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Review Article

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Seeds of Alpiste (*Phalaris canariensis*) and Niger (*Guizotia abyssinica*) as Unconventional Food Plants: A Review of the Literature

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Abstract

Non-conventional food plants (PANCs) are plants that have largely their structure, satisfactory amounts of nutrients beneficial to the human body and can be used directly in human food. They are classified as PANCs: Roots, seeds, rhizomes, bulbs, stems, leaves, shoots, flowers and fruits, which naturally grow in streets, backyards, plantations and are known as "Matos" or "weeds", however, have food importance and nutrition [1]. Some species of PANCs can be totally unknown, of restricted uses, limited geographic distribution, but with great potential for flavor, culinary versatility, resilience and rusticity in nature. These plants may possess unusual processing methods, lower market value or be marketed in small scales [1]. The objective of this review article is to highlight the nutrition value and food properties of the seeds of birdseed (*Phalaris canariensis*) and Niger (*Guizotia abyssinica Cass*), being these plants, are classified The PANCs.

Keywords: Pancs; Unconventional Flours; Nutritional Properties

Nutritional properties of Niger (*guizotia abyssinica Cass*) and birdseed (*Phalaris canariensis*)

The Niger (*Guizotia abyssinica Cass*), is an annual erect shrub, cultivated mainly for its high oil content. Some countries that use large amounts of vegetable oil, such as Ethiopia and India, are the main producers of the Niger and cultivate it, in conventional farming systems [3-5].

The birdseed (*Phalaris canariensis* L.) is a perennial forage grass considered a smaller cereal crop, with production practices and a life cycle similar to other crops of winter seeds, such as spring wheat (*Triticum aestivum* L.), barley, rye and oats, being the only species of the genus cultivated for seed production [5]. Before the decade of 1990, the birdseed was not considered viable for human consumption due to the spirits (hairs in the bark of the grain), which cause irritation when they come into contact with the skin or human lung, besides being associated with esophageal cancer. However, this problem was solved from mutagenesis to create seeds of birdseed without Pelos [6].

Containing significant nutritional properties, the birdseed flours [6,7] and Niger [8,9], can be classified according to the table of nutritional composition of the two seeds, shown in table 1.

Components	Average quantities/100g of Niger seeds	Average quantities/100g of birdseed seeds
Protein	23.50 g	7.90 g
Starch	36.50 g	23.70 g 7,3 g
Fatty acids	50.00 g	7.70 g
Fibers	11.00 g	7.30 g
Ashes	5.85 g	2.30 g
Calcium	318.50 mg	40.00 mg
Iron	59.50 mg	6.50 mg
Phosphorus	490.00 mg	64.00 mg
Thiamine	27.50 mg	0.85 mg
Riboflavin	0.38 mg	0.16 mg
Niacin	3.66 mg	0.68 mg

Table 1: Nutritional value of the seeds of Niger and birdseed (for 100 g of seeds).

Fonte: Ramadan, 2012; Thatte, Lakshmi, 2011; I'm Abdel-Aal. *et al* (2011) e Cogliatti (2012).

The iron values of the Niger are values approximately six times higher than the values found in the "Carioca" type bean (9.31 mg per 100g of beans) [9,10]. The Niger has high levels of tocopherol (720-935 μg g^{-1}), being 90% α-tocopherol, an antioxidant that increases the stability of the oil and acts in the prevention of cardiovascular diseases and inflammatory processes in general [4].

On the birdseed, according to Abdel-Aal and Collaborators [7], the birdseed has significant levels of tryptophan (2.8 g per 100 g of birdseed), compared to 1, 1g/100g of wheat flour. The birdseed flour stands out as a healthy option for the preparation of breads, since its starch content is lower when compared to wheat (55% in the birdseed to 73% in wheat). The birdseed also contains high amounts of carotenoids such as lutein (2.667-3370 M g/kg) and Betacarotene (4946 M g/kg), when compared to wheat, which has 674-2111 M g/kg and 176-362 μ g/kg, respectively [11,12]. Such carotenoids are natural antioxidants that assist in the prevention of chronic-degenerative diseases and should be obtained from the diet. Lutein has a role in the health of the eyes and skin because it constitutes the pigments in the human retina. Betacarotene plays an important role in the biosynthesis of vitamin A factor this occurring in cell reproduction [11].

Food properties of Niger (*Guizotia abyssinica Cass*) and birdseed (*Phalaris canariensis*)

In Brazil, the seeds of Niger are marketed in its vast majority, as feed for birds, but some people use the bud as food [1]. There are no reports of its use in the form of flour for the enrichment of products, but its seeds can be consumed fried, such as seasonings for vegetables or used as degreasy flour mixed with honey, being a delicacy for making Cakes [13]. The use of níger seeds in human food is limited, because the dark coloration and high concentration of fibers makes the consumer opt for clearer and more everyday seeds. However, because it is oilseed, the use of Niger flour can be an excellent option for nutritional enrichment of meals, which increases the caloric intake, iron, proteins, antioxidants, as well as improvements of texture effect in the food [8].

The seeds of birdseed can be used as ornamental plants in tropical and temperate regions of the world, as well as feed for birds and raw material for glue in the textile industries. Its use in human food is based on the use in soups, sweets and pastels, being more used in the East [14]. Because it does not have gluten fractions in the composition, the birdseed flour can be used to enrich preparations such as breads and biscuits [7]. According to Abdel-Aal and Collaborators [7], breads made with up to 25% of seeds of birdseed presented rheological characteristics such as color of the crumb, crust and specific volume similar to the breads made only with flour of wheat.

Conclusion

This article briefly reviewed the nutritional and dietary properties of seeds of birdseed and niger, thus verifying that the niger seed has in its composition a high content of protein, starch, fatty acids, minerals and dietary fibers in its composition when compared to the flour of niger seed. birdseed that has essential amino acids and antioxidants, elements that help increase the nutritional intake of foods developed with these seeds, consequently increasing the caloric intake in meals. In addition, Niger and birdseed seeds may be an unconventional food option, given the unconventional seed market and application in gluten-free products in view of its non-component composition.

Conflict of Interest

The authors declare no conflict of Interest.

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