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## Investigation on The Farming, The Marketing and The Consumption of Cameroon's Pumpkin (*Cucurbita spp*).

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### ABSTRACT

In Cameroon, according to the Ministry of Health, the prevalence rate of type II diabetes in the population is 4,5 %. Several studies have demonstrated the virtues and the biological properties of pumpkin's leaves, fruits and seeds, particularly in the prevention of type II diabetes. In order to offer a platform for a good understanding of the pumpkin sector in Cameroon, leading to its improvement, this study aims at bringing out the practices and cultural conditions as well as the constraints bound to the marketing of Cameroon's pumpkin while listing consumption mode of the cultivated species. A survey was done with 120 producers, in the agro ecological zone of the Cameroon's western highlands, 125 wholesalers in the Coastal region of Cameroon and 250 consumers of pumpkins in the administrative regions of the coast of west Cameroon. The results showed that: 03 species of pumpkins are usually cultivated in the western highland area of Cameroon, *Cucurbita maxima*, *Cucurbitamoschata* and *Cucurbitapepo*. These producers (98 %) do not use chemical fertilizers. However 95 % use biological fertilizers, such as bush fire ashes, compost from plants, waste from kitchen and droppings. Pumpkins are cultivated in association with other farming activities. Wholesalers buy fruits between 200 and 500 CFA from producers. Losses are estimated at approximately 10 % of pumpkins during transportation. The retailed prices of pumpkins to the consumers vary between 800 and 2000FCFA / fruit. 97 % of these consumers eat the steamed pumpkins;86 % consume them out of food habits. It emerges from this study that the pumpkin sector in Cameroon has no standards. Pumpkin distribution and marketing network are not regulated. Pumpkin fruits are mainly consumed steamed without vegetables or soup.

**Keywords:** cultural practices; marketing; culinary modes; pumpkins.

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## INTRODUCTION

Studies showed an outbreak of non-communicable diseases bound to malnutrition such as obesity and diabetes. According to the WHO's statistics, world prevalence of diabetes for adults above 18 years old changed from 4,7 % in 1980 to 8,5 % in 2014 [1]. In Cameroon, according to the Ministry of Health, 90 % of the people with diabetes are suffering from type II diabetes, which has a prevalence of 4,5 % of the total population. Several studies demonstrated the virtues and the biological properties of pumpkin leaves, fruits and seeds, particularly in the prevention of type II diabetes, due to the low glycemic index of the pulp of the steam cooked fruit [2; 3; 4], in the fight against the deficiency in vitamin A [5]. Certain studies demonstrated the impact of the environment and the composition of the ground on the potential in nutrients and the biological properties of the cultivated botanical species [6]. Indeed, the nature and the concentration of the fruit's metabolites are under the influence of the environment, the genetic structure can be modulated by the cultural practices [7]. The cultural practices using fertilizers would have an impact on the phytochemical composition of fruits [7; 8]. In some developing countries, the growth of certain fruits and vegetables, in spite of their high nutritional value and virtues draw little attention from political decision-makers. Such is the case of pumpkins (native vegetable fruit of Latin America, the family of *Cucurbitaceae*), in Cameroon. In order to offer a platform for a good understanding of pumpkin sector in Cameroon, leading to its improvement, this study aims at bringing out the practices and the cultural conditions as well as the constraints bound to the marketing of Cameroon's pumpkin while listing consumption mode of the cultivated species.

## METHODOLOGY

The investigation on the pumpkin production in Cameroon was made in the agro ecological zone of the Cameroon western highlands, to bring out the diverse species cultivated and the cultural practices employed. The climate of this zone is the Sudanese tropical type with 2 seasons: a dry season which goes from October-November till March-April, a rainy season which begins in March-April until October-November. The temperatures oscillate between 15 °C and 30°C on average with a strong daily variation: the average temperature is 25°C. Producers constituted the target of this investigation. Investigation took place in the localities of Foubot, Baleng, Bafoussam, Bandjoun, Bayangam. The questionnaire in this investigation was articulated around the knowledge of the number of pumpkin species usually cultivated in this zone, around pumpkin farming area, using of artificial and biological fertilizers, pesticides, weed-killers, yield on farming, and identification of the various species of pumpkins by the producers.

The investigation on pumpkin marketing was made in the region of the coast-Cameroon, to better bring out the constraints there concerned. The storekeepers constituted the target of this investigation. It took place in the markets of the city of Douala: the central market of Nkolouloun, the Dakar market, the Sandaga market, the Bépanda and Bonamoussadi markets. The questionnaire in this investigation was articulated around the knowledge of the mode of storage and transport of gourds, as well as constraints bound to the marketing.

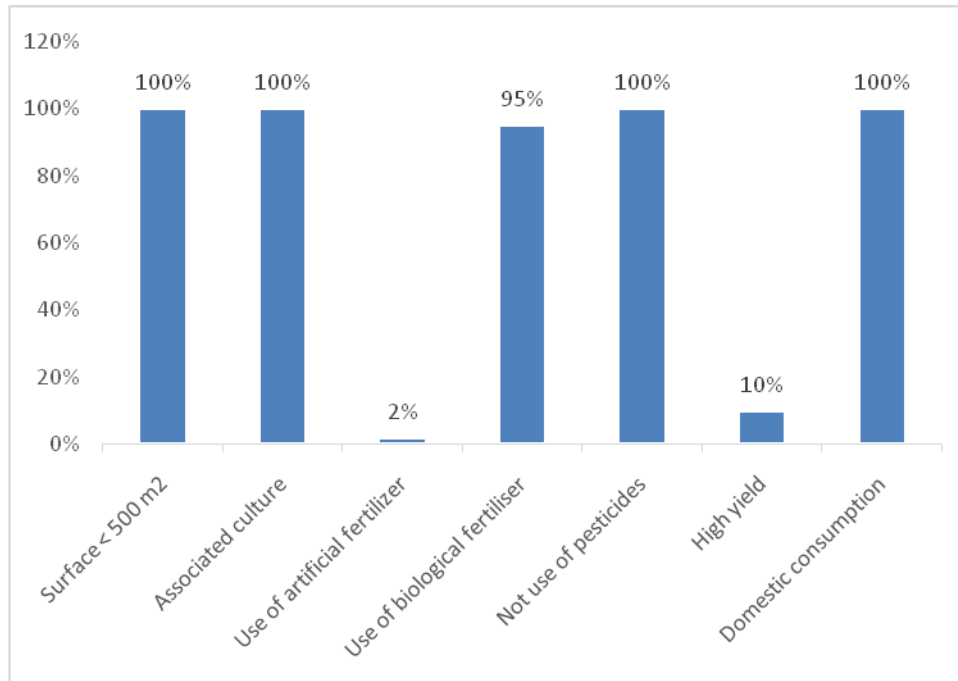
The investigation on pumpkin consumption was made in the coastal region of Cameroon. Inventory was made on the main modes of consumption, the frequencies of consumption, as well as the knowledge of their nutritional and therapeutic properties. The consumers constituted the target of this investigation. It took place in hypermarkets and aforementioned markets of the city of Douala. The questionnaire of this investigation was articulated around the knowledge of the main culinary modes and the consumption, the frequencies and the motives for consumption as well as on the knowledge of their nutritional and therapeutic properties.

These inquiries were realized by administration of a questionnaire in targets. The collected data were treated and analyzed using software Microsoft Excel.

## RESULTS

The Figure 1 above shows that all the producers (100 %) cultivate pumpkins on a surface lower than 500 m<sup>2</sup>, by using as seed the sowing of the previous harvest. The seed is made in the beginning of rainy season (month of March) and the harvest takes place between five and seven months later (from August to October). Three species of gourds are usually cultivated in this zone of the western highlands of Cameroon, *Cucurbita*

*maxima*, *Cucurbitamoschata* and *Cucurbitapepo*. However, these farmers make no difference between *Cucurbitamoschata* and *Cucurbitapepo* which they assimilate to the same species. The producers (98 %) do not use artificial fertilizer for the fertilization of the ground. *Cucurbita maxima* (photo 1) are cultivated for its leaves and its seeds which are very consumable by the local populations (90 %), whereas the fruit, not very consumable, is intended for the porcinis' food. However, *Cucurbitamoschata* (photo 2) is cultivated for its fruit and its leaves, which are very consumable by the local populations (90 %).



**Figure 1: Conditions of pumpkin farming**

*Cucurbita maxima* (photo 1) possesses a cylindrical and soft stalk, the peduncle is rounded off, of spongy aspect and not widened to the apex without ribs marked as well as with big leaves in five lobes. So called pumpkin, winter gourd, gourd turban (French), pumpkin or winter squash (English), the fruit is a big spherical bay in egg-shaped. Seeds are egg-shaped, flattened, of 1,5-2,5 cms x 1-1,5 cms, whites with brown blade, of smooth surface in a little bit rough and on board prominent [5].

*Cucurbitamoschata* (photo 2) possesses a stalk polygonal last in section, the peduncle is marked by ribs, at least five and widens clearly in the shape of pentagon on the basis. Leaves are cord forms marbled by white. Still called musk pumpkin, the fruit is a big spherical bay in egg-shaped, heavy up to 10 kg with a big variety of colors. Seeds are flattened, of 1-2 cms x 0,5-1 cms, usually white or fawn, sometimes darkened, on smooth or a little bit rough surface and prominent edge [5].

*Cucurbitapepo* (photo 3) possesses a hard stalk in section polygonal. The peduncle is in section pentagonal, not widened in the point of insertion of the fruit, contrary to *Cucurbitamoschata*. Sheets are cord forms marbled by white. Still called summer squash, the fruit is a big spherical bay in egg-shaped, heavy up to 50 kg with a big variety of colors, covered with small protruding spots, smoother, profoundly grooved. The flesh is whitish in yellow orange-colored, packaging of numerous seeds (1-1,5cms x 0,5-1 cms), usually white or fawn, on smooth or a little bit rough surface and prominent edge [5].

All the producers do not use weed-killers on their plots of land. Besides 95 % of the producers use biological fertilizers, such as ash, compost and droppings. Pumpkins are cultivated in association with other cultivation. All the producers of gourds cultivate in the first place for purposes of domestic consumption. They distinguish the species of pumpkins according to the shape of the fruit and so make no difference between *Cucurbitamoschata* and *Cucurbitapepo* whom they assimilate to the same species.

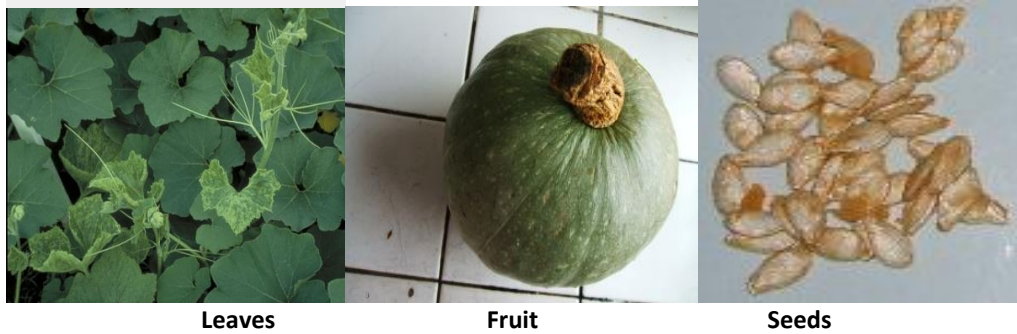


Photo 1: *Cucurbita maxima*



Photo 2: *Cucurbitamoschata*

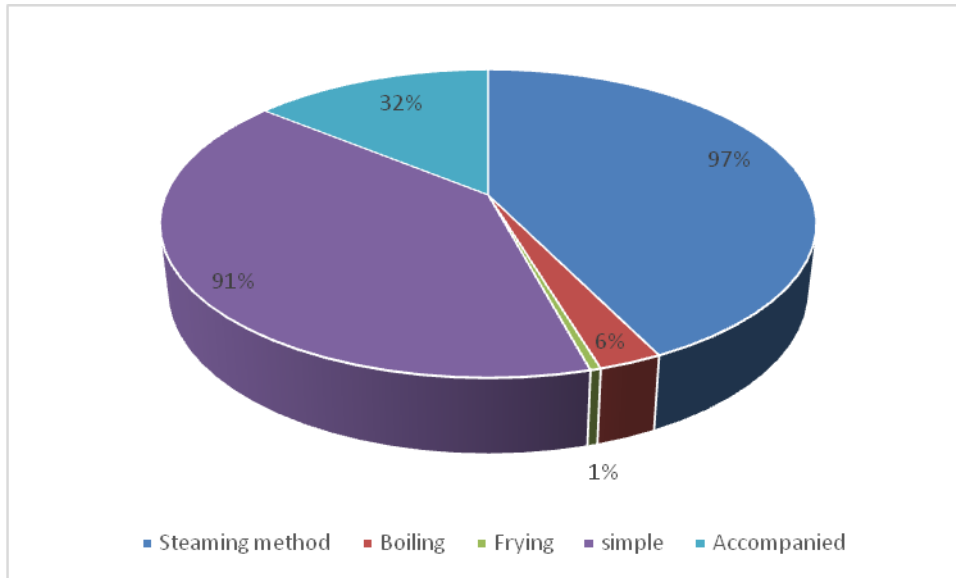


Photo 3: *Cucurbitapepo*

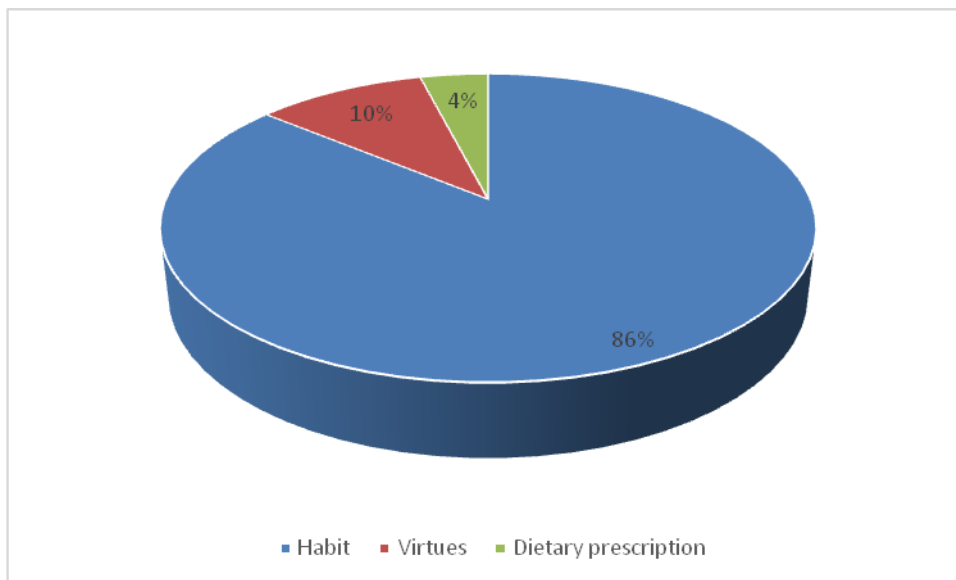
The results of inquiries with the storekeepers showed that wholesalers buy fruits between 200 and 500 CFA francs at the producers. They distinguished the species of pumpkins sold according to the shape of the fruit. These storekeepers store them in baskets and forward them to towns in trucks. Because of the bad state of the road, there are losses of pumpkins during transportation. The fruit is then resold to the consumers between 800 and 2000 CFA francs.

Figure 2 below shows that 97 % of the consumers prepare gourds by steaming them and 6 % boil them. 91 % consume them without support (accompaniment) whereas 32 % consume them accompanied with vegetables or soups.

Several reasons were presented by the consumers to justify their consumption of pumpkins (Figure3). Indeed 86 % of the consumers of gourds consume did so out of food habit; certain consumers (4 %) did so due to dietary prescription and others (10 %) did so because of the virtues present in pumpkin.



**Figure 2: The culinary modes and consumption of pumpkins**



**Figure 3: Motivation for consumption of pumpkins**

**DISCUSSION**

The seed is made in the beginning of the rainy season (month of March) and the harvest takes place between five and seven months later (from August to October), as well as in Central America [9]. The culture being made on a lower surface in 500m<sup>2</sup> (figure 1), would be bound to the fact that for these farmers, pumpkins are not an important source of income. Few farmers, that is 10 % have yields raised to the harvest, corresponding to a harvest from 06 to 08 bags of 100kg of seeds of gourds on a lower surface in 500m<sup>2</sup>; This result would be bound on one hand to the absence of use of pesticides and weed-killers by these producers of pumpkins for the treatment of their plots of land, what induce a vulnerability of shoots and losses in fruits and on the other hand in the absence of use of artificial fertilizer. However, 95 % of the producers use biological fertilizers, such as ash, compost and droppings instead of artificial fertilizers. Almost all of the producers cultivate pumpkins for purposes of domestic consumption. However the farmers sell them to the storekeepers who forward them to town for the consumption, when the yield is raised. This practice is against that of the farmers in the Caribbean, for whom pumpkins constitute a real source of income [10]. Indeed in Trinidad and Tobago, gourds are produced all year round and are an important export product and a source of currency for

the local farmers. In 2012, the total production in Trinidad and Tobago reached 1 790 tons, for a 1,3 million US dollars value on the market [10]. The farmers, in highlands of west-Cameroun, always cultivate pumpkins in association with other plants such as the Bean and the peanut. They sell them at prices between 200 and 500f / fruit, to the storekeepers-wholesalers who will go to resell them in the markets in big cities. These storekeepers store them in baskets and forward them to towns in trucks. The sale prices of pumpkins to the Cameroonian consumers vary between 800 and 2000F CFA FRANC /fruit. This high difference in price is due to losses during transportation. Because of the bad state of the road, there are losses of pumpkins during transportation. These losses would be due to the physical damages of post-harvest and in the time of transportation towards the diverse points of sale. Indeed in the Caribbean and the other developing countries, 40% of the horticultural cultures are lost before being consumed; this established fact is mainly due to high rates of physical degradation, loss of water and decay post-collects caused by microbial infections [11; 12]. As regards the various culinary modes of pumpkins in Cameroon, results show that 97 % of the consumers prepare pumpkins by steaming them, 6 % boil them. Certain consumers (91 %) consume them simple whereas 32 % consume them accompanied by vegetables or soups. However, in Latin America, fruits are usually consumed as soup and similar food, dessert or incorporated into various meals [9]. Results obtained as regards the motives for consumption of the Cameroonian pumpkins show that majority of the investigated (86 %), consume pumpkins because these are a part of their ancestral food habits. However, some consume pumpkins by dietetics' prescription (4 %) and others consume it for their virtue (10 %). Indeed several studies demonstrated the virtues of leaves, fruits and seeds of pumpkins, in particular in the prevention of the type II diabetes due to the low glycemic index of the pulp of the steam cooked fruit [2], in the fight against the deficiency in vitamin A [5], as well as in the prevention of obesity, high blood pressure and certain cancers. Certain consumers (81 %) rarely consume gourds. This result would be bound to the ignorance of the population as well as to the unavailability of gourds in the Cameroonian markets.

### CONCLUSION

Summary, it was necessary to take out again the practices and the cultural conditions as well as the constraints bound to the marketing of Cameroon's pumpkin while listing the diverse modes of consumption of the cultivated species. In fact Cameroon's pumpkin sector has no standard. The culture is relieved in the second row by the farmers who cultivate them on low plots of land. Pumpkins are cultivated in association with other farming activities. Producers do not use artificial fertilizers nor pesticides and weed-killers. The producers cultivate *Cucurbita maxima* especially for its seeds and its leaves. *Cucurbitamoschata* and *CucurbitaPepo* was cultivated especially for their sheets and their fruits which are mainly consumed in the steaming form without accompaniment with vegetables or soup. The pumpkin's distribution and marketing network is not regulated. Pumpkins are consumed by certain people due to food habit and by others because of their virtues.

**Conflict of interest:** No conflict

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