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Analysis of Sclerotia and Sporophores of *Pleurotus tuber-regium* Fr. an edible mushroom in Nigeria

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ABSTRACT: Chemical analysis of both sclerotia and the fruits of *Pleurotus tuber-regium* showed higher values for such elements as calcium(Ca), iron(Fe), zinc(Zn) in the fruits than in the sclerotia. On the contrary magnessium(Mg) was found to be higher in sclerotia than in the fruits. protein and carbohydrate were also found to be more in the fruits. There was no significant difference between the chemical values of old(1 year) and fresh sclerotia. Oil palm fruit fibre substrate produced sporophores with higher values for the minerals, protein and carbohydrate than those on riversand substrate.

KEYWORDS: *Pleurotus tuber-regium*, Protein, Carbohydrate

The genus *Pleurotus* has many edible species that have been extensively studied. They are found in both temperate and tropical countries of the world. *Pleurotu's ostreatus*(Jacquin ex Fr.) for example which has been mostly studied is now cultivated commercially in Europe and Asia(Bisht and Harsh, 1981, Jandaik and Kapor, 1974, Zadrazil, 1978, Okhuoya and Harvey, 1984).

Different studies on species of *Pleurotus* abound in literature(Rempe, 1953, Zadrazil, 1978, Okhuoya and Harvey, 1984). Most of these studies however are in the developed countries of Europe, America and Asia. Mushroom cultivation is still very limited in Africa, even though many such species are common in the wild states.

Pleurotus tuber-regium Fr., an edible fungus in Nigeria is widely used in the preparation of soups and traditional drugs(Oso, 1977). It produces sclerotia between September-December during its off season and resumes fruiting during the following raining season(April-August). Both the sclerotia and resulting fruits are eaten in Nigeria. The sclerotia when dug up from the soil or dead woods are used more than the fruits.

In this study the sclerotia and the resulting fruits(sporophores) were analysed for minerals, protein and carbohydrate.

Materials and methods

Fresh sclerotia of *Pleurotus tuber-regium* Fr. were collected from different perts of Bendel State of Nigeria. They were cut into small sizes(25g) and then subjected to the following series of experiments. They were sown in plastic bowls containig white riversand, watered regularly for sporophore development.

Three sclerotial pieces were sown per bowl and replicated. Similarly three bowls containing oil palm fibre fruits were inoculated with sclerotia and watered regularly for sporophore production. In another set up, freshly harvested and one year old sclerotia were analysed for metalic and mineral content as follows.

Metallic analysis of sclerotia and sporophores

Four grammes each of sclerotium and freshly harvested sporophores of the fungus were ground and put in kjeldahl flask and subjected to wet digestion. Standard solutions were prepared in ppm and the prepared samples were fed into Varian AA-1475 series atomic absorption spectrophotometer. Values of calcium, zinc, iron and magnesiun for both sclerotia and sporophores were read from the standard curves in ng/*l*.

Protein content was determined using kjeldahl method(Annon, 1975), for both sclerotia and fresh sporophores. Also protein content of 1 year old sclerotia was determined, and compared with fresh ones.

Carbohydrate contents of both sclerotia and sporophores were also determined using kjeldahl method(Annon, 1975). Anthrone reagent was

mixed with 0.5 m*l* of the ground sample and the optical density was read at 620 nm from a spectro photometer.

Carbohydrate values were read from a standard curve prepared with a series of dilutions of a standard D-glucose solution. Using the procedure, carbohydrate contents of both old and fresh sclerotia were determined.

The resulting sporophores from the oil palm fibre substrate were analysed for all the elements and minerals as done above.

Results and Discussion

Analysis of fruits and sclerotia showed the fruits to have more minerals than the sclerotia, with the exception of magnesium which was more in the fruits(Table I).

The fruits cultivated on oil palm fibres had more mineral values than those on riversand. No significant differences were found between mineral values of old and fresh sclerotia.

Carbohydrated and protein analysis showed fruits to contain more of those foods than in the sclerotia(Table I).

The results of this study(Table I) showed that the sporophores contained more minerals than the sclerotia. This indicates that the mushroom tuber is not a storage organ as expected in tuberous higher plants. The sclerotia essentially constitute means of survival of the dry season(Oso, 1979).

Magnesium concentration was found to be more in the sclerotia than in the sporophores, and was generally found to be least among the metals examined in the fruits. This confirms the general low mobility of this element. In soils it is known to be highly immobile.

Calcium was found to be highest in concentration than other elements, both in the sclerotia and sporophores(Table I). Calcium is known to be immobile in plants. Once delivered by transpiration stream it remains stationary in the plant. However its high concentrations in both sporophores and sclerotia indicate that this mushroom could be a source of this element in feed compoundment for livestock.

The trace elements, iron and zinc, appeared to be readily taken up by the sporophores. Protein values were higher in the different sporophores than in the sclerotia.

The highest percentage concentration of protein was recored on sprorophores grown on oil palm fibre substrate.

This indicates that the medium of cultivation can influence the nutritive values of mushrooms. Oil palm fibre is known to contain some oleic acid which might have favoured the increase of the amino acid content.

Carbohydrate analysis also showed the sporophores on oil palm fibre medium to contain more values than those from other samples.

The protein estimates obtained in this study were lower than those of Ogundana and Fagada(1982) who obtained 19.6% protein from fruits of this fungus. However carbohydrate values were higher than those they obtained(32%). The variations could certainly be due to the quality of fruits in the different localities of specimen used.

The observation in this study that sporophores contain more protein and carbohydrates suggests that it is more profitable to eat fruits than the sclerotia which are eaten more in the country.

The food value of the sclerotia did not change with period of storage of over one year. However better storage method will be necessary since they easily are destroyed by insects and then crumble

Table I. Mineral centents of sclerotia and sporophores of *P. tuber-regium.*

	Metals (μg/m*l*)				Organic components (%/g)	
Sample	Ca	Mg	Fe	Zn	Protein	Carbohydrate
hiversand sporophores	125.5	30.0	37.0	56.2	9.5	30.0
Oil palm sporophores	137.5	40.0	49.0	65.0	10.2	38.8
Fresh sclerotia	106.0	62.5	17.7	22.5	3.0	16.8
One year old Sclerotia	104.0	62.0	17.8	23.0	3.1	16.5

easily.

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