



## Contribution to the inventory of some spontaneous food plants used as ingredients of typical sauces: case of Daloa, central west of Côte d'Ivoire

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### Abstract

An ethnobotanic survey, aiming at making a list of wild food plants still present in the Haut-Sassandra region (central west) of Côte d'Ivoire, was among the rurals and cytadins population. Their geographical distribution extends throughout the whole Ivorian territory from North to South via the Center (the Baoulé V) and from East to West. Some food plants come from Central west were listed. A total of 24 plant species were recorded, using in different typical food recipes. Many ethnobotanical works emphasize their importance as food and medicine and their interests for the indigenous populations of these regions. Their vernacular name and scientific name were revealed. Unfortunately, there is little systematic research on the physiological influence of these plants. Their health impact is also insufficiently highlighted, revealing only the presumptuous quality of this natural resource. Studies of total physicochemical analysis (proteins, carbohydrates, lipids, ash and minerals), biometrics and histopathology clearly may reveal their nutritional qualities. This study popularize and provides a better understanding of the value and possible dissemination of this abundant local resource of spontaneous plants in the consumption of the people of Haut-Sassandra, Côte d'Ivoire, in order to cope with the many noncommunicable diseases that occur in our regions (Daloa).

**Keywords:** Côte d'Ivoire, spontaneous food plants, ethnobotanical, phusicochemical, nutritional quality

### 1. Introduction

In Africa, plants have traditionally been the mainstay of people's diets (Kubmarawa *et al.*, 2009) <sup>[6]</sup>. Indeed, African peoples have a long tradition in using these wild plants as a dietary supplement in the making of their various typical dishes (Chweya Eyzaguire, 1999) <sup>[6]</sup>. These plants have many virtues in the maintenance and prevention of many nutritional diseases because containing many ingredients in the growth and maintenance of the body that could be used (Falade *et al.*, 2003) <sup>[11]</sup>. Vegetables are important in people's diets because they contribute to food security through their composition and a major source of employment and income (Adorglorh-hessou, 2006) <sup>[1]</sup>. Moreover, in comparison with cultivated exotic plants, these plants have a certain economic value. These plants are more and more found on the different markets of large urban areas; this reflected the interest of certain populations in the different forest regions. Unfortunately, in the face of civilization, the consumption of these spontaneous plants in many urban and rural homes today is becoming less common. Indeed, they are less used in the consumption for the benefit of cultivated plants which we control today the mode of production. This change in eating habits has a serious impact on the well-being of the population, with today's emergence of many nutritional diseases. On the other hand, in rural areas, deforestation is felt either by the decrease of arable land and by the scarcity of

spontaneous food plants. Intense degradation of the forest poses the problem of the follow-up of the real food plant source of nutritional supplement and motto in rural environment. In the past, these species have played an important role in the well-being of populations (Gautier, 1992) <sup>[12]</sup>. Knowing that it is possible to feed anywhere in nature has reminded us of the importance of generous flora. In Côte d'Ivoire, Gautier's research (1992) was carried out by the Dida, Baoulé, Senufo, Krobou and Gagou and Gouro families. Thus, despite the availability of many cultivated products sold on the markets of the region, the issue of many nutritional diseases remains a concern for our governments in Africa and more particularly in Daloa, Côte d'Ivoire. Faced with this scourge, the search for food strategy is essential to strengthen the nutritional status of rural populations as urban essential link of development (Dally *et al.*, 2014) <sup>[7]</sup>. To achieve this objective we have made an investigation on the different markets of the city place of speculation of forest products and some peri-urban areas of Daloa (Côte d'Ivoire.) to determine the presence of these spontaneous food plants.

### 2. Material and Methods

#### 2.1. Biological material

The material consists of spontaneous food plants (leaves, fruits and grass) whose organs are consumed. These organs are: leaves or buds, peduncles, tubers, etc.

## 2.2. Methods

Before the ethnobotanical surveys proper, prospecting were carried out only the major commercial centers of the city of Daloa. The survey was based on identifying and interviewing mainly Malinke traders operating in these different markets and the peri-urban population of Daloa. This questionnaire should allow us to obtain the vernacular names and then the scientific names of the different seasonal species consumed. From ethnobotanical surveys, we selected a sample of twenty-five species. They are common in some homes and we can say that they are part of the dishes that the people of the region of Daloa (Haut-Sassandra) consumes well. It was thus necessary to know if these species were also available in quantity in the field, it is common that a name is given to several species or vice versa. Thus, the identification of spontaneous food plants from local names only carries the risk of errors. These risks will be minimized by harvesting consumed organ sample and aerial part. When it was possible to photograph are made on the harvest Sète (local markets) for a better identification of their species. The survey method also used is called "ethnobotanical survey method". This method involves interviewing volunteer traders on the translational use of their useful plants. The survey was conducted in 2018 in the fields of vendors located in the markets (Lobia, Orly and Gbeuly-Ville) and in some villages around the city of Daloa (Gboguhé, Zépréguhe, Chtébléguhé, etc.). The use of these plants has been noted. Plant samples were purchased from each vendor and the corresponding prices were collected and forwarded to the Botany Lab for identification.

## 2.3. The study area

### 2.3.1. Geographic localisation

The city of Daloa is located 385 km from the city of Abidjan and 141 km from Yamoussoukro. It is located in the center-west of Côte d'Ivoire in the region of Haut-Sassandra and is the capital of this region. Our study took place in two major markets. The Orly market located between 6°54'30" west longitude and 6°30'20" north latitude and the Sun neighborhood located between 6°27'18.53" west longitude and

6°52'50.79" north latitude in the city of Daloa.

### 2.3.2. Climate

The region of Haut-Sassandra in which the city of Daloa is located belongs to the humid tropical climate with a rainfall of between 1200 and 1600 millimeters of rainfall per year. Precipitation is spread over the whole year with a maximum in the months of June and July and a minimum of December to March. Humidity is important with an average annual average temperature of 26 °C (SODEXAM, 2010)<sup>[7]</sup>.

### 2.3.3. Vegetation

The Haut-Sassandra region is characterized by a varied flora and presents two distinct types of vegetation. The forest zone that occupies most of the region is characterized by semi-deciduous forest at *Celtis* sp. and *Triplochiton scleroxylon* and the savanna or pre-forest savanna zone.

### 2.3.4. Population and economic activities

Population of the municipality of Daloa is estimated at 319,487 inhabitants and is the third most populous city in Côte d'Ivoire (INS, 2014)<sup>[13]</sup>. Population is cosmopolitan and made up of natives (Betes, Gouros, Guérés and Nianbouas), non-natives (Baoulés, Malinkés, Sénoufos, Agnis, Attiés, etc.). The foreigners are mainly nationals from ECOWAS (Burkinabes, Malians, Ghanaians, etc.). Economic activities of the population are dominated by trade and the agricultural sector. Non-native and non-native speakers from other localities are the most involved in this sector.

## 3. Results

All spontaneous plants samples collected in these different markets were identified at the Botany Laboratory. The list of scientific names and their respective families of spontaneous plants found on the market and periphery (with a few homes in neighboring villages) of the city is presented in the table below. These are 24 plant species distributed among 22 botanical families.

**Table 1:** List of spontaneous food plants identified in Daloa

Scientific name	Botanic family	Vernacular name (ethnic group)
<i>Abrus precatorius</i> Linn.	Fabaceae	Gnoubloumènio, wawayo (dida)
<i>Aframomum exscapum</i> (Sims) Hepper	Zingiberaceae	Babayé (dida)
<i>Anchomanes difformis</i> (Blume) Engl	Araceae	Pondou (dida)
<i>Beilschmiedia mannii</i> (Meisn.) Benth. & Hook.f.	Lauraceae	Bouket (bété)
<i>Ceiba pentandra</i> (Linn.) Gaerth.	Bombacaceae	Manéon (guéré), abouè (baoulé)
<i>Cleome rutidosperma</i> DC.	Capparidaceae	Kogbo-tohounogbo (dida)
<i>Cola lateritia</i> K. Schum. var. <i>maclaudi</i> (A. Chev.) Brenan & Keay	Sterculiaceae	Konkongba (dida)
<i>Combretum paniculatum</i> Vent.	Combretaceae	Gbogbawi (dida)
<i>Dioscorea praehensilis</i> Benth.	Dioscoreaceae	Sèmè (bété, dida)
<i>Heterotis rotundifolia</i> (Sm.) Jac.-Fél.	Melastomataceae	Tchitechri-devio (dida)
<i>Emilia sonchifolia</i> (Linn.) DC.	Asteraceae	Gben (tagbana)
<i>Glyphaea brevis</i> (Spreng.) Monachino	Tilicaceae	Sissilé (bété)
<i>Irvingia gabonensis</i> (Aubry-Lecomte ex O'Rorke) Baill.	Irvingiaceae	Kaklou, siakoh (bété)
<i>Myrianthus arboreus</i> P. Beauv.	Cecropiaceae	Pessiè(dida), tikliti (bébé, néyo), Pessio-oudie (dida)
<i>Ricinodendron heudelotii</i> (Baill.) Pierre ex Pax	Euphorbiaceae	Apki (baoulé), koh (bété)
<i>Sesamum indicum</i> Linn.	Pedaliaceae	Mahicor (bété), gnangnan (baoulé)
<i>Solanum nigrum</i> Linn.	Solanaceae	Nagbokouo (bété), lèbè (guéré)

<i>Spondias mombin</i> Linn.	Anacardiaceae	Troma (baoulé), tautoè (dida)
<i>Strombosia pustulata</i> Oliv. var. <i>lucida</i> (J. Léonard) Vill	Olacaceae	Klè-kor (bété, gnaboua)
<i>Talinum triangulare</i> (Jacq.) Willd.	Portulacaceae	Agouchi (allandjan, dida, avikame), nangourou (doula)
<i>Tetrapleura tetraptera</i> (Schum. & Thonn.) Taub. A	Mimosaceae	Esehese (dida, avikame)
<i>Treulia africana</i> Decne. subsp. <i>africana</i> var. <i>africana</i>	Moraceae	Blenbledou (bété)
<i>Triplochiton scleroxylon</i> K. Schum.	Sterculiaceae	Gnandèè (dida)
<i>Vernonia colorata</i> (Willd.) Drake	Asteraceae	Gnimimè (dida)

#### 4. Discussion

Surveys carried out on the major markets of Lobia, Orly and Gbeuly-Ville in the region of Daloa (Côte d'Ivoire) and the surrounding villages of the city of Daloa (Gboghuet, Zahia, Boboua, Zokoguhe, Krikoria) have shown that the flora of our study environment is divided into 24 species and 22 families. These seasonal plants are widespread in tropical Africa and well consumed by African people. The nutritional value of these plants is due to organic substances (carbohydrates, proteins) and minerals (calcium, iron, zinc, etc.) that they contain. Women are among the majority of those involved in the sale of these spontaneous food plants. These samples of results appear to be small and not very diversified, compared to flora of similar studies (Ambe, 2001; Kouamé *et al.*, 2008) [3, 8]. However, our results are in agreement with those of these authors, although the number of people surveyed in these markets may differ from one area to another. Also, these results corroborate those of Tchataat and Ndoye (2006) [6, 25] who attest that the trade of spontaneous food plants is an activity essentially practiced by women. Fruits or grains and leaves dominate among the vegetable organs sold as condiments in the markets of Daloa. Its results corroborate with the work conducted in Cameroon, Central Africa and particularly in the Far North region (Betti and Mebere, 2011, Hamawa, 2013) [5, 14] and the doula markets (Priso *et al.*, 2011; Dibong *et al.*, 2011) [9, 4]. Similar results were also obtained in the Democratic Republic of Congo and particularly in the markets of Kinshasa (Mutembwe Shango, 2010) [21] and (Betti *et al.*, 2011) [5]. The importance of the fruits or grain and leaves would be due to their nutritional value. These marketing activities of these plants are in principle shared between men and women. Indeed, the activities requiring great efforts are reserved for the men whereas the ones which consume a lot of time are reserved for the women, whose marketing. N'dri *et al.* (2008) [22] make the same observation in the cheese region of Côte d'Ivoire. In addition, certain food plants are also used in traditional medicine to relieve certain diseases. This same observation is observed with the work of N'dri *et al.* (2008) [22] which has shown that certain species such as *Recinodendron heudelotti*, *Irvengia gabonensis* and *Beilchmedia manii* are the subject of significant commercialization. Most of the people involved are Ivorians mainly from the North and the Central. Zanh *et al.* (2016) [28], also shown that some of these spontaneous food plants are recognized for their therapeutic virtues used in the treatment of certain pathologies. Diouf *et al.* (2017) showed the importance of certain vegetables such as African nightshade (*Solanum scabrum*) in reducing malnutrition problems by their quantitative intake of proteins, minerals and vitamins. Indeed, the strong anthropization of the Ivorian forest areas in general and Daloa in particular has resulted in the transformation of forest cover to the benefit of various plantations in the quest

for food security (Kouamé *et al.*, 2009). In these degraded ecosystems, the natural regeneration of forest tree species is compromised inhibited not only by the scarcity of species but also by the systematic collection of edible fruits, especially since they are seasonal. On the other hand, some tree species are consciously protected in yards because of their compatibility with certain exotic plants (cocoa, coffee, etc.) (Mollet *et al.* 2000). Indeed, the use of forest products is essentially part of the informal sector; therefore, there is little reliable data available on production, trade and the number of people involved in the extension of these species (Vantomme and Gazza, 2010) [27]. These are therefore found in commercial speculation (Betti *et al.*, 2016). These plants in the forest regions of tropical Africa are in the form of mostly unopened leaves, dried fruit or not in the form of condiments and spices. These food plants are presented in several groups according to their particularity: they are for example; oleaginous plants (*Recinodendron heudelotti*, *Treulia africana*); cellulose plants including fruits and bark; aromatic plants (leaves, fruit and seeds); edible leaves. Some have generalized uses in normal times, others are in times of scarcity or wedding. These species are used for cooking by the leaves, their seeds and their exudates. Thus they are the basis of many ingredients in the making of many typical sauces (accompaniments food) in our urban areas, Traoré *et al.* (2005). Their chemical composition would show some energy balance in consumption and can understand the health of our popular peasant despite what is implied about poverty and undernourishment. These plants also contain antioxidants that inhibit the action of harmful free radicals for the cells of the body (Pisoschi and Negulescu, 2011). In view of the numerous nutritional and economic values, some species survive in highly anthropogenic environments because they are protected and even regenerated by some farmers (Tchataat and Ndoye, 2006) [6, 25]. Faced with the loss of natural resources directly usable by local rural populations, one of the innovative solutions could come from the creation of community forests as a voluntary nature reserve, more and more encouraged by the State of Côte d'Ivoire (Adou *et al.*, 2013) [2]. Indeed, a food has value only if it has a good taste and provides all the nutrients or some of the nutrients necessary for the growth, maintenance and maintenance of well-being of the individual (Fergusson *et al.*, 2009) [12].

#### 5. Conclusion

The purpose of the study of spontaneous food plants was to inventory some plants with organs (tubers, leaves, fruits, seeds) used in the making of certain typical complementary or accompaniment dishes consumed by the populations of the Daloa region. Haut-Sassandra. The usefulness of these nutritionally spontaneous food plants is well proven compared with the crops grown for these many nutritional potentialities.

Most of the listed plants are rich in energy nutrients. In short, all of these species provide the substances (carbohydrates, lipids, proteins and minerals) necessary for life. In view of these many non-communicable or nutritional diseases observed today, it is envisaged to ensure the preservation of these natural species that could help restore nutritional status or maintain the well-being of populations. It could even be considered their protection or initiate regeneration tests in their natural ecosystem to control their reproduction. It remains to verify that this quantitative contribution is also qualitative to ensure the physiological and nutritional balance of man.

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