Consumers’ sensory perception and acceptability of Hibiscus drinks: a cross-cultural study in Europe

Appréciation et perception sensorielle des jus d’Hibiscus: une étude inter-culturelle en Europe

Maria João Monteiro, Ana Isabel Costa, Geneviève Fliedel, Aurelie Bechoff, Mady Cisse, Isabelle Maraval, Ana Pintado, Dominique Pallet, Keith Tomlins, Pintado Manuela
Bissap ou Karkadé

Bissap (Senegal) or Karkade (Egypt) is obtained from the flower of Red Sorrel (*Hibiscus sabdariffa* L.). Dry calyx of the flower is used in Senegal and other Western African countries for the preparation of beverages and other products with high anthocyanins content.


Improved Bissap drinks

Development

Scale-up
Improved drinks
- Ground calyces
- 50% Koor: 50% Vimto
- Extraction ambient temperature
- Filtration 0.45 μm
- Pasteurisation at 75 °C

Sensory perception and acceptability

Calyces extraction efficiency
Production time
Pasteurization temperature
Cost
Nutritional quality

Sensorial quality

2013

2014
Sensory perception and acceptability  Dakar

Improved syrup (REs)
Diluted prior to use

Ultra-vacuum concentrate (UVc)
Diluted and sweetened prior to use

Improved infusion (REi)
Ready to drink

Commercial traditional infusion (CTi)
Ready to drink

Very good results!
Improved syrup (REs)
Ultra-vacuum concentrate (UVc)
Calyces’ infusion freshly prepared (FTi)

Overall liking
Attribute intensity appropriateness:
red colour, sweetness and acid taste

Sensory profile

390 consumers
98% European or European residents.

Hibiscus drinks consumption

95% consumed fruit beverages or cold tisanes at least monthly.
Positive for improved drinks in all countries.

Similar preference profiles observed across countries.

Slightly higher results in France.

Mean likings and CI of the mean (p=0.95). Significant differences: Tukey’s HSD (p ≤ 0.05).
Cluster analysis
Segmentation according to overall liking pattern (n=390)

Dendrogram

Agglomerative Hierarchical clustering
Euclidean distance, complete linkage

C1 (51%) Overall likers
C2 (24%) New drinks likers
C3 (25%) Syrup likers

No significant differences between clusters related with countries and gender were observed. Significant differences detected for age (p<0.01)

Age - C1: $\bar{x}=32.2$, C2: $\bar{x}=32.5$, C3: $\bar{x}=27.4$
Sensory attribute intensities relatively to participants’ ideal level

Similar results were observed in all countries.
Weighted penalties

JAR rating data & overall liking

Weighted penalties (n=390)

- Res Color
- REs Sweetness
- REs Acidity
- UVc Color
- UVc Sweetness
- UVc Acidity
- FTi Color
- FTi Sweetness
- FTi Acidity

High penalties

Too Weak

Too Strong
Sensory and hedonic-oriented descriptors drawn from previous focus groups held in Senegal and in Europe.

Evaluation of drinks plus an ideal beverage.
Non-discriminant balanced flavor artificial, healthy, natural, refreshing, invigorating, new, Antioxidant, red fruits and different /unknown
Consumer sensory profiling
Check-all-that apply (CATA)

*Tisane* and *new* were among the less frequently chosen terms, and the most frequently selected CATA descriptors were *fruity and red fruits*.

*This suggests* consumers in general did not recognize the drink as an extract of an unknown plant, misidentified it as a red fruits beverage.
Conclusions

• AFTER improved drinks were liked by most European consumers.

• Important drivers for further sensory optimization were uncovered using JAR, CATA techniques.

• Future studies should investigate the levels of marketing activities (pricing, distribution and promotional information – including nutritional and healthiness attributes) which will best support the successful introduction of Hibiscus in European markets.
Thank you very much for your attention

Merci beaucoup de votre attention