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PHYSICO-CHEMICAL CHARACTERISTICS AND FATTY ACID COMPOSITION OF YELLOW NUTSEDGE OIL (*CYPERUS ESCULENTUS*)

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INTRODUCTION

Yellow nutsedge (*Cyperus esculentus*) is a perennial plant which is widely distributed throughout the world and constitutes one of the worst known weeds [1]. The tuber, which is also known as chufa, is usually grown and harvested during the rainy season, thrives well on damp, sandy, extremely acidic soils. The plant has been in cultivation in major countries in tropical and subtropical parts of the world most especially Nigeria, since early times, for the sake of edible tubers which it bears underground. The tuber forms part of the people's diet when it is eaten raw or baked.

Previous workers have given data on chemical composition of the tuber [2,3]. The most significant of these findings is the content of 66–68 % oleic; 5–6 % linoleic and 15–17 % palmitic and stearic combined. But none of these previous works is based on GLC analysis.

This communication reports the physico-chemical characteristics and fatty acid composition of the oil of the Nigerian yellow nutsedge (*Cyperus esculentus*).

EXPERIMENTAL

(i) *Extraction and analysis of oil.* The dried thinly scaly, pale tuber was ground in a laboratory grinder to pass through a 100 mesh sieve and subjected to soxhlet extraction with petroleum ether (b.p. 40–60°C). The solvent was removed in a rotary evaporator to yield light yellow oil. The percentage of oil in the sample and its physico-chemical characteristics were determined by the methods of the AOAC [4].

(ii) *Separation of oil into lipid classes.* To separate the oil into lipid classes, about 250 mg of dry extract was streaked on plates of 300 m Si gel. The developing solvents were petroleum ether, diethyl ether and acetic acid (80:20:1). Lipid classes were detected by exposing to iodine vapours. Triglycerides were extracted with four washes of diethyl ether and MeOH (9:1) while polar lipids were extracted with two washes of $CHCl_3$, MeOH and HOH (50: 45:1) and one wash of MeOH.

(iii) *Analysis of component fatty acids.* The polar and triglycerides extracts were methylated by refluxing with dry methanol and 1 % w/w sulphuric acid for 1 hr., and were subsequently analysed by a Pye-Unicam 204 series GLC using a column of diethylene glycol succinate (DEGS, 10 %) coated on diatomite (80–100 mesh) at 200°C. Nitrogen flowing at a rate of 40 ml/min was used as carrier gas.

RESULTS AND DISCUSSION

The importance of yellow nutsedge (*Cyperus esculentus*) is due to the quality of its oil as is seen from its physi-

Table 1. The fatty acid composition and physico-chemical characteristics of yellow nutsedge oil.

Fatty acid	Lipid classes	
	% Triglyceride	% polar
Palmitic	10.21	12.4
Stearic	1.47	2.8
Oleic	75.72	46.9
Linoleic	11.64	35.3
Linolenic	0.64	2.6
Arachidic	0.32	trace

Characteristics	Range	Mean ± SD
Yield %	22.6– 22.9	22.8 ± 0.2
Saponification number	193.2–195.6	194.4 ± 1.2
Iodine number	80.2– 83.3	82.1 ± 1.3
Hydroxide value	10.3– 10.7	10.5 ± 0.2
Peroxide number	5.3– 6.9	6.1 ± 0.8
Refractive index (40°C)	1.4674	–

co-chemical characteristics and fatty acid composition of the lipid classes (Table 1). Oil of the tuber is characterised by the presence of unsaturated essential fatty acids. Further, the production of oil/hectare of the yellow nutsedge has been worked out as 190 kg [5]. This is greater than that of cottonseed (128.1 kg) and soybean (84.6 kg) [6]. Thus the deliberate cultivation of *Cyperus esculentus* tuber must be intensified if shortage of edible vegetable oils is to be overcome in most tropical and subtropical countries of the world.

Key words. Weeds, *Cyperus esculentus*, Fatty acid.

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