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Short Communication

Proximate analysis of *Lentinus squarrosulus* (Mont.) Singer and *Psathyrella atroumbonata* Pegler

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***Lentinus squarrosulus* and *Psathyrella atroumbonata*, two mushroom species commonly found growing on dead leaves and logs, were collected from the Zaria environ and taken to the laboratory for further studies. Each of the mushroom species was separated into its stipe and pileus and used for proximate analysis. There was a highly significant difference (p<0.01) in the proximate composition of the two species. *P. atroumbonata* had significantly higher crude protein, crude fibre and moisture content than *L. squarrosulus* while the reverse was the case for ash, dry matter, crude fat and soluble carbohydrates. In addition, there was a highly significant difference (p<0.01) in the proximate composition of the different mushroom parts. The pilei contained significantly higher amounts of crude protein, crude fibre, ash, and dry matter than the stipes while the converse was the case for moisture, crude fat and soluble carbohydrates. There was also a highly significant difference (p<0.01) in the interaction of species by parts.**

Key words: *Lentinus squarrosulus*, *Psathyrella atroumbonata*, proximate analysis.

INTRODUCTION

Mushrooms are cultured world wide for their taste, nutritional attributes and potential applications in industries (Sunagawa and Magae, 2005; D'Annibale et al., 2005; Mata et al., 2005). In addition, they have many medicinal uses and are good agents of bioremediation (Magingo et al., 2004; Lim et al., 2004; Adenipekun and Fasidi, 2005; Estévez et al., 2005).

We have worked extensively on the culture of *Lentinus squarrosulus* and *Psathyrella atroumbonata* at the hyphal level in submerged liquid cultures as well as at the carpophore level on various different media (Nwanze et al., 2004, 2005a, 2005b). In addition, we have examined the mineral content and amino acid composition of the two species (Nwanze and Adamu, 2004). The present investigations, however, center on the proximate composition of the mushrooms.

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MATERIALS AND METHODS

Proximate analysis

The moisture content, dry matter, crude fat, crude protein, crude fibre, ash and soluble carbohydrate content were determined on a dry weight basis as described by Praveena et al. (2001). The percentage of crude protein in the different samples was calculated as %N x 4.32 as described by Crisan and Sands (1978) while the amount of soluble carbohydrate was calculated by difference.

Statistics

The data obtained was analyzed by ANOVA with factorial treatment structures and interactions (Christie et al., 2001). Difference between means was compared using Duncan's multiple range test (DMRT, Snedecor and Cochran, 1987).

RESULTS

The proximate analysis of *L. squarrosulus* and *P. atroumbonata* is depicted in Table 1 along with their first order interactions. There was a highly significant difference (p<0.01) in the protein, fibre, ash, moisture, dry

Table 1. Proximate composition (g/100g dry matter) of the stipe and pileus of L. squarrosulus and P. atroumbonata pooled.

Treatments	% crude protein	% crude fibre	% ash	% moisture	% dry matter	% crude fat	% soluble carbohydrate
Species							
L. squarrosulus	22.82b	7.64b	7.52b	2.76b	97.25a	6.29a	60.65a
P. atroumbonata	30.20a	9.71a	17.76a	5.46a	94.55b	3.05b	51.59b
Significance	**	**	**	**	**	**	**
SE±	0.22	0.09	0.04	0.05	0.06	0.06	0.27
Parts							
Pileus	29.82a	9.31a	13.06a	4.01b	96.01a	4.53b	52.40b
Stipe	23.19b	8.05b	12.22b	4.21a	95.79b	4.80a	59.84a
Significance	**	**	**	**	**	**	**
SE±	0.22	0.09	0.04	0.05	0.06	0.06	0.27
Interactions							
S X P	**	**	**	**	**	**	**

Means followed by the same letter(s) within a treatment group are not significantly different statistically at 5% level of probability using DMRT.
* and ** = significant at 5% and 1% levels, respectively; NS = not significant.

Table 2. The proximate compostion (g/100g dry matter) of L. squarrosulus and P. atroumbonata parts

Mushroom species and parts	% crude protein	% crude fibre	% ash	% moisture	% dry matter	% crude fat	% Soluble carbohydrate
L. squarrosulus stipe	18.32c	6.80d	6.62c	3.83c	96.18b	6.01b	65.07a
L. squarrosulus pileus	27.25b	8.48c	8.42b	1.7d	98.33a	6.56a	56.23b
P. atroumbonata stipe	28.00b	9.30b	17.82a	4.60b	95.4c	3.59c	54.61c
P. atroumbonata pileus	32.40a	10.14a	17.70a	6.33a	93.7d	2.51d	48.56d
SE±	0.31	0.13	0.05	0.07	0.08	0.09	0.38

Means followed by the same letter(s) within a treatment group are not significantly different statistically at 5% level of probability using DMRT.
* and ** = significant at 5% and 1% levels, respectively; NS = not significant.

matter, fat and soluble carbohydrate content of the two mushroom species. Analysis of the data showed that *P. atroumbonata* had significantly higher crude protein, crude fibre and moisture content than *L. squarrosulus* while the reverse was the case for ash, dry matter, crude fat and soluble carbohydrates.

The proximate composition of the stipe and pileus of *L. squarrosulus* and *P. atroumbonata* is shown in Table 2. There was a significant difference (p<0.01) in the means due to the protein, fibre, ash, moisture, dry matter, crude fat and soluble carbohydrate content of the different mushroom parts. The pileus of *P. atroumbonata* contained a significantly larger amount of crude protein than the corresponding stipe as well as the pileus of *L. squarrosulus*, both of which had similar means, but nonetheless contained significantly more crude protein than the stipe of *L. squarrosulus*. The pileus of *P. atroumbonata* contained a significantly larger amount of crude fibre than the corresponding stipe followed by the pileus and stipe of *L. squarrosulus*. The ash content of the pileus and stipe of *P. atroumbonata* were at par, but of greater magnitude than the ash content of the pileus and stipe of *L. squarrosulus*. The pileus of *L. squarrosulus* contained a significantly larger amount of dry matter and crude fat than the corresponding stipes. However, it was the stalk of *P. atroumbonata* that contained a significantly larger amount of dry matter and crude fat than the corresponding pileus. There was a significantly higher amount of soluble carbohydrates in the stipe of *L. squarrosulus* than in its pileus. The soluble carbohydrate content of the stipe of *P. atroumbonata*, though significantly lower compared to the stipe of *L. squarrosulus*, contained a significantly larger amount of soluble carbohydrate than its corresponding pileus.

DISCUSSION

Of the two species examined in this investigation, *P. atroumbonata* had the higher protein content. The protein content obtained for *P. atroumbonata* agreed with the value obtained by Aletor (1995) while the value for *L. squarrosulus* was slightly higher. However, the crude protein content of *L. squarrosulus* was comparable to that reported for *L. tigrinus* by Adejumo and Awosanya (2005). The pilei of both mushroom species contained higher levels of protein than the stipes. The protein contents obtained in the pileus and stipe of *P. atroumbonata* by Alofe (1985) were higher than the values presently observed while the reverse was true for *L. squarrosulus*. In addition, the protein content of both *L. squarrosulus* and *P. atroumbonata* was higher than the values reported for *Auricularia auricula*, *A. polytricha*, *Tremella fuciformis*, *Ganoderma lucidum*, *Calvatia cyathiformis* and *Poria cocos* by Cheung (1997) and Aletor (1995).

The two mushroom species contained more crude fibre in their pilei than in their stipes. However, Alofe (1985) reported the converse for *P. atroumbonata*. Of the two mushroom species, *P. atroumbonata* contained more fibre than *L. squarrosulus*. The values obtained for the two species were slightly higher than the values reported by Aletor (1995), but lower than the values reported by Alofe (1985). In addition, the crude fibre content reported for *L. squarrosulus* by Fasidi and Kadiri (1991) was much higher than the values presently observed. Nonetheless, the crude fibre content presently reported was in agreement with the values reported for *Poria cocos*, *T. fuciformis, A. polytricha* and *L. tigrinus* (cheung, 1997; Adejumo and Awosanya, 2005). Thus, *L. squarrosulus* and *P. atroumbonata* should be regarded as a good source of dietary fibre for humans.

The pileus and stipe of *P. atroumbonata* contained significantly higher levels of ash than the corresponding parts of *L. squarrosulus*. The ash levels obtained for both parts of *P. atroumbonata* were in agreement with the values obtained by Alofe (1985) and Aletor (1995) for the same species. The value obtained for *L. squarrosulus* agreed with that reported by Fasidi and Kadiri (1991), but was lower than the value reported by Alofe 1985). In general, the lower ash content observed for *L. squarrosulus* was in agreement with those reported for *A. auricula*, *A. polytricha* and *P. cocos* (Cheung, 1997). Both *L. squarrosulus* and *P. atroumbonata*, however, had higher ash content than *Lentinus edodes*, *L. shimeji*, *Pleurotus sajor-caju* and *V. volvcea* as reported by Cheung (1997).

Both the pileus of *L. squarrosulus* and that of *P. atroumbonata* had higher levels of carbohydrate than their corresponding stipes. However, Alofe (1985) reported the stipes as having higher carbohydrate levels than the corresponding pilei. Of the two species *L. squarrosulus* had the higher carbohydrate level and it compared favourably with the levels reported in *A. bisporus* and *L. tigrinus by* Cheung (1997) and Adejumo and Awosanya (2005), respectively.

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