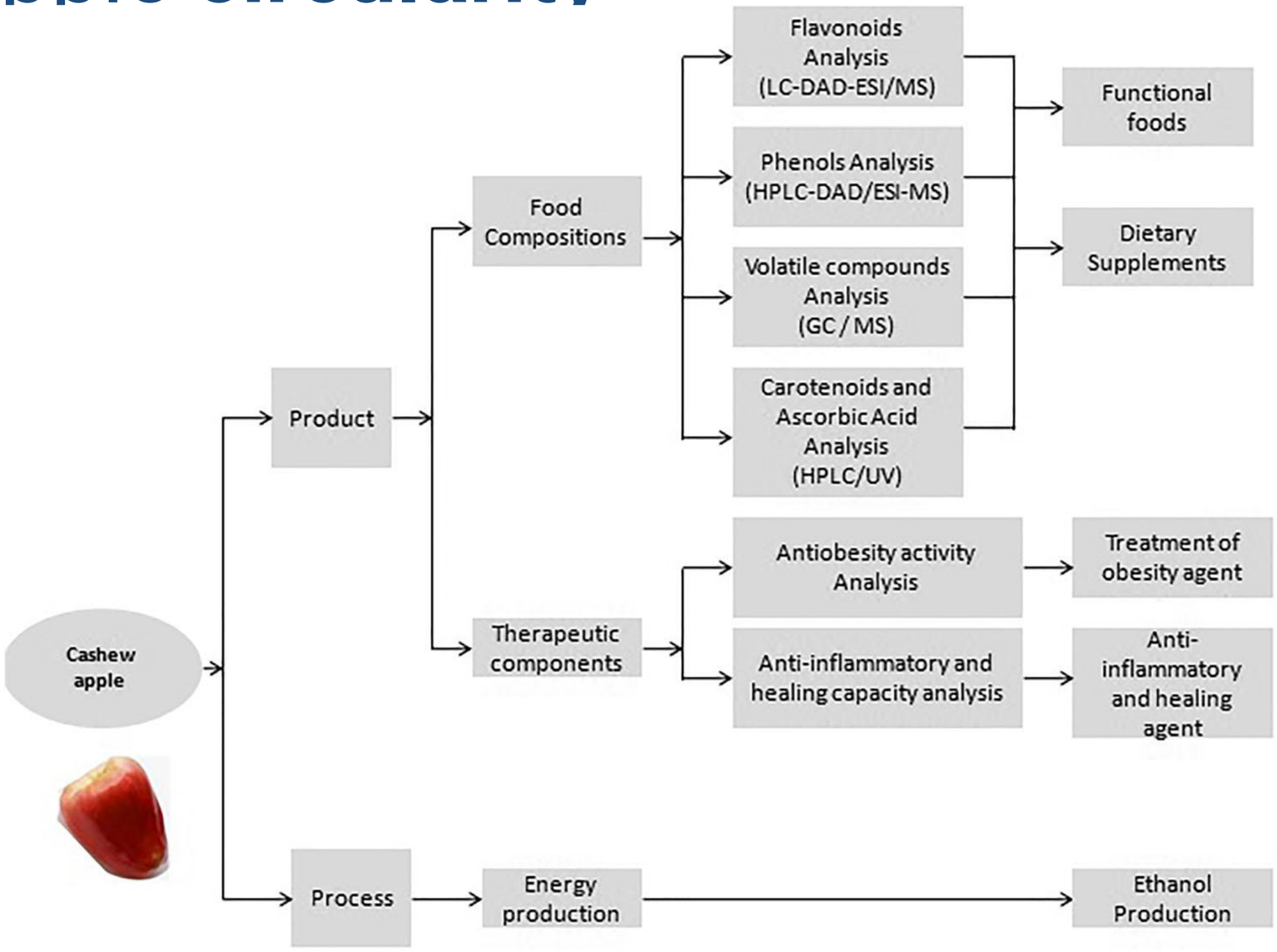


- The biocatalyst showed **operational stability** and it was **thermally stable**;
- **Citronellyl butyrate** showed an outstanding **antibacterial** activity than citronellol.

Cashew apple **circularity**



Cashew apple **circularity**



BIOREFINERY

Thank you!

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