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To cite this version:

HAL Id: hal-02788253
https://hal.inrae.fr/hal-02788253
Submitted on 5 Jun 2020

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Composition and quality of artisanal crude palm oils in Cameroon in link with production factors

Germain kansci, Doris Nanda, Sylvain Rafflegeau, Pierre Villeneuve, Lucie Ribourde, Nathalie Barouth, Claude Genot

Introduction: Cameroon, amongst African countries of the Guinean gulf, is a traditional producer and eater of both artisanal and industrial crude palm oil (CPO) [1]. Nowadays oils and fats consumption per capita is regularly increasing in these countries. In parallel, health problems associated to obesity, type 2 diabetes and vitamin A deficiency are alarming [2]. The production of oil palm Viable CP oils on the informal market out of any quality control, is rising due to the development of small-scale mills in the southern Cameroon. In such a context, it seemed necessary to assess the chemical and physical quality of artisanal CPO and to relate the recorded quality differences to producing conditions.

Material

Ripe bunches of oil palm (Elaeis guineensis)
Artisanal Crude Palm Oil extraction
Oils samples

32 artisanal producers from 4 different production regions were interviewed, and 32 samples collected. One oil sample was also collected from a local industrial as a reference.

Methods

1. Survey in palm oil production areas: Information on the plant material and the detailed process of oil extraction ; June to July 2015.

2. Physicochemical properties

Nutritional composition [4]:
- Carotene content (UV-Vis spectroscopy)
- Tocopherol and tocotrienol content (HPLC-fluo)
- Fatty acid composition (GC of FAME)

Lipolysis and oxidation levels:
- Free fatty acid content (NF T60-204, 1985)
- Peroxide value (NF T60-220, 1968)
- Malondialdehyde (MDA: HPLC-DAD of MDA(TBA), adduct) [5]

Results 1. Identification of CPO samples and processes

Table: planting material and extraction processes.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Regions</th>
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<tbody>
<tr>
<td></td>
<td>CENTER</td>
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<tr>
<td>Planting material</td>
<td>Selected</td>
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<td>Unselected</td>
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<td>Motorised</td>
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<td>Press type</td>
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<td>Caltech (b)</td>
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<td>Hydraulic cage press (c)</td>
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<td></td>
<td>Motorized water extractor (d)</td>
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<tr>
<td>Method of storage</td>
<td>Bunches</td>
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</tbody>
</table>

The storage time between harvesting and treatment of palm fruit ranged from 2 to 14 days depending their availability or demand on the market.

Results 2. Effect of production processes on:

a. Carotene content

Figure 1: Carotene content of artisanal CPOs
- The Western region had the highest carotene content; this is due to the presence of unselected dura type planting material.
- ANCOVA: 69% of the variability of these data are explained by: time and method of storage of bunches/fruit before oil extraction. Each day of storage significantly reduced by 14 points carotene content.

b. Free fatty acid (FFA) content

Figure 2: Acidity of artisanal CPOs
- Center and Litoral: sample with high FFA content were stored for more than 12 days.
- West: the high levels are related to the storage of fruit in bags because the storage time is less than 6 days.
- ANCOVA: Each day of storage significantly increased by 1.5 point FFA content.

c. Oxidation markers

- Peroxide value: 0 - 8.62 meq. O₂/kg oil ; MDA: 0 - 11 nmol/g oil. According to Codex Alimentarius [6], the artisanal palm oils were not oxidized.

Conclusions: In agreement with previous studies [3, 7] artisanal CPOs produced in Cameroon present FFA contents superior to current edible oil standards. This is related to the time and method of storage of bunches or fruit before oil extraction. These oils are also characterized by high variations in carotene content linked to the type of planting material and length of storage between harvest and oil extraction. The role played by FFA in typicality of artisanal CPOs and functional role in the achievement of local dishes should be explored.


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