

NUTRIENT PROFILE AND CLASSIFICATION OF TEN SELECTED WILD EDIBLE FRUITS FOR NUTRITIONAL DIETARY GUIDANCE

Omujal F.^{1,2}, Ochan P.^{1,3}, Okullo P.^{2,5}, E. Ogwang P.E^{2,4}, Okia C.A.^{2,6}, Natukunda S. and Olupot W.²

¹Natural Chemotherapeutics Research institute, Kampala, Uganda, ²Nature and Livelihoods, Kampala, Uganda, ³School of Food Technology, Nutrition and Bioengineering, Makerere University, Uganda, ⁴Department of Pharmacy, Mbarara University for Science and Technology, Mbarara, Uganda; ⁵National Agricultural Research Organizations, Nabuin Agricultural Research and Development Institute, P.O. Box 569, Soroti, Uganda, ⁶Muni University, Arua, Uganda (Correspondence : Email: fomujal@gmail.com)

Introduction

- The Recommended Dietary Allowances (RDAs) has been used to rank foods based on their nutritional composition, but many nutritious foods have been left out due to the technique focusing on individual nutrients rather than the overall nutritional value.
- Wild edible fruits (WEF) are among foods that have not been fully utilized in nutritional education, because the available information is on individual nutrients with emphasis on those with high concentration e.g., vitamin C or A, Zn or Fe instead of their overall nutritional value.
- This study classified WEF based on their nutritional composition, and ranked them according to their overall nutritional value for nutritional guidance.

Materials and Methods

- The study was conducted on ten WEF; *Carissa edulis* L., *Saba comorensis* (Bojer) Pichon, *Sclerocarya birrea* A.Rich, *Flacourtia indica* L., *Vitex doniana* L., *Strychnos spinosa* Lam., *Ximenia americana* L., *Vangueria infausta* Burch, *Vitellaria paradoxa* CF Gaertn and *Physalis minima* L collected from Amuria and Katakwi districts in Eastern Uganda
- The fruit pulps were analysed for proximate and mineral composition values using standard methods (AOAC, 2001), and their mean values tested for significance in differences using ANOVA, and compared using Duncan's means test (P<0.05).
- Principal Component Analysis (PCA) and Hierarchical Cluster Analysis (CLA) statistical methods were used to establish homogeneity in the nutritional values.
- Nutrient density profiling was used to evaluate quantitatively the nutritious food index (NFI) and the naturally nutrient rich score (NNR) for individual WEF, and then ranked accordingly (Drewnowski and Fulgoni 2007)

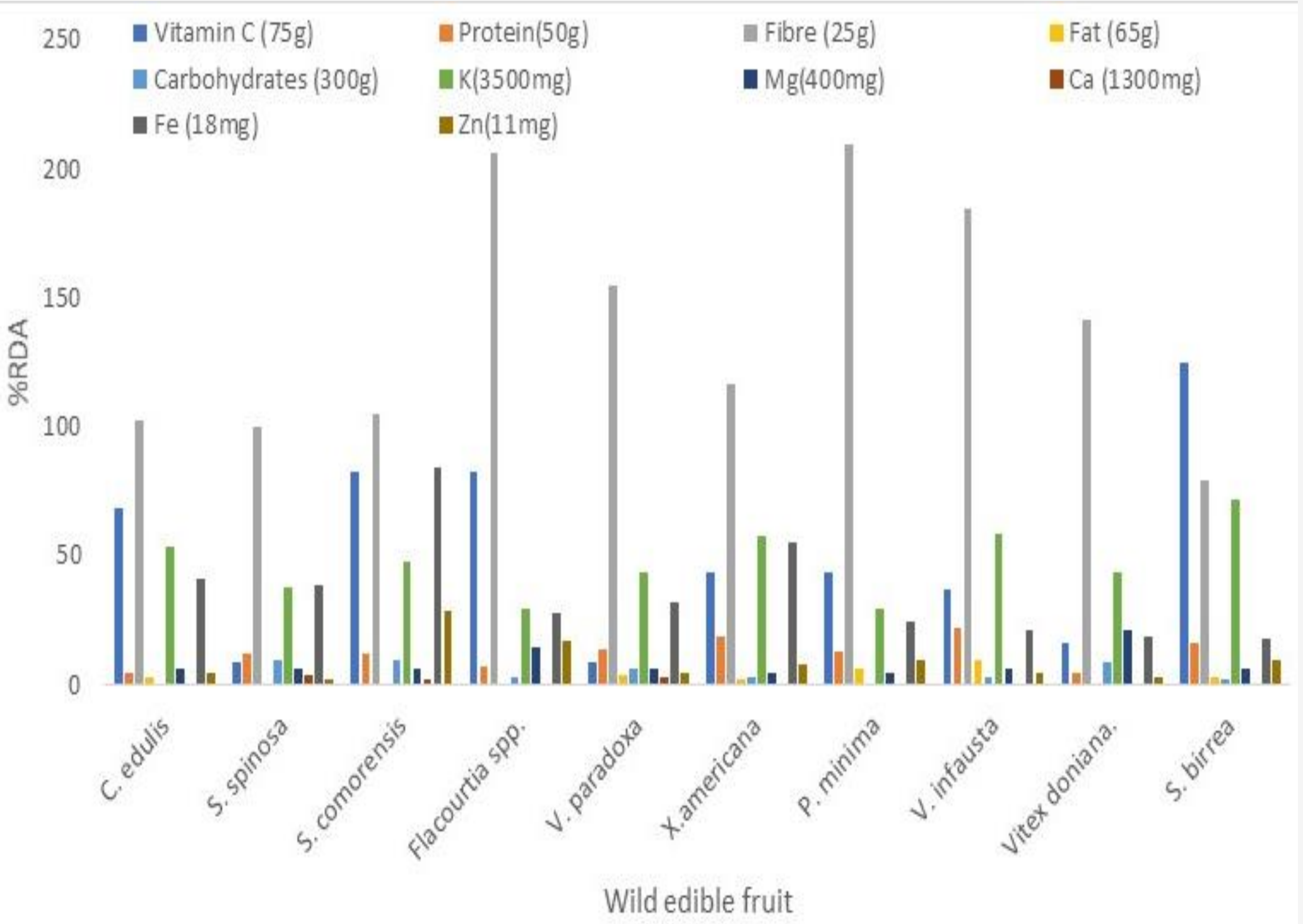


Fig 1: Recommended Dietary Allowance (RDA) contribution of the different WEF

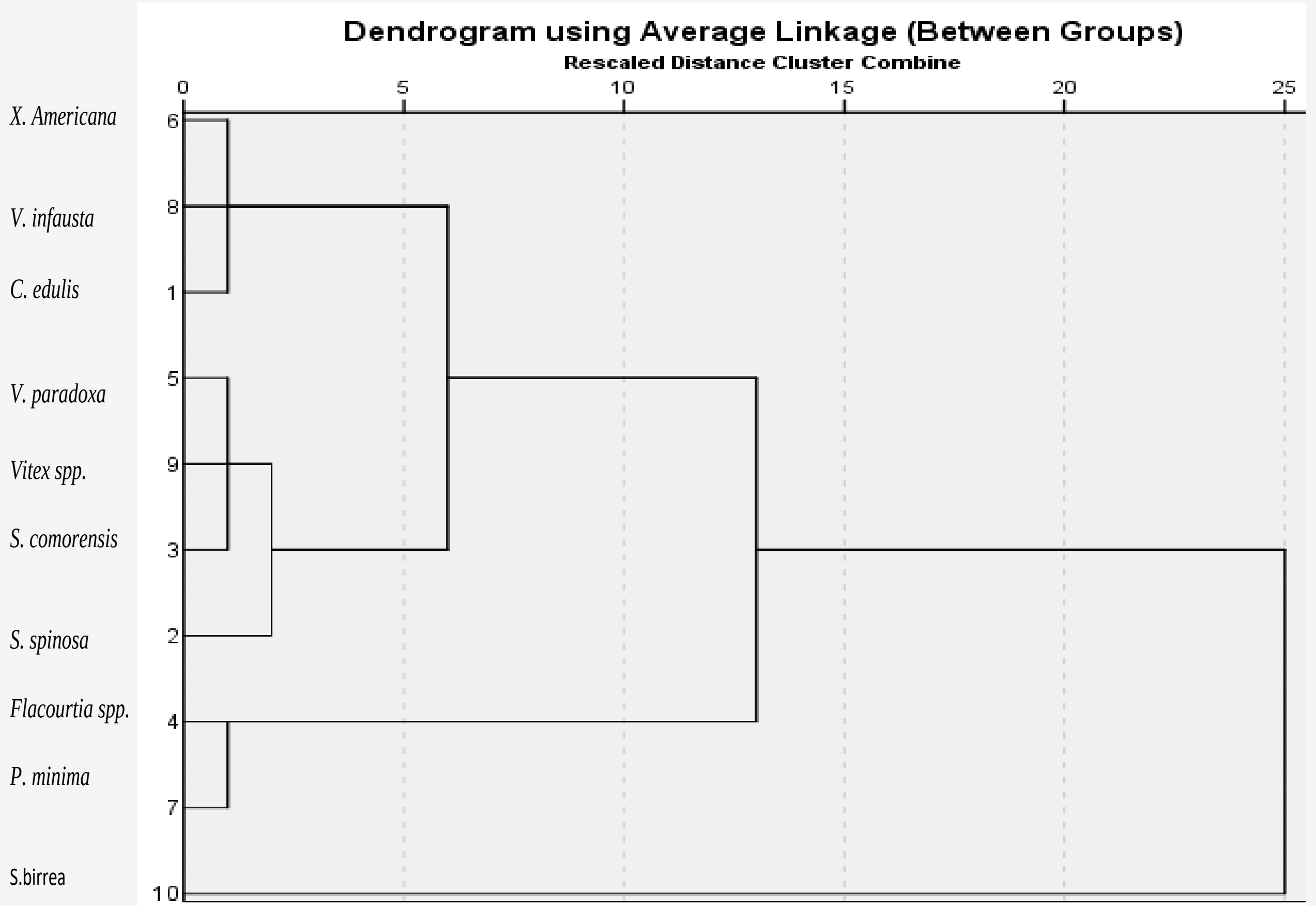


Fig 2: Dendrogram depicting agglomerative hierarchical clustering of ten WEF

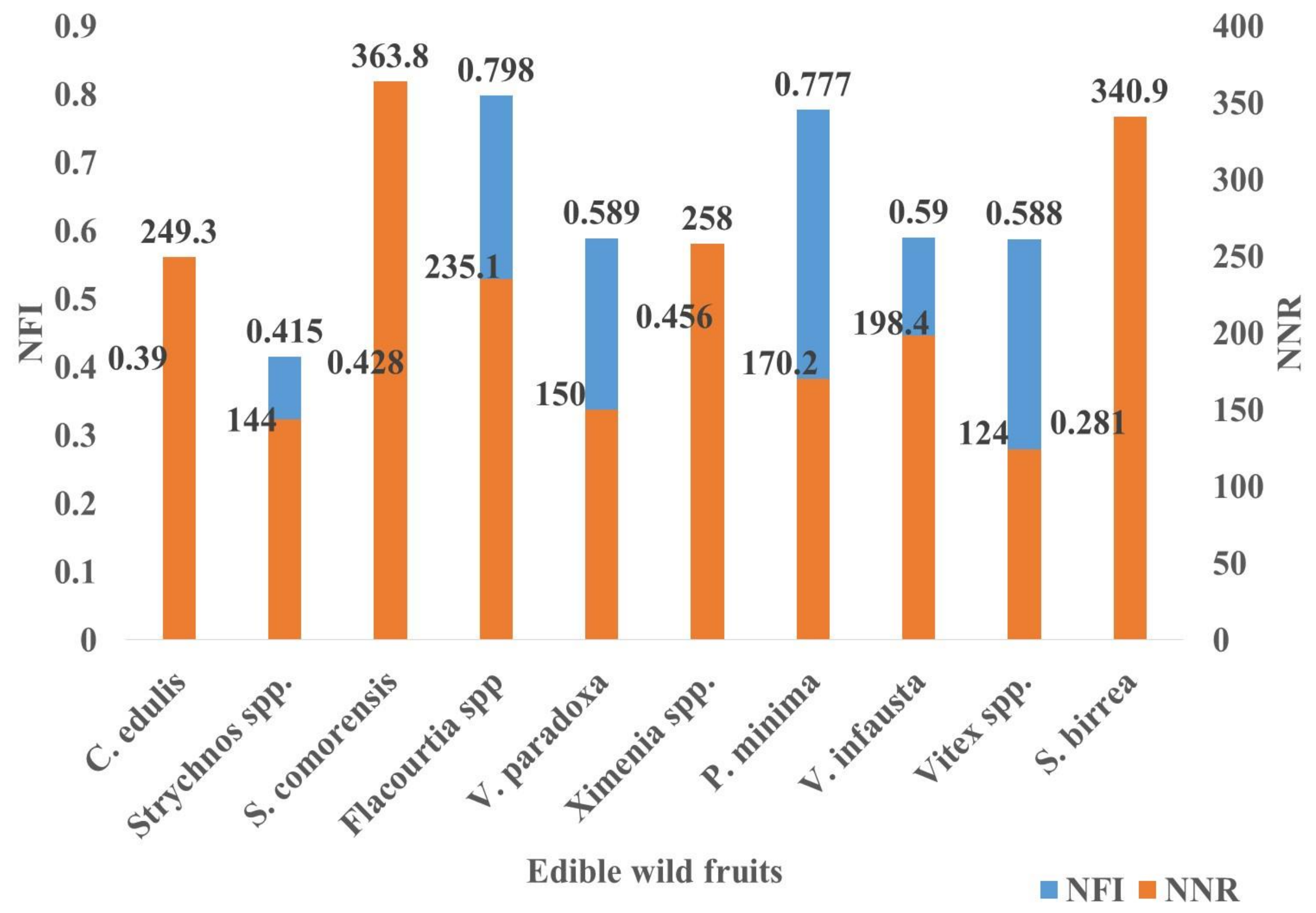


Fig 4: Nutritional profile of ten WEFs

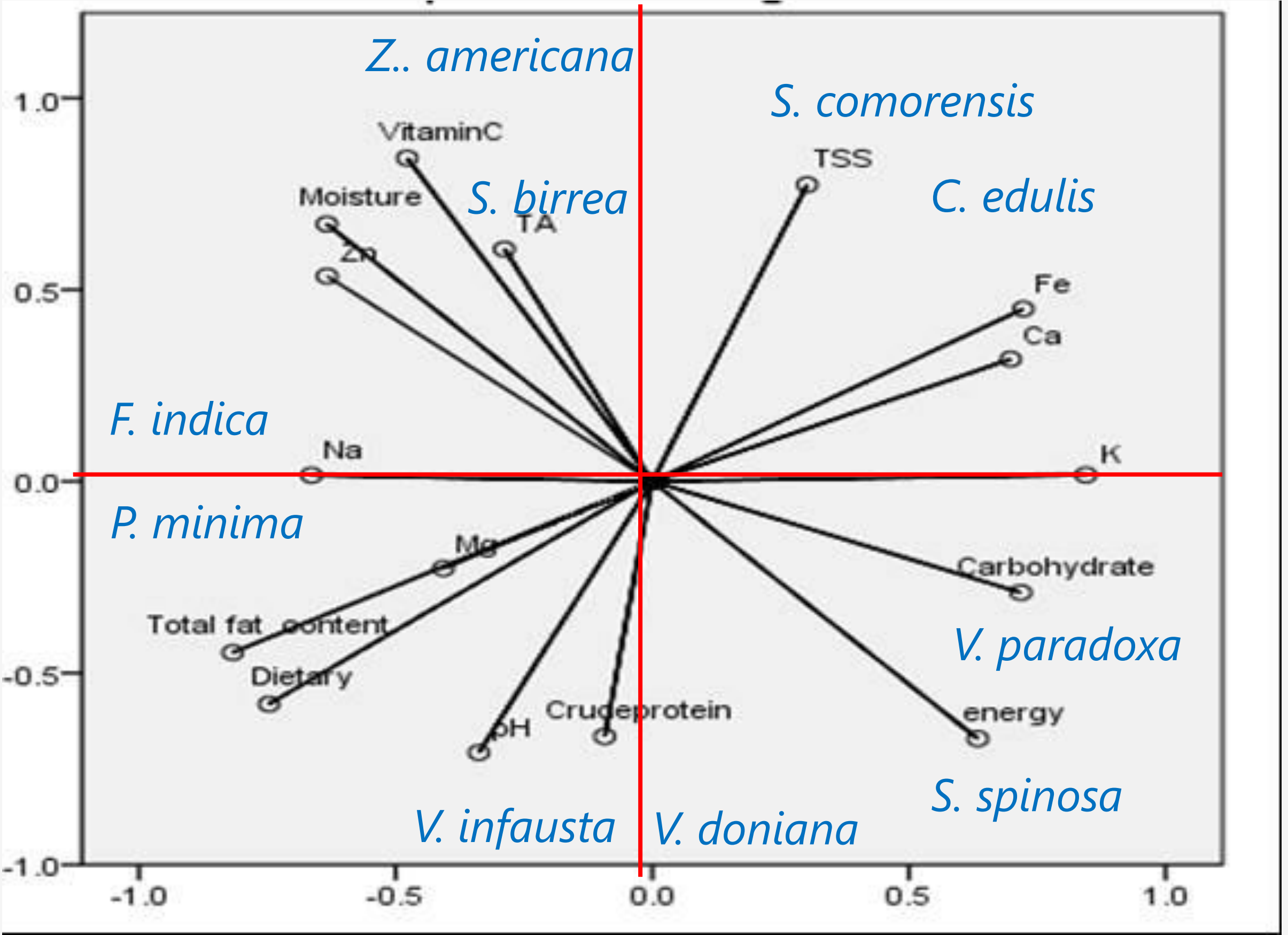


Fig 3: Biplot obtained from the PCA illustrating separation of the ten wild fruits

Results and Discussion

- The WEF with the highest protein, energy and vitamin C were *V. infausta*, *F. indica*, *S. comorensis* and *S. birrea*, respectively.
- Although *P. minima* fruit registered the highest values for dietary fibre and carbohydrates, it is dietary fibre also had the highest nutritional contribution in the RDA (Fig 1).
- However, hierarchical dendrogram clustering separated *S. birrea* from the other nine WEFs at linkage distance of 25 while at linkage distance 13, *F. indica* and *P. minima* were separated from the others (Fig 2)
- The PCA presented five components that accounted for 86.27% of the variability in nutritional composition values of fruits (Fig 3).
- Nutritional profile with NFI technique found *F. indica* with the high score largely contributed by its dietary fibre while the NNR techniques found *S. comorensis* as the most nutrient dense fruit largely contributed by its high value for Fe and Zn (Fig 4).

Conclusion & Recommendation

- Given these nutritional information, *F. indica* and *S. comorensis* should be promoted in communities for addressing malnutrition

References

- AOAC(2001).Official methods of analysis. 17th ed. Washington, DC
- Drewnowski and Fulgoni (2007). Nutrition Reviews® Vol. 66(1):23–39

Acknowledgement

•Mr. Xavier Okwi and Mr. Zadock Ameu for collecting the WEF. NCRI for providing laboratory space for storage and analysis of sample,, and Satoyama Development Mechanism, Japan for funding this study