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Research Article

## Ethnobotanical Studies on Food and Medicinal Uses of Four Amaranthaceae in Mossi Plate, Burkina Faso

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### Abstract:

An ethno botanic survey, aimed at the inventory of the food and medicinal uses of amaranth as vegetable of mossi plate, Burkina Faso was carried out with the collaboration of the urban and rural populations. The use of the amaranths as vegetables is developed in the area of Ouagadougou. Most known are *Amaranthus dubius* Mart. Ex. Thell, *Amaranthus graecizans* L., *Amaranthus hybridus* L. and *Amaranthus viridis* L. *A. hybridus* is used and is abundantly cultivated; however the others are more or less wild. These plants are as well used by the human ones as by the animals. They are used for much dish in the kitchen. The chemical compositions are badly known. These plants are very little used in traditional medicine.

**Keywords:** Ethnobotanical Studies, Amaranthaceae, Wild Plants

### 1.0 Introduction:

The majority of the countries in development process depend on foods containing starchy like principal food for the provisioning of energy and protein. This partly explains the protein deficiency which reigns among the population and recognized by FAO (Ladeji et al., 1995). In BURKINA FASO, as in the majority of the other tropical countries of Africa where the daily mode is dominated by starchy foods, the vegetables are easily sources available of proteins, vitamins, minerals and acid amino essential (Okafor, 1983). Many local vegetables are under exploited because of insufficiency of scientific knowledge on their food potential

The family of Amaranthaceae is very widespread in the tropical areas and is generally African and American. It is cosmopolitan, especially characteristic of the ruderal, arid or saline habitats and is characterized by the presence of betalain, the flowers with papery perianths, the ovules with basal placentation. In West Africa, one counts 14 kinds and 37 species (Hutchison and Dalziel, 1954). In Burkina Faso, it is represented by 11 kinds and 20 species. Only the species of the kind *Amaranthus* and *Chenopodium* find their place in the food. The family also includes some decorative species in the kind *Alternanthera*, *Celosia* and *Gomphrena*.

The leaves of amaranth constitute an inexpensive and rich source of protein, carotenoids, vitamin C and dietary fiber (Shukla et al., 2006), minerals like calcium, iron, zinc, magnesium (Kadoshnikov et al., 2008; Shukla et al., 2006), and phosphorus (Ozbucak et al., 2007). The use of these vegetables in traditional medicine was also reported (Nsimba et al., 2008; Nacoulma, 1996). The purpose of this work is to collect food and medicinal uses of amaranth in order to guide research on the nutritional and anti-nutritional factors and for better framing the consumption of these plants.

### 1.1 Site of Study:

Located in the center of Burkina Faso, the Central Plate Mossi is located between 11th and 16th parallels. This area of Burkina Faso is a vast plain with the Precambrian base makes granites and of residual sedimentary rocks (lateritic ferruginous armors) with altitude average of 350 m. Central Plate Mossi fits between 11°24' and 11°29' of Latitude North and between 0°49 and 0°54 of Western Longitude. Burkina Faso climate is characterized by a long dry season (from October at the end of April) and a short rain season (from May to September). Apart from urban centers, the principal economic activity is agriculture of subsistence (INSD).

## 2.2 Material and Methods:

The investigation related to the five following species primarily: *A. dubius*, *A. graecizans*, *A. hybridus*, *A. spinosus* and *A. viridis*. It was held according to a card of investigation. The language of communication used was moore and French. It was held on 9 sites including 4 markets with Ouagadougou (Katr yaar, Dasasgho, Samandin, Kossodo), 4 markets in the surrounding rural communes of Ouagadougou (Saaba, Kamboinssin, Loubila, Koubri) and in a village (Ipala) located at 12 km of Ziniare. Fifty one (115) people of the age bracket 25 to 60 years and more were surveyed.

The general objective was to have all local knowledge on the use of the amaranths in the area of the central plate mossi. That is articulated around the following points:

- Food mode of use of the amaranths
- Sources of provisioning
- Context of consumption
- Inventory of fixtures of the culture of the species of amaranths
- Social groups which use the plant at food purposes
- Therapeutic qualities of the amaranths.

## 3.0 Results and Discussion:

**Table1: Amaranth uses**

Plantes		<i>A. hybridus</i>	<i>A. dubius</i>	<i>A. spinosus</i>	<i>A. graecizans</i>	<i>A. viridis</i>
Food uses	Human	86.27%	100%	52.94%	56.86%	61.24%
	Livestock	86.27%	100%	84.31%	45.09%	27.01%
Consumption context	Food insufficiency		5.88%	41.17%	9.80%	7.85%
	Food sufficiency moment	86.27%	90.19%	11.77%	47.06%	58.60%
Used parts	Leaves stems	86.27%	96.25%	0%(tige épineuse)	56.86%	56.05%
	leaves		3.7%	52.94%	0%(feuilles trop petites)	27.30%
Types of meal		*Baabenda *Leaves sauce *Groundnut sauce	*Baabenda *Leaves sauce *Groundnut sauce	*Baabenda *Leaves sauce *Groundnut sauce *Couscous in leaves	*Leaves sauce *Couscous in leaves	*Baabenda *Groundnut sauce *Leaves sauce
<b>Cooking Procedure</b>						
Direct cooking with other meal components		86.27% (10% recommend to boil before)	98.03% (47% recommend to boil before)	22.65%	6.36%	75.56%
If cooking separately, how many time		0%	0%	30.33% approximately 30 mn	37.25% approximately 30 mn	7.25% Approximately 30 mn
Nutritional contribution		Vitamin (9.40%)	Vitamin (1.88%)	Unknown	Unknown	Unknown
<b>Medicinal Use</b>						
Medicinal uses		Constipation, diuretic (3.77%)	Constipation fever, stomach ache (5.65%)	Diuretic, furoncle, burns (7.54%)	Vermifuge (1.88%)	Diuretic, purgative (3.77%)

Baabenda is a traditional meal prepared with cereals and leaves.

**Table2: Cultivation potential**

Biodiversity- Cultivation Potential						
Species	Plants	<i>A. hybridus</i>	<i>A. dubius</i>	<i>A. spinosus</i>	<i>A. graecizans</i>	<i>A. viridis</i>
	Wild	11.76%	80.39%	52.94%	56.86%	60.08%
	Cultivated	72.54%	3.04%			
	Introduced	1.25%				
	Local					
Preferred growing characteristics	Fertile soil + NPK	66.66%	58.82%	33.33%	19.60%	40.12%
	Black soil	17.64%	19.60%	23.52%	15.02%	12.55%
	Sandy soil			1.2%	23.52%	

**Table 3: Comparison of the use of the amaranths in town and rural areas**

Species	<i>A. hybridus</i>	<i>A. dubius</i>	<i>A. spinosus</i>	<i>A. viridis</i>	<i>A. graecizans</i>
Rural	68.96%	100%	96.55%	94.41%	93.10%
Town	100%	100%	72.72%	42.10%	31.81%

At the end of this ethno botanic investigation, it arises that:

- The surveyed people are of an age equal to or higher than 25 years with approximately 50% in section 35-55 years. The amaranths in a general way are appreciated as well by the human ones the animals. They are consumed by all the sections of the population, secured with the poor and the children to the old people.
- All use the sheets for consumption, with a preference for those which are quite young people and fresh. The potential source of provisioning is the market (80.39%) for the towns men and the field (70.58%) for the villagers. The price of the amaranths on the market is considered to be accessible by all (80.39%).
- The amaranths are not consumed raw like salad. The mode of preparation is varied. Some consume them boiled with or without couscous (47%), others use it in groundnut sauce (94.11%). Very few therapeutic uses were mentioned (5%).
- The majority of people cooks the amaranth in a great volume of water and throws the water of cooking probably containing soluble nitrates and oxalate.
- The majority of the edible sheets including the amaranths are seldom consumed only. The various species of amaranths are always prepared in partnership generally between them or with species as *Cleome gynandra*, *Cleome viscosa* (Capparidaceae), *Hibiscus sabdariffa* (Malvaceae), *Basella alba* (Basellaceae).
- The use of *A. spinosus* is in reduction, and one regards it more and more as a food of famine (41.17%). It is said that it has a bitter taste and is usually consumed in small quantities as substitute when no other vegetable is available.

- This reveals that the very great food use of the amaranths masked a however mentioned therapeutic use by some (5%) and by certain authors.
- The importance of the use of the amaranths varies according to whether one is in shift or down town (Table 3). *A. hybridus* is less known in shift and that could be explained by the fact why some (1.25 %) mention that it like exotic plant. On the other hand *A. viridis* and *A. graecizans* are less known in town.
- In addition, many people collect in the dustbins black soil resulting from the rot of various wastes and use it to fertilize the gardens. The products which leave are likely to contain dangerous heavy metals with consumption (Margiotto and al., 1997).

#### 4.0 Conclusion:

The general objective of this work was to contribute to the valorization of the medicinal and food plants of Burkina Faso, through the collect of food and medicinal uses of *Amaranthus dubius* Mart. Ex Thell, *Amaranthus graecizans* L, *Amaranthus hybridus* L, *Amaranthus spinosus* L. and *Amaranthus viridis* L. These plants are more or less known by the populations on the food level. On the other hand they do not know any much about probable medicinal use of these plants. It is advisable to undertake studies in order to evaluate the nutritional and anti-nutritional factors of these species; too it will be necessary to evaluate toxicity related to the soil used like manure.

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### References:

- 1) Ladeji O., Okoye Z.S., Ojobe T., 1995. Chemical evaluation of the nutritive value of leaf of fluted pumpkin (*Telferia occidentalis*). Food Chem. 53: 353-355.
- 2) Okafor J.C., 1983. Horticultural Promising indigenous wild plant species of the Nigerian Forest zone. Acta Hort. 123: 165 – 176.
- 3) Nacoulma O. G., 1996. Plantes médicinales et pratiques médicales traditionnelles au Burkina Faso: cas du plateau central. Thèse d'état, Université de Ouagadougou, Tomes I et II; 320 p. et 254 p.
- 4) Nsimba R. Y., Kikuzaki H. & Konishi Y. (2008). Antioxidant activity of various extracts and fractions of *Chenopodium quinoa* and *Amaranthus* spp. seeds. Food Chemistry, 106: 760-766.
- 5) Margiotto M. & Moustier P., 1997. Rapport du groupe de travail. Agriculture périurbaine,
- 6) approvisionnement et distribution alimentaires des villes de l'Afrique francophone, Actes du
- 7) Séminaires sous-régional, FAO-ISRA.