

## Variation in physicochemical characteristics of safou (*Dacryodes edulis* (G. Don) H.J. Lam) fruits

ONDO-AZI Alain Serges<sup>1</sup>, ELLA MISSANG Crépin<sup>1</sup>, SILOU Thomas<sup>2</sup> and CHALCHAT Jean Claude<sup>3</sup>

<sup>1</sup> Unité de Recherche Agrobiologie, Université des Sciences et Techniques de Masuku, Franceville Gabon, E-mail: ondoazi@yahoo.fr

<sup>2</sup> Pôle d'Excellence Régional AUF, Equipe Pluridisciplinaire de Recherche en Alimentation et Nutrition, Brazzaville, Congo,

<sup>3</sup> Laboratoire de chimie des hétérocycles et des glucides, des huiles essentielles, Université Blaise PASCAL de Clermont-Ferrand, France.

### Introduction



The safou tree, *Dacryodes edulis* (G. Don) H.J. Lam, of the *Burseraceae* family, is an important native resource of the Gulf of Guinea. It is a multipurpose tree, valued for its medicinal, nutritional, economic and social uses. During the last three decades, more and more studies have been conducted on *D. edulis*, essentially the tree and its fruit. The pulp, the only edible part of the fruit, is particularly rich in lipids (50-70% dry matter), indicating that safou could be an important source of oil. Besides lipids, safou pulp also contains substantial amounts of many other nutrients including proteins, carbohydrates, minerals, vitamins and fibres.

The specific taxa existing in *Dacryodes edulis* are not clearly differentiated and delimited. Research on *D. edulis* classification has usually relied on fruit morphological characteristics as criteria of classification such as tree traits have proved less expressive. Morphological characteristics of the fruits, studied on large scale samples from Cameroon, Gabon and Nigeria, present a broad variability.

This study aimed to determine the physicochemical characteristics of safous gathered on 213 trees from Franceville and characterize oil of pulps mixture.

### Material and methods

#### Material

Mature fruits were picked on 213 trees randomly selected in home gardens in Franceville. Samples of 20 fruits were manually collected for each tree and transported to the laboratory for fruit characterization. Franceville is located at 01°37'S and 13°36'E of the equator.

#### Methods

##### Proximate composition of fruit

The methods described in AFNOR (2000a) were used to analyze the proximate composition of 213 safou trees for protein, lipid, ash and moisture. Carbohydrate content was carried out according to standard method.

##### Determination of fatty acid (FA) composition

Fatty acid composition was determined according to method described by Silou et al. (2007).

### Results

Table 1. Physicochemical composition of safou pulp

Variable	Mean	SD	Maximum	Minimum
Moisture (%)	60.07	5.21	73.71	46.01
Lipid (%)	56.76	5.58	70.17	40.82
Ash (%)	3.35	0.69	5.55	1.93
Carbohydrate (%)	30.91	9.69	49.53	20.05
Protein (%)	10.45	1.92	13.76	07.33
Palmitic acid (C16:0)	44.11	3.44	53.34	32.67
Stearic acid (C18:0)	3.29	0.96	6.65	1.67
Oleic acid (C18:1)	30.38	4.91	49.78	16.84
Linoleic acid (C18:2)	20.43	4.41	32.02	9.07
Linolenic acid (C18:3)	0.82	0.36	3.36	nd

SD: Standard deviation nd: no detected

For minimum and maximum values, 3 trials from each sample.

For total mean and SD value n=213 trees.

Table 2. Fatty acids (FA) profiles obtained on 213 safou oils

Profile	FA order	Number of safou trees *
I	C16:0>C18:1>C18:2>C18:0>C18:3	184 (86.4)
II	C16:0>C18:2>C18:1>C18:0>C18:3	24 (11.2)
III	C18:1>C16:0>C18:2>C18:0>C18:3	4 (1.9)
IV	C16:0>C18:2>C18:1>C18:3>C18:0	1 (0.5)

\*% in parentheses

### Acknowledgements

The authors thank the "Service de la Coopération et d'Action Culturelle (SCAC) de l'Ambassade de France", the "Agence Universitaire de la Francophonie (AUF)" for funding this work and Professor David MAMPOUYA, "UMNG", for his skilful assistance for lipid analysis.

### Conclusions

The aim of this work was to describe the variation on physicochemical characteristics of safou fruits in order to identify potential elite trees for industrial exploitation. For all physicochemical parameters studied including the global composition of pulps and the fatty acid contents of pulp oils, results showed high tree-to-tree variation. Safou pulps were particularly rich in lipid, in addition to substantial amounts of carbohydrate and protein. Pulp oils exhibited fatty acid composition like those of usual oils with high level of essential fatty acids. The order of the five major fatty acids allowed to distinguish four profiles, one of them, designated Profile I, representing about 86% of the population. This profile is characterized by palmitic acid as main fatty acid followed by oleic, linoleic, stearic and linolenic acid. Oil obtained by mixing pulps from the 213 safou trees showed good physicochemical properties, suggesting that safou could be a useful raw material for the lipid industry.

### References

- Omoti, U., and Okiy, D.A. 1987. J. Sc. Food Agri. **38**: 67-72.  
Silou, T., Rocquelin, G., Mouaragadja I., Gallon, G. 2002. Riv. Ital. Sost. Grasse. **79**: 177-182.  
AFNOR 2000a. Tome 2, Paris, France.  
AFNOR 2000b. Tome 1, Paris, France.  
Tchendji, C., Severin, M., Wathelet, J.P., and Dona (De), C. 1981. Rev. Fr. Corps Gras. **28** (3): 123-125.  
Silou T., Massamba D., Goma Maniongui J., Maloumbi MG. and Biyoko S. 2007. J. Food Eng. **79** (2): 392 - 400.