

Detection of *Bissap calyces* and bissap juices adulteration with sorghum leaves using NIR spectroscopy and VIS/NIR spectroscopy

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INTRODUCTION

- ❖ The sales and consumption of local drinks such as sobolo made from local herbs (*Bissap calyces*) has increased due to potential health benefits

Good source of antioxidant

Sorghum leave is a natural dye in food preparation that is substituted for *Bissap calyces*



Bissap calyces

All these qualities makes it favorable to be substituted with cheap sorghum herbs used as a dye in food preparation

Reduces blood pressure

1. Time consuming
2. Expensive reagent
3. It is bulky
4. Skilled expertise required



Conventional method (HPLC)

Advanced analytical method (NIRS)



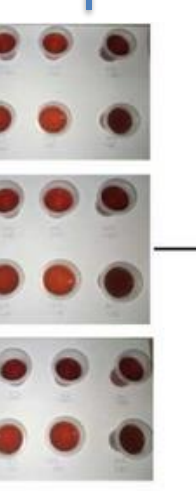
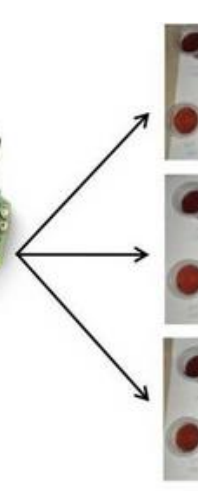
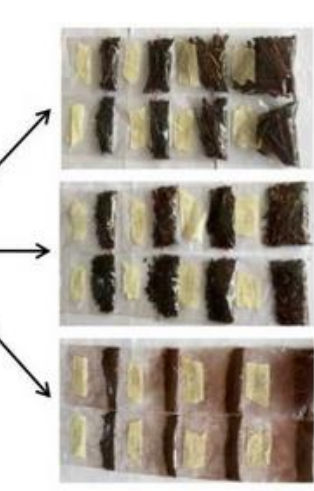
1. Fast and rapid
2. No Expensive reagent
3. It is mobile
4. Not much expertise required

METHODOLOGY

Physicochemical parameters

Bissap calyces

Sorghum Leaves



Handheld NIRScanNano

UV-Vis spectrophotometer

Statistical Analysis

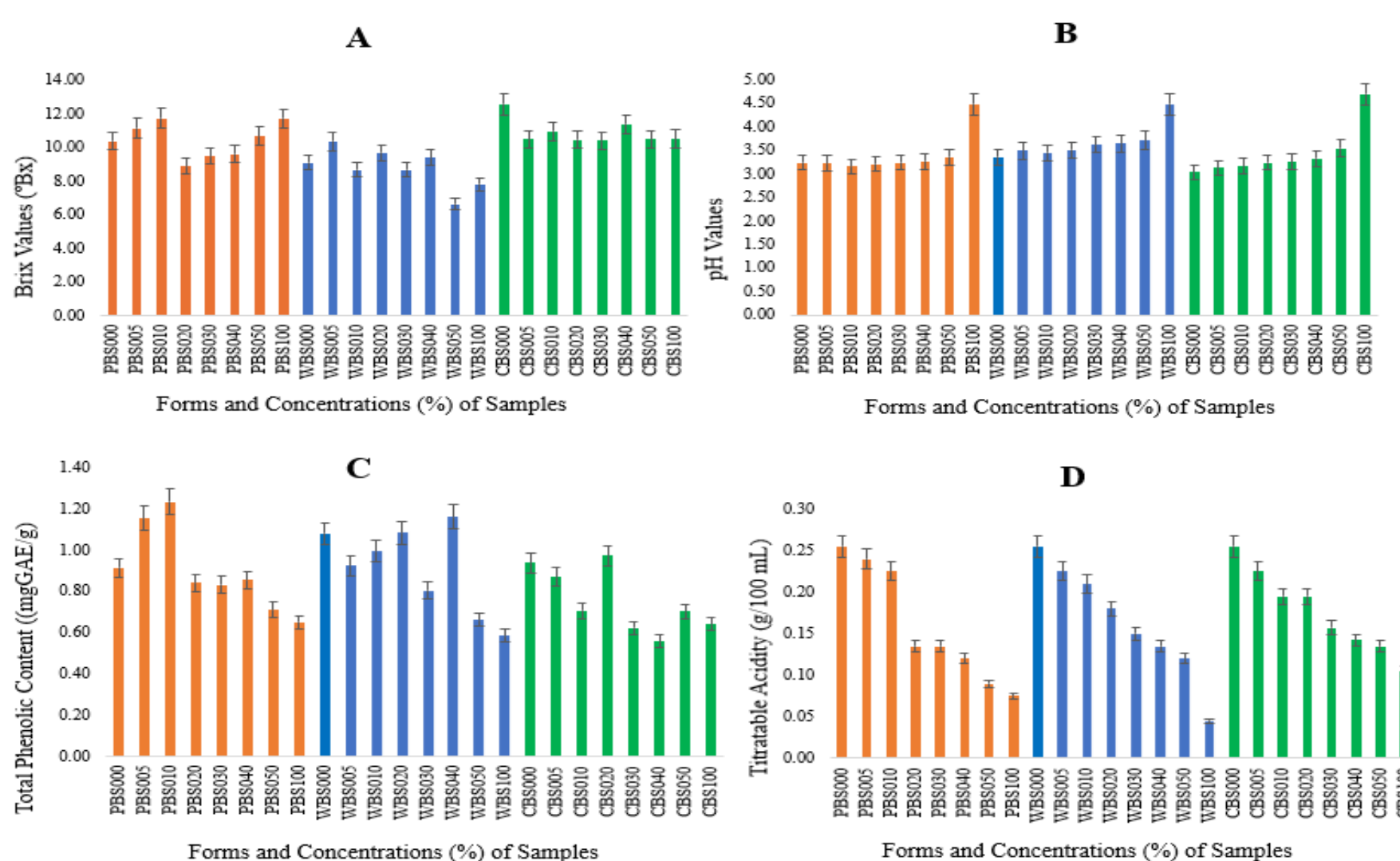
Physicochemical Analysis

- Analysis of Variance, RStudio

Spectra

- Chemometric, Aquap2 package, RStudio

RESULTS AND DISCUSSION



Unadulterated samples had higher total phenolic content due to high total phenolic content in bissap calyces

High total dissolved sugars in unadulterated juices resulted in higher brix values

Figure 2.0: (A) Brix content (B) pH ('sobolo') samples, (C) Total phenolic content and (D) Titratable acidity of all bissap juice ('sobolo') samples

RESULTS AND DISCUSSION

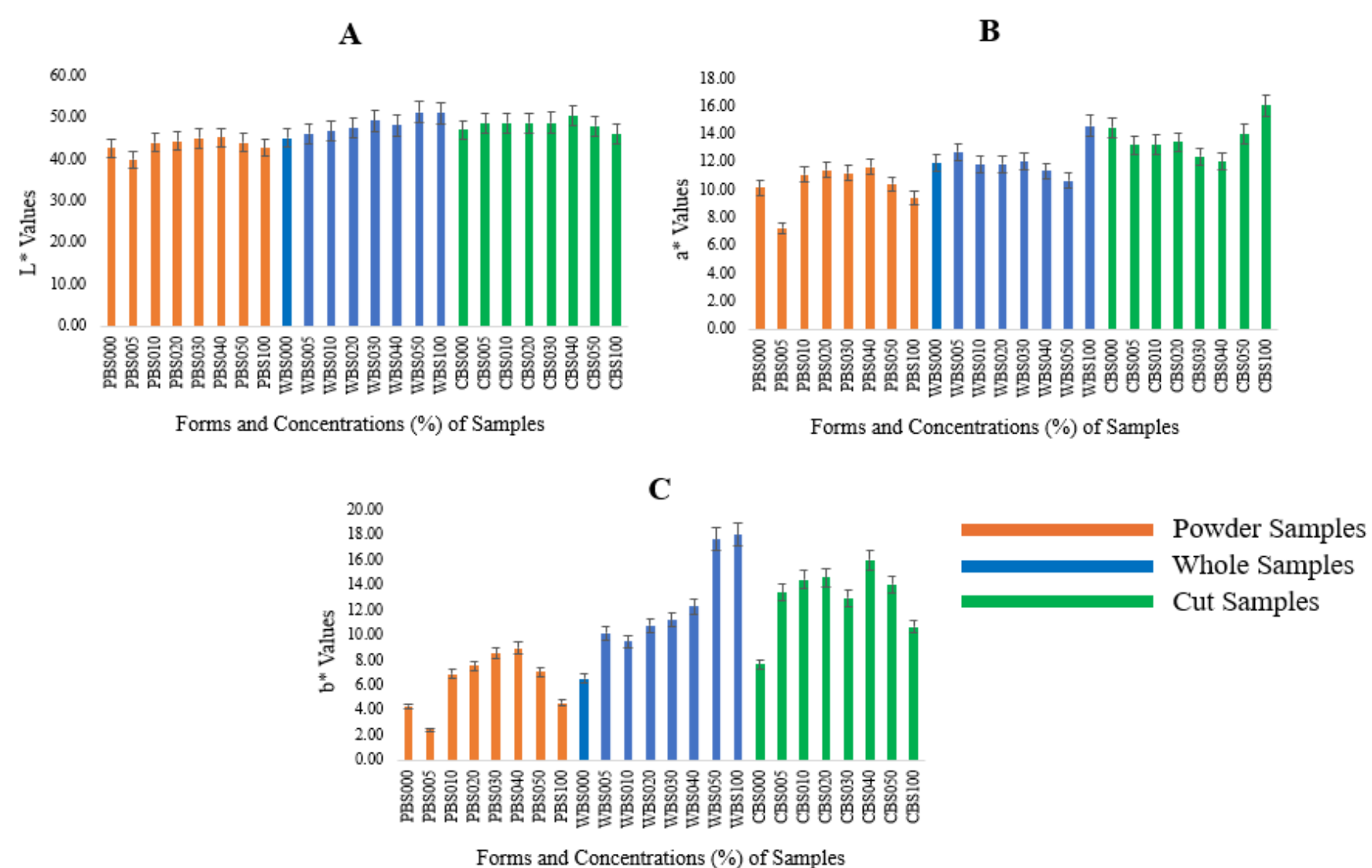


Figure 1.0: Color Analysis (A) (L^* Values) of all bissap juice ('sobolo') (B) (a^* Values) of all bissap juice ('sobolo') (C) (b^* Values) of all bissap juice ('sobolo') samples

Size reduction negatively impacted the accuracy efficiency of the LDA model

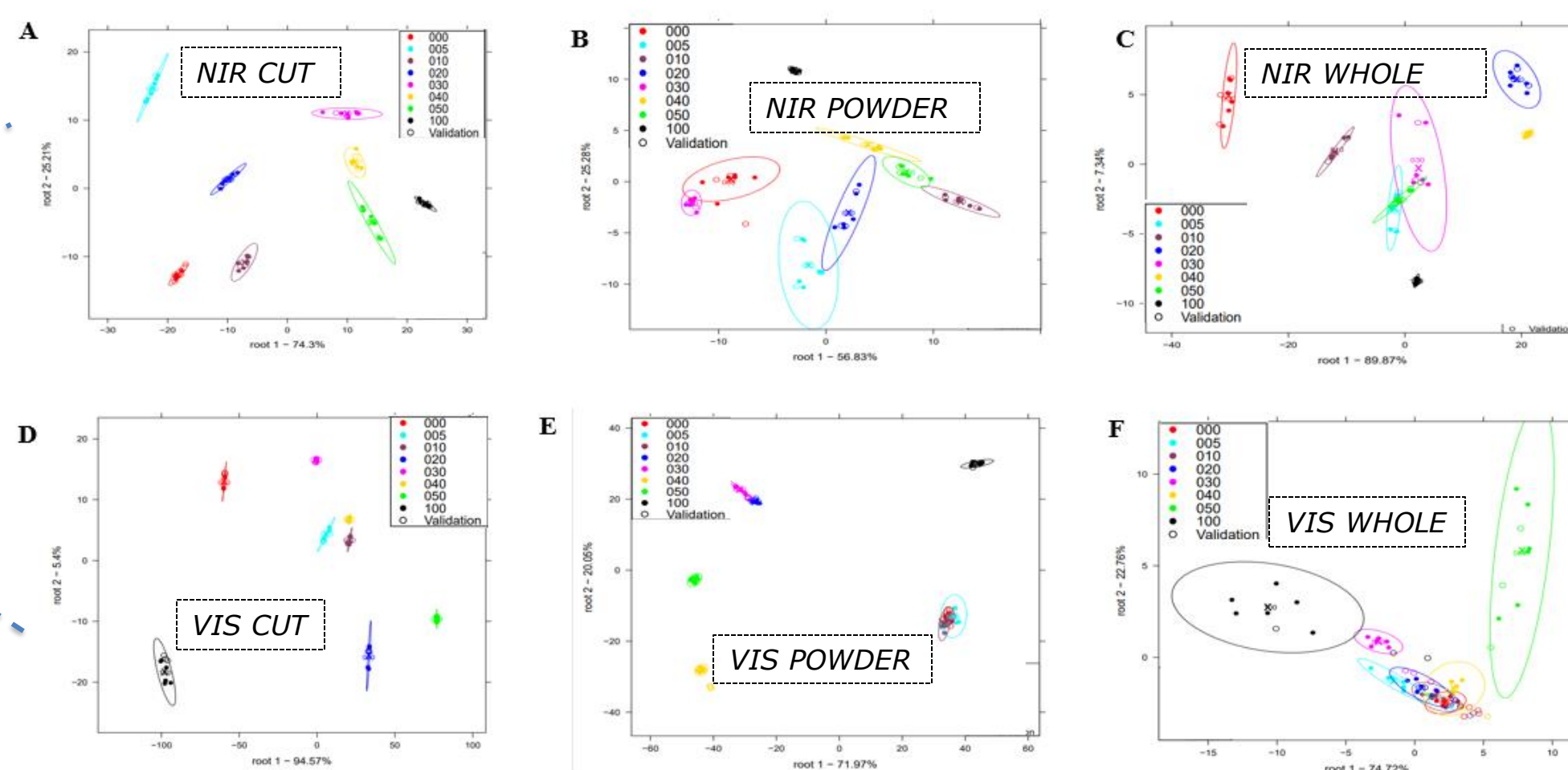


Figure 4.0: Linear discriminant analysis of the different classes of Bissap calyces juices

CONCLUSION

- Nutritional parameters were impacted by the addition of sorghum leaves (**Customers are not getting value for their purchase**)
- LDA models showed a 100% classification for all cut samples but misclassification for whole and powdered samples

ACKNOWLEDGEMENT

- ❖ We extend our gratitude to the Erasmus+ mobility partnership between the Hungarian University of Agriculture and Life Sciences and the Kwame Nkrumah University of Science and Technology and to the Biosystems and Food Engineering (BiosysFoodEng) Conference

REFERENCES

- Essuman, E. K., Teye, E., Dadzie, R. G., & Sam-Amoah, L. K. (2022). Consumers' Knowledge of Food Adulteration and Commonly Used Methods of Detection

✓ Adulterated samples recorded high L^* values and lower a^* values due to low anthocyanin content in sorghum leave