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Analysis of *Asparagus africanus* (LAM) for some hair growth – stimulating elements

A.M. Lohdip* and T.T. Tyonande
Department of Chemistry, University of Jos
Jos – Nigeria

ABSTRACT

The stem of *Asparagus africanus* (Lam) was analysed for the presence of iodine and some metals which are believed to stimulate hair growth. The ash content of *A. africanus* was found to be 24.77 ± 0.38g/kg (wt of ash/wt of raw sample powder). Analysis by atomic absorption spectroscopy (AAS) showed that K, Zn, Fe, Cr, Mg and Mn were found to be present, while the sodium fusion test revealed the absence of iodine.

*Author for correspondence

INTRODUCTION

Asparagus africanus (Lam), (African asparagus) is one of five species of Asparagus. It is a perennial woody shrub with a single stem with thorny branches. It could grow up to five meters high under certain environmental condition [1]. *A. africanus* can be found in most parts of Nigeria. In Nigeria the Hausa call it 'Kayar Bera' (Rat's thorn) or 'Kayar Kandangare' (Lizard's thorn), the Tivs call it 'Kpamberakpa' (it can hook and tie you down) and the Tarohs in Plateau State call it 'Ngbamin'.

It is used as part of an ointment by women to stimulate hair growth, and used medicinally as a remedy for haematuria (blood in urine) as a diuretic (increases the passage of fluid outside the body) and as a remedy for syphilis [1]. Hair is 90% protein (Keratin) and 10% moisture [2]. There are so many factors that affect the growth of hair; some of which are due to hormones and cytokines products naturally produced in the body. The hormones include adrogens, estrogens, thyroxines, etc, cytokines are chemicals that act in a hormone-like manner [3,4]. Ribonucleic and (RNA) and deoxyribonucleic acid (DNA) also help in protein synthesis, and hence in hair growth. This implies that factor such as folic acid and vitamin B_{12} which are vital for the synthesis of some building blocks of RNA and DNA is necessary for hair growth. More vitamins and minerals are also necessary [3]. The vitamins and minerals that are helpful for improving hair growth are vitamins A, B, B_6, B_{12}, B_{17}, C, D, E and K, Biotin, Calcium, Choline, Chromium, Copper, Iodine, Iron, manganese, Magnesium, Potassium, Selenium, Folic Acid, Linoleum Acid, Inositol, Lecithin, parapbenzoic Acid, Amino Acid etc. [5]. Other factors that could affect the health of the hair include genetics, environmental circumstances, change of weather, etc. [3].

This work is limited to the determination of the elements – Ca, Cr, Cu, Fe, Mg, Mn, K, Se and I that have been reported to help in hair growth.

EXPERIMENTAL

Sample Collection and Preparation

The stems of *Asparagus africanus* (Lam) were collected in January from Gboko in Benue State of Nigeria. It was identified by some local medical herb sellers and by the Head of Department of Horticulture and Landscape Technology, Federal College of Forestry, Jos, Plateau State. The plant was washed with water and dried under the sun for two weeks and then pulverized.

Preparation of Sample for Elemental Analysis

The sample (2g) was ashed in triplicate in a furnace at 600^{o}C for 24 hours. The ash content was determined as gram per kg of the dried crude sample [6,7].

The ashed samples were then digested using 10ml of conc HCl and $HN0_3$, and 10ml of distilled water. These were filtered and the filtrates kept in clean plastic containers. Determination of the metals were done using PYE Unicam SP9 Atomic Absorption Spectrophotometer (AAS). The determinations were done in triplicate.

Qualitative determination of iodine

The qualitative determination was carried out on the powdered sample (2.0g) by the Sodium Fusion (Lasaigne's) test as described by Furniss *et al.* [8].

RESULTS AND DISCUSSION

The results for the ash content analyses for metal and iodine contents of the sample are as shown in Tables 1 and 2.

The result showed that I, Cu and Ni were not detected in *A. africanus* (Lam). However Zn, Fe, Mg, Mn, K and Cr were found to be present.

The presence of these metals in *A. africanus* supports the claim that the plant is used in ointment for hair growth since these metals have been reported to be useful for improving hair growth [3,5]. It has been

Table 1: Result of ash content analysis for *Asparagus africanus* (Lam)

S/NO	Xi g/kg (wt of ash/wt of crude sample)
1	25.20
2	24.60
3	24.50
S =	74.30

The standard deviation was calculated from the data above as 0.38

.: The ash content for *Asparagus africanus* (Lam)

= 24.77 ± 0.38 g/kg

Table 2: Result of analysis of hair-growth stimulating metals and iodine in *Asparagus africanus* (Lam) in mg/kg (wt of metal/wt of raw sample)

S/No	Metal	Concentration (mg/kg)
1.	Cu	ND*
2.	Zn	0.594 ± 0.02
3.	Fe	0.489 ± 0.09
4.	Mg	9.780 ± 0.06
5.	Mn	0.465 ± 0.01
6.	K	0.310 ± 0.02
7.	Cr	38.948 ± 1.44
8.	Ni	ND*
9.	I	ND*

*ND = Not detected

reported that Zn deficiency leads to impairment of DNA and protein synthesis, and without the proper formation of nucleic acids, the cell replication and hence hair growth cannot occur; Zn deficiency also leads to coarse and sparse hair [3]. Cr, Mn, Ni and Fe have been found to be present in RNA, suggesting their importance in the Kreb cycle of oxidative energy production adequate glycogen which is vital for hair follicle growth [3]. These metals, especially Mn and Fe, must be present for optimal function of the Kreb cycle. Without optimal function of the Kreb cycle, adequate high energy phosphate bonds cannot be produced for building up.

CONCLUSION

Even though it has been pointed out that hair growth depends on a combination of factors, it has also been agreed that vitamins, minerals and other nutrients are important to hair growth. This therefore means that our result presents *A. africanus* (Lam) as a promising ingredient for hair food since a vast number of hair-growth – stimulating metals are found present.

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