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Diplazium sammatii: Athyraceae ('Nyama Idim'): Age-related nutritional and antinutritional analysis

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Abstract. Tender and mature leaflets and leaves of *Diplazium sammatii* (*'Nyama idim'*), were separately investigated for their nutritional and antinutritional properties. Results showed little difference in proximate nutritional contents between tender and mature leaves, except for crude fat, which was present in levels 1.5 times higher in younger than in older leaves. Crude fiber levels were low. Zinc (Zn) and copper (Cu) were higher in younger leaves (6.8 and 3.5 mg/100 g dry matter, respectively, compared to 4.5 and 2.5 mg/100 g dry matter, respectively in older leaves). Older leaves contained higher levels of iron (Fe): 6.7 mg/100 g dry matter, in comparison to 4.3 mg/100 g dry matter, in young leaves. Oxalate levels were slightly higher in younger than older leaves. However, the reverse was true for tannin content. Both antinutritional compounds were present in levels which should be safe.

Key words: Antinutrients, *D. sammatii*, Leaf maturity, Minerals, Proximate composition

Introduction

Traditionally, the dishes, especially the soups, eaten by the peoples of Akwa Ibom State of Southern Nigeria are rich in vegetables of various types. The leafy green vegetables include a very wide, diverse array of such vegetables, the majority of which have not been researched nor reported in the literature.

One such vegetable that is considered a rare delicacy by the rural dwellers of Akwa Ibom is *Diplazium sammatii*. The plant is a fern of the family *Athyriaceae*. It is referred to as 'Nyama Idim' in the Ibibio language, translated to mean 'the shining brightness of the stream'. It is found growing profusely on the banks of village streams. It is becoming extinct in the state because of increased pollution of streams by industrial effluents as well as reduced harvesting, following massive rural migration of rural dwellers to urban areas.

The fronds are pinnate with an odd terminal pinna. The pinnae margins are crenate and accurately serrate, the veins are close and sub-parallel. It is specifically found terrestrially on the banks of streams and marshes at low elevations [1]. The edible parts are the young pinnae and croziers which are

usually harvested in the wild. The plant has not been cultivated, even though it is a common delicacy.

Haynes [2] commented that various parts of the fern saprophyte have been eaten by various people throughout the world. Frond tips, as well as entire croziers, are regularly harvested by rural peasants from the tropics. However, he asserted that far from being an emergency or 'primitive' type of food, ferns have provided the basis for gourmands the world over. Fiddleheads, he reported, are imported by some of the best restaurants, to be served as 'exotic' food.

Hitherto, the nutritive value of *D. sammatii* has not been investigated to justify its continued use by people and to encourage its cultivation or bioconservation. The purpose of this work was, therefore, to address this research paucity.

Materials and methods

Fresh fronds of *Diplazium sammatii* were harvested from a stream in Afaha Oku Village of the Uyo Local Government Area of Akwa Ibom State in Southern Nigeria. Both young sterile fronds as well as mature sporulating ones were collected. The pinnae were carefully detached, washed with distilled water and spread on fresh clean sheets of blotting paper on a glass-topped bench surface to air-dry.

Young and mature leaves were treated as separate samples. After air-drying, samples were weighed and oven-dried (Gallenkamp Blue M) at 60 °C for 48 hrs. They were then milled to a fine powder (National – MX 491N) and stored in air-tight, brown containers. All samples were analyzed in triplicate.

Proximate analyses of samples were carried out according to the methods of AOAC [3] : 7.003–7.006 for moisture, 7.009 for crude ash, 7.025–7.032 for crude protein, 7.061 for crude fat, 7.066–7.074 for crude fiber and 3.013–3.016 for minerals. Carbohydrate content was determined by difference. A summation of the multiplied means for protein, fat and carbohydrate using respective Atwater factors (4,9,4), provided caloric values. Oxalate was determined by the permanganate titration method of Dye [4], hydrocyanic acid by the sodium hydroxide/silver nitrate titration method of Harbone [5] and tannins by the vanillin-HCL method of Burns [6].

Standard deviations for triplicate determinations, followed by students 't' test, were used for statistical analyses. Significance was accepted at $p \leqslant 0.05$.