



The Analysis of the Phytochemical Content of Some Edible Grains Marketed in Kotma Colliery M.P.

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ABSTRACT

Food grains represent the main supplementary energy source in starchy food-based diets consumed by large segments of people. Three food grains (groundnut, millet and wheat) commonly consumed in Kotma Colliery analysed for their phytochemical content. The results revealed that the grains contained 0.62-1.24% alkaloid 0.72-1.78 % flavonoid 0.02-0.08 % saponin 0.46-0.60 % tannins 2.43-2.64 % phenols and 0.21-0.31 phytic acid..Dietary implications of these constituents are highlighted.

Key words: Phytochemical, Anti-nutritional factors, Food Grains.

INTRODUCTION

Food grains represent the main supplementary energy source in starchy food-based diets consumed by large segments of people. Generally grains have found good applications in food products and animal feeds. They are good sources of metabolizable energy, dietary minerals, proteins, carbohydrate and vitamins.

Food grain legumes e.g. beans, lentiles, groundnuts, breadfruit, etc. have high nutrient bioavailability, particularly high protein, which allows them to serve as excellent protein supplements to cereal grains. According to Philips

and McWaters cereals and food legumes provide a great part of dietary nutrients for large populations of people living in developing countries where protein-rich foods are expensive.

In addition to their nutritionally useful constituents, grains have been found to contain phytochemicals and anti-nutritional factors, which constitute a great health hazard. Thus the nutritional value of food grains can be divided into positive factors, which are nutritionally beneficial and the negative factors, which are non-beneficial. Ahmad et al., have identified the positive factors as high protein and fibre while the negative factors include anti-nutritional constituents like polyphenols, tannin, phytate, enzyme (Trypsin) inhibitors etc.

According to Aletor and Adeogun, the presence of inherent anti-nutritional components in plants is a major factor affecting the nutritional value of food and feeds. The objective of this study was therefore to estimate the phytochemical constituents and anti-nutritional factors present in selected food grains from markets in the Kotma Colliery.

EXPERIMENTAL

The millet, wheat and groundnuts used in this study were randomly purchased directly from markets in Kotma Colliery. The grain samples were sorted to remove foreign materials, washed, dried and bottles till required for analysis. ground into uniform powder and stored in labeled air-tight.

Phytochemical analysis

Alkaloid contents of the samples were estimated by the alkaline precipitation method described by Harborne. Total phytate contents of the samples were determined using the spectrophotometric method described by Hang and Lantzsch while saponins were quantified according to the method described Obadoni and Ochuko. Flavonoids were determined following the method of Bohm and Kocipai-Abyazan. Total phenols were determined according to the Prucian Blue spectrophotometric method described by Price and Butler while tannins were estimated using the Folin-

Dennis spectrophotometric method described by Pearson.

Statistical analysis

Three replicate samples of each food grain from each of the states in the study area were analyzed and values were averaged.

RESULTS AND DISCUSSION

The phytochemicals determined the food items investigated are presented in Table 1-3.

The average concentration of alkaloids obtained were wheat 0.643% groundnut 1.236% and millet 0.626%. The highest alkaloid content of 1.236% was obtained from groundnut and the lowest concentration of 0.626% was recorded for millet. Alkaloids affect a lot of metabolic activities in the body and most of them possess dramatic physiological activities hence they are widely used in medicine. Alkaloids are toxic to man. Certain plant alkaloids cause serious intoxications in animals and humans and are often mutagenic.

The highest flavonoid content of 1.766% was obtained from wheat while the lowest concentration of 0.726% was recorded for groundnut. Plant flavonoids have attracted attention as potentially important dietary cancer chemoprotective agents. In addition the possible anti

Table 1: Phytochemical Contents of Wheat %

Sample	Alkaloid	Flavonoid	Saponins	Tannins	Phenol	Phytic Acid
1	0.66	1.76	0.07	0.48	2.61	0.28
2	0.64	1.78	0.07	0.48	2.64	0.31
3	0.63	1.76	0.08	0.46	2.64	0.29
Average	0.643	1.766	0.073	0.473	2.63	0.293

Table 2: Phytochemical Contents of Groundnut %

Sample	Alkaloid	Flavonoid	Saponins	Tannins	Phenol	Phytic Acid
1	1.24	0.73	0.03	0.59	2.52	0.28
2	1.23	0.73	0.03	0.60	2.52	0.28
3	1.24	0.72	0.02	0.58	2.53	0.29
Average	1.236	0.726	0.026	0.59	2.523	0.283

Table 3: Phytochemical Contents of Millet %

Sample	Alkaloid	Flavonoid	Saponins	Tannins	Phenol	Phytic Acid
1	0.63	1.56	0.03	0.51	2.43	0.23
2	0.63	1.58	0.03	0.50	2.44	0.23
3	0.62	1.56	0.03	0.50	2.43	0.21
Average	0.626	1.566	0.03	0.503	2.433	0.223

tumor action of certain flavonoids has also generated interest. Perhaps the grains may provide the necessary dietary bioflavonoids required to prevent cancer and the growth of certain tumor in humans when adequate quantities are consumed regularly. Flavonoids have been reported to possess certain biological properties such as antibacterial, antitoxic and anti-inflammatory activities and often function as strong antioxidants, free radicals scavengers and metal chelators.

The phytochemical score of the samples shows that saponins ranked last. The mean concentration of saponins obtained were 0.073%, 0.026% and 0.03% for wheat, groundnut and millet. Saponins have been reported to possess anticarcinogenic properties, immune modulation activities and regulation of cell proliferation as well as health benefits such as inhibition of the growth of cancer cells and cholesterol lowering activity.

The average concentration of tannins obtained were wheat 0.473%, groundnut 0.59% and millet 0.503%. Groundnut had the highest concentration 0.59% of tannins compared to the

other food items studied. Osagie and Eka reported that tannins may decrease protein quality by decreasing digestibility and palatability and may cause damage to intestinal tract.

The average concentration of phenols recorded were 2.63%, 2.523% and 2.433% for wheat, groundnut and millet.

The levels of phytic acid in the grains samples investigated are showed that the highest concentration of phytic acid is in the wheat 0.293% and lowest concentration in the millet 0.223%. The dietary phytic acid has been reported to inhibit intestinal absorption of certain divalent minerals such as Ca and Mg limit protein and starch digestibility, hinder mineral bioavailability and inhibit proteolytic and amylolytic enzymes.

CONCLUSION

The study has revealed that some of the grains studied contained substantial amounts of some of the phytochemicals examined.

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