

POTENTIALS OF CORN HUSK AS INDUSTRIAL RAW MATERIAL

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Abstract

Corn popularly known as maize (*Zea mays*) span both domestic and industrial uses. The cobs usually thrown away after removing the seeds were analyzed to x-ray their chemical composition in relation to their possible uses. Chemical studies carried out on the dried cobs revealed that they have moderately low moisture content (MO5%) while dry matter like ash content (A.C. = 1.35%), crude protein (C.P=3.50%) and crude lipid (C.L. 0.864%) were relatively low bulk high in crude fibre (C.F. = 31.24%) and carbohydrate content (C.C. = 63.05%). The mineral composition of the cobs were relatively low with phosphorus (P=0.85%) and calcium (Ca=0.902%) accounting for the highest in mineral contents. The least of the minerals was sodium (Na = 0.191%) while potassium and magnesium have (k = 0.475%) and (Mg = 0.608%) respectively. The **an ions-carbonates** and hydroxides were found to be $Co_{3^{2-}} = 0.24g/l$ and $OH = 0.64g/l$ respectively. The pH of the sample extract was 8.10 while the pH of the ash extract (**filterate**) and concentrated alkaline solution were 9.9998 and 10.37 respectively which can be useful for soap making while the fibre could be useful in feed formulation and pulp making. ^{^^}*Corresponding Author*

Introduction

Corn popularly called maize (*Zea mays*) is an annual monocotyledon plant that tolerates almost all climatic conditions. Even though it is a warm weather plant, it grows in both temperate and tropical climates.

The production and utilization of maize rank second among the cereal family and span both domestic and industrial purposes. It serves essentially three main purposes which include: as staple food for man, feed for livestock and raw material for so many industrial purposes and products.

The utilization of corn as food and as raw material for industrial processes is attributed to its large nutritive value. Domestically, corn is eaten either roasted or boiled and milled to produce pap and other dishes. The cobs after removing the seeds or grains are usually thrown away. Thus, this study tries to examine the chemical contents of the corn husks (cobs) and the possible uses of the cobs in relation to some useful application.

Material and Methods

The corn husks (cobs) were sourced locally within Oboro in Ikwuano L.G.A. of Abia State. The cobs were recovered after removal of the seeds and adequately sun dried. Some quantities of (he dried cobs were ground into powder with a grinder and used for analysis.

The moisture content was determined by the oven drying gravimetric method, ash content by the muffle furnace method, crude protein was determined by the micro Kjeldahl Nitrogen method while crude lipid was analyzed by the sox let ether extraction method at 65 C and crude fibre was determined from the residue of either extraction using the weed method, all determined according to AOAC(1986).

The mineral content (Macro elements) were analyzed by the wet acid digestion method using H_2SO_4 - selenium - salicylic acid mixture for multiple nutrient analysis to extract the sample digest. Specifically, the digest was used to determine calcium and magnesium using the Ethylenediamine tetraacetate - EDTA versenate titration method, sodium and potassium were determined using the flame photometric method and phosphorus was by the vanado molybdate yellow spectrophotometric method as described by Udo and Ogunale (1988).

The double indicator titration method as described by Basset et al (19S8) was used for both levels of carbonate, and hydroxide determination while pi 1 was determined using the glass electrode pH meter in a 1 : 10 sample/water ratio of titrant extract.

Black soap was prepared using the method of Ogazi (1996) after Alteration and concentration of the ash filterated by beating and evaporating the alkaline solution at 1090 and saponified with heated/bleached palm oil to a thick black foamy mass of soap. The soap solution was tested in a test tube for lathering.

Table of Results

Table 1: Proximate Analysis of Corn Husk (%)

Sample	Moisture Content % Wet Weight	Crude Fibre	Crude Lipid	Crude Protein	Ash	Carbohydrate by Difference
Corn Husk	5.70	31.24	0.864	3.50	1.35	63.05

Table U: Mineral Composition of Corn Husks (%)

Sample	Potassium	Sodium	Calcium	Magnesium	Phosphorus
Corn Musk	0.475	0.191	0.902	0.608	0.875

Table 111: Levels of Carbonates, Hydroxides And Ph Values

Sample	Car_bonates(g/l)	Hydroxide (g/l)	PH
Extract	0.24	0.64	8.10

Table: IV pH Values of Alkaline Solution of Ash

Sample	PH of Warm Filterate	PH of Concentration Alkaline Solution
Ash extract	9.98	10.37

Discussion of Results

Proximate analysis (Table 1) showed that the cobs have moderately low moisture content, relatively low crude ash, crude protein and crude lipid contents but high in crude fibre and carbohydrate content. Protein, lipids and carbohydrates could be useful if incorporated into animal feed formulation to provide some essential organic nutrient which are major dry matter feed materials. The fibre content could also be useful if incorporated into animal feed because it could provide the necessary roughages to ease out the incidence of constipation and digestive problems thereby facilitating bowel movement, increasing stool bulk and lowering of blood sugar and cholesterol (Forth, 1990). The fibre also accounts for the use of the cobs as raw materials for pulp and abrasives or fillers manufacture and wood panels. Also it could be used as a cheap source of fuel and in making charcoal (Rwanet, 1987).

The minerals as illustrated in (Table II) are relatively low with phosphorus and calcium accounting for the highest. The minerals are useful and required by both plant and animal. Several crops like yams, canara, maize, melon etc. require the minerals for growth, root and leaves development (Ajayi et al. 1991). Potassium is useful in soap making. The ash extract from the cobs can be useful in black soap production with reasonable extent of lathering. The ash could also serve as a cheap local potash that could be used in the preparation of Ngu an Igbo delicious meal by stirring the ash extract with palm oil to obtain a yellowish sauce which could be used for eating trifoliate yam and African traditional salad - Ugba. The cobs generally are useful in the manufacture of some organic industrial solvents like furfural (Rwanet, 1987).

Conclusion

Useful materials are contained in corn husks (cob) as revealed by proximate analysis of the cobs and could be used in animal feed formulation. The cobs also contain useful minerals from which local black soap can be prepared from the alkaline solution of the ash. The alkalinity of the ash is also-useful for soil conditioning and could be used in reducing solid acidity. The cob generally serve so many other industrial purposes,

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