

## Biochemical Passion Fruit Seeds Characterization (*Passifloraedulis F. Flavicarpa Degener*) Cultivated In Republic Of The Congo.

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### Abstract

The fruit of the passion (*Passifloraedulis f. flavicarpa Degener*) native of the Brazil, is a popular fruit in the world. It is a climbing plant, perennial, and Woody that grows everywhere in Republic of Congo. The ripe fruits are harvested and sold in every market in the country. Their seeds are rich in lipids (23,65%). The humidity is 15.18%; Protein, carbohydrates and fiber makers are respectively: 10,53%; 48, 94 and 13,76%. The ash content is 1.70%. Among the identified ions, we got: phosphorus: 0,24%; Iron: 0,01%; Calcium: 0,36% and Magnesium: 0,60%. The energetique calcule value gives a value of 450, 73 Kcal / 100g.

**Keywords:** Biochemical passion fruit seeds *Passifloraedulis f. flavicarpa Degener*, characterization

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### I. Introduction

L health and well-being of every individual depend on sufficient nutritious food varied and good quality. Eating habits influence several risk factors for cardio-metabolic and fruit consumption reduces the risk of chronic diseases, including obesity and diabetes [1]. The beneficial effects of fruit have been partly related to their levels of micronutrients, including vitamin C, carotenoids, minerals and polyphenols [2]. However, it is also important to take into account their composition in lipids, carbohydrates, protein and fiber.

The fruit of the passion (*Passifloraedulis f. Flavicarpa Degener*) native to the Brazil, is a popular fruit in the world. It is widely grown in tropical countries of the world for its edible and exported fruits in several countries because of its delicious juice; It is also included in the pharmacopoeia of several countries [3].

Passionflower is a climbing, perennial, and woody plant with shallow roots. It can grow very quickly (4.5 to 6 m per year), but his life is relatively short (3 to 6 years). Passionflower has leaves trefoil, long and deep. These leaves are bright on their upper and dull faces on their lower faces [4] with 7.5 to 20 cm thick.

Congo, like other countries of Central Africa has significant agricultural potential thanks to their climate, which unfortunately are insufficiently exploited and makes the country dependent on food imports. In recent years, there is a renewed interest in non-conventional crops with both potential assets for the development of populations at the local level as the industry [5].

The valuation of the seeds of local fruits as a source of fat, protein or carbohydrate sometimes takes us to rare specimens that can be investigated. Indeed, the fruit of the passion (*Passifloraedulis f. Flavicarpa Degener*) is one of the domestic plants that grow on the whole of the territory of the Congo-Brazzaville which seeds have never been the subject of culinary applications normal (production of oil, used as a source of protein or carbs,...).

*Passifloraedulis f. flavicarpa Degener* is consumed fresh and also used State as raw material in the manufacture of juice first.

The purpose of our study is to characterize the seeds of the passion fruit (*Passifloraedulis f. Flavicarpa Degener*) who can made a great asset if you can determine their physicochemical and biochemical characteristics. Thought us it was so interesting to approach this study on the valorization of the seeds of *Passifloraedulis f. Flavicarpa Degener*, in order to know their real nutritional potential.

### II. Material and Methods

#### 2.1. Plant material

Plant material of our study consists of the seeds of the fruit of the passion (*Passifloraedulis f. flavicarpa Degener*), harvested throughout the territory of the Republic of the Congo. Figures 1, 2, 3 and 4, below show the fruits and seeds of *Passifloraedulis f. flavicarpa Degener*

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**Figure 1:** Whole fruits of *Passifloraedulis f. flavicarpa* Degener



**Figure 2:** Demi-fruits mature of *Passifloraedulis f. flavicarpa* Degener showing the pulp and seeds.



**Figure 3:** Dried seeds of *Passifloraedulis f. flavicarpa* Degener



**Figure 4:** Dried and crushed seeds of *Passifloraedulis f. flavicarpa* Degener

## **2.2. Methods.**

We have described the methods used to determine moisture, fat, protein levels, the rate of ash and a few major minerals, carbohydrates and fiber content.

### **Determination of moisture (H)**

The humidity level was determined according to the [6]. 2g of crushed obtained after grinding the seeds are placed in a previously weighed capsule and put the oven (Mettler, Germany) at 70 ° C until the mass becomes constant.

#### **Determination of the content (C) raw ash and major mineral**

2g of crushed seeds meal were used for the determination of the ash rate according to the gravimetric method [6]. The incineration of the samples is performed in an oven mittern at 550 ° C for 6 hours. The rate of ash after incineration is calculated.

The mineral elements contents are measured by atomic absorption spectrophotometry (Perkin-Elmer-1100) on ash obtained after mineralization. Prior to dosing, the ashes are diluted in a solution containing 10% as corrector of interactions lanthanum chloride (concentration: 116 LaCl<sub>3</sub> g in 1L of HCl concentrated diluted to one-quarter).

#### **Determination of the rate of fat (MG)**

The lipids in 5 g of the dried and crushed seeds were extracted using Soxhlet. (NFISO 82 62 - 3, 2006) by 200 mL of hexane for 6 hours. The excess of solvent is evaporated to the rotavapor (IKA HB 10 basic).

#### **Determination of the rate of protein (P)**

About 0.1 g of crushed seeds is used to determine the rate of crude protein from the determination of total nitrogen by the Kjeldhal method [6]. Protein was obtained by multiplying the total nitrogen by a convention factor 6.25.

#### **Determination of the rate of total carbohydrate (G)**

Carbohydrate (G) was estimated by the difference method. According to the method [6], it was calculated by subtracting from 100, the sum of moisture (H), of the FAT (MG), protein (P) and ash (C) contained in the sample.

#### **Determination of the rate of crude fiber (FB)**

Levels in raw fibers of the samples are determined by the method of Weende [7]. To do this, 1 g of the crushed seeds (M) is brought to a boil in 50 ml of sulfuric acid (0.25 N) and then 50 ml of soda (0.31 N) for 1 h. The resulting residue is dried at 105 ° C for 8 h and then cremated at 550 ° C for 3 h.

#### **Determination of the Energy Value (EV)**

The energy value of 450, 73 Kcal / 100g is very close to 398,04 Kcal / 100g, average value obtained for the same product by some authors [9; 10; 11; 12]. This value is superior to that obtained by [8], working on the seeds of seven cultivars of voandzou [Vignasubterranea (l) Verdc. Fabaceae] grown in the Ivory Coast and who have obtained the values ranging from 370,02 to 388.8 Kcal / 100 g. The value of 450, 73 Kcal / 100g is high compared with Borassus aethiopicum (308, 87 Kcal/100 g): the seeds of (*Passifloraedulis f. Flavicarpa Degener*) passion fruit are a very good source of energy.

The total energy value was calculated according to the method of [8]

It is determined using the formula above - after:

VE (kcal / 100g) = (CHO x 4) + (CL x 9) + (CP x 4) with CHO = % of carbohydrates.

CL = % of lipids and CP = % proteins.

### **III. Results and Discussion**

#### **3.1: Humidity level.**

Different tests for the moisture content obtaining gave an average value of 15.18% on the seeds of the (*Passifloraedulis f. flavicarpa Degener*) passion fruit studied. This value is quite high compared to 10.8%, average value obtained by some authors [9] ; [10];[11] and [12], on the same product. This level of humidity (15.18%) is less than 56,33%, value obtained by [13] in 2015 on the fresh almonds Borassus aethiopicum and also low compared to the Cocos nucifera (94.45%) studied by [14] which allows to conclude the fresh seeds of the (*Passifloraedulis f. flavicarpa Degener*) passion fruit studied are less hydrated than fresh almonds Borassus aethiopicum and there fore keeps a little better than the last.

So for better conservation, the seeds should be lightly dried beforehand. This value is very high compared to those obtained by various authors on other products such as peanuts with: 7,48% [15;16] on seeds (rawgroundnut, sun-driedgroundnut and roastedgroundnut); 7.54% [17] on Sinkarzie, F - mix, JL 24, and Manipintar varieties; 4, 12-4, 75% [18] on day 93, Rio Balsas, Ocozocautla, varieties Tlaxmalac, Gerardo Uribe, Ranferi Diaz, A-18 and RF-214 in Mexico; 5, 55-6, 05% [19] on a variety of peanut in Sri Lanka after treatments of organic fertilizers; 7.18% [20] on a variety of peanut in Nigeria. It is also lower than the fresh almonds of the Hyphaeneguineensis which is 37,32%. This moisture is normal for a good preservation of seeds (the conservation of seed water content ranges 10 and 14%).

#### **3.2 : Lipid content.**

The seeds Soxhlet extraction of the (*Passifloraedulis f. Flavicarpa Degener*) passion fruit gives an average fat content of 23.65 percent. Some authors [9];[10];[11] and[12] have achieved an average of 23.4% on the same product: this value is substantially identical to that obtained in our study. The lipid content in seeds of the fruit of the passion (*Passifloraedulis f. flavicarpa Degener*) (23,65%) is superior to those obtained by [21]

(8-10%) working on the same product. On the other hand, this value is high compared to that obtained by [13]: 0.01% on *Borassus aethiopum*. These seeds are poor in oil compared to *walnuts Juglansregia* L. (58.3-65.2%) reviewed by [22]. This content is far inferior to those obtained by [16], who is 46,10%; 40 to 42%, obtained by [23]; about 46% obtained by [23] and 39,30% obtained by [21] and [24] achieved values from 49,20 to 50,76% working on five varieties of peanuts. [18] by studying the chemical properties of eight varieties of peanuts grown in the Mexico received varying from 37.9 to 56.3% seed oil content. This value of 23.65% is very low compared with 67.5%, value obtained by [26] on the kernels of the fruit of the tree of Cayor (*Neocaryamacrophylla* Sabine) in 2008.

The seeds of (*Passifloraedulis f. Flavicarpa* Degener) passion fruit can be used directly in oil as raw material first in the production of a plant to use either food or cosmetic oil.

### **3.3 : Protein content.**

The average protein content has been determined from 6 tests. The result is a value of 10.53%. This value is substantially identical to the average (10.80%) obtained by some authors [9; 10; 11] and [12] on the same product. The value of 10.53%, is greater than 6.9%, value obtained by [13] on *Borassus aethiopum*. This value is very low compared with the seeds of *Parkiabiglobosa* (Jacq.) (24, 33-33, 70%) studied by [27] and small compared to the values obtained by some authors working on some varieties of peanuts: 19,81% [20] 24.70% ; [15]27, 54-32, 85% [18]; 23, 62-28, 88% [17] and 32.64% [28] We can thus say that the (*Passifloraedulis f. flavicarpa* Degener) passion fruit contains significant value in proteins.

The seeds of the (*Passifloraedulis f. flavicarpa* Degener) passion fruit are less rich in protein than seeds of *Voandzou (Vignasubterranea* (L.) grown in the Ivory Coast, with a rate ranging from 14,61 to 20,74% [29].

### **3.4 : Rate of ash and minerals.**

Different tests for the analysis of the rate of ash gave an average value of 1.70%, higher than the average obtained by some authors [9; 10; 11] and [12], on the same product. Indicating that the seeds of the (*Passifloraedulis f. flavicarpa* Degener) passion fruit are also a significant source of minerals. This value (1.70%) is greater than 1.17%, value obtained by [13], on *Borassus aethiopum*. It is however lower than 4.08%, value obtained by [28], by working on the melon seeds (*Cucumismelo* L. *Inodorus*).

This value (1.70%) is greater than those obtained by [15;16], values ranging from 1.38 to 1.48 percent on the seeds of peanut. It is by contrast less than those obtained on peanuts by [18], in 2013, values ranging from 2.45 to 2.96%. Peanut "Manga" has a rate of 5.68% ash [28] very high value compared to that of the seeds studied here. *Passifloraedulis f. flavicarpa* Degener contains more minerals ions (rate of 1.70% ashes) as *Borassus aethiopum* (1.60%).

We looked for phosphorus, iron, calcium and magnesium in the ashes and the result: phosphorus: 0.24%, iron: 0.01%, Calcium: 0.36% and Magnesium: 0.60%. These values are very low compared to those found by some authors [9;10; [11] and [12], even though in both cases the magnesium is the most represented element among the four items sought in our study. This result shows that he still has a lot of minerals to determine in these ashes, because the sum of the values found is less than 1.70%.

These identified minerals are essential to the proper functioning of the body.

### **3.5 : Carbohydrate content.**

The rate of carbohydrate (48,94%) We found is higher than the average of 36,06% found by some authors [9;10; 11] and [12], working on the same product. Studied seeds are rich in carbohydrates than those studied by these last authors.

This value of 48,94% we got is very small compared to that obtained by [13] and [9] (81%) on *Borassus aethiopum*.

Levels of carbohydrates of some varieties of peanut: 17.41% [15;16]; 11, 54-19, 65% [17] and 17.56% [18] are inferior to the one of (*Passifloraedulis f. Flavicarpa* Degener), passion fruit which is 48,94%.

The seeds of (*Passifloraedulis f. Flavicarpa* Degener) passion fruit oil extract can be used directly in food or feed as the source of carbohydrate.

### **3.6 : Rate of fiber.**

The rate of fiber is 13,76%, high value compared to that obtained by [13]; (11.2%) While working on the Palm (*Borassus aethiopum*). The seeds of the (*Passifloraedulis f. Flavicarpa* Degener) passion fruit are a good source of fiber from the *Borassus aethiopum*.

### **3.7 : Energy Value (EV)**

The energy value of 450, 73 Kcal / 100g is very close to 398,04 Kcal / 100g, average value obtained for the same product by some authors [9;10;11] and [12]. However, this value is higher than that obtained by [29] in 2015, while working on the seeds of seven cultivars of *voandzou [Vignasubterranea* (L) Verdc. Fabaceae] grown

in the Ivory Coast and who have obtained the values ranging from 370, 02 to 388.8 Kcal / 100 g. The value of 450, 73 Kcal / 100g is high compared with *Borassus aethiopum* (308, 87 Kcal / 100 g): seeds of the (*Passifloraedulis f. Flavicarpa Degener*) passion fruit are a very good source of energy .

#### IV. Conclusion and Outlook.

The *Passifloraedulis f. flavicarpa Degener*, passion fruit who made the object of our study, is one of many varieties of fruit that exist in our country and has never been a comprehensive scientific study. This study enabled us to achieve this goal by determining the physico-chemical composition of the seeds of passion fruit (*Passifloraedulis f. flavicarpa Degener*) whose results are the following: water (15.18%), lipids (23.65%); protein (10.53%); ash (1.70%), carbohydrates (48,94%) and the fibers (13,76%).

The values obtained show that these fruits contain significant health nutrients and can be recycled in the industrial production of human foods.

The study of food quality oil is to continue (the determination of the composition in fatty acids, glycerides, phospholipids, ceramides, and sphingomyelin, the position of fatty acids on triglycerides, on phospholipids and the) composition of the unsaponifiable).

This work should be completed by making a thorough study of the protein fraction of these seeds. Thus, it would enhance oilcake extract of these seeds in food meals human and feed manufacturing.

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