Effect of different drying temperatures on the rehydration of the fruiting bodies of Yu Muer (*Auricularia cornea*) and screening of browning inhibitors

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DOI:

10.21203/rs.2.21958/v1

SUBJECT AREAS

Botany Forestry

KEYWORDS

Auricularia cornea cv. Yu Muer, Hot-air drying, rehydration methods, polyphenol oxidase, browning inhibitor

Abstract

In this study, the color of the dry fruiting bodies, drying ratio, amino acids, and total phenolics, which are of nutritional or commercial interest, were compared among different drying temperature treatments. The effect of rehydration methods and color protection reagents on the fruiting body-color, polyphenol oxidase (PPO) activity, and browning inhibition rate were evaluated. The results showed that drying with hot air at 65°C was quickest and resulted in a better color without compromising the drying ratio and rehydration ratio of the fruiting bodies. Furthermore, some reactions that occurred under high temperatures increased the content of protein, amino acids, and total phenolics. Soaking after boiling was the most suitable rehydration method, leading to the lowest PPO activity (39.87 ± 1.35 U/g). All of the four analyzed color protection reagents could significantly inhibit the browning of Yu Muer fruiting bodies under room temperature water rehydration conditions.

Full-text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed.

However, the manuscript can be downloaded and accessed as a PDF.

Tables

Table 1 (a and b)

The effect of different drying temperatures on the drying time and water loss ratio.

a0.5 -5 h

Drying temperature	Drying time (h)							
	0.5	1	1.5	2	2.5	3	3.5	4
35°C	22.96 ± 0.72^b	13.52 ± 2.72^c	12.19 ± 1.15^c	11.22 ± 1.79^a	10.20 ± 0.73^a	8.87 ± 0.64^a	8.57 ± 1.70^a	4.96 ± 0.77^a
45°C	25.57 ± 1.67^b	20.08 ± 2.55^b	13.76 ± 2.05^b	12.87 ± 0.68^a	9.41 ± 0.99^a	7.91 ± 1.04^a	5.17 ± 0.91^b	2.1 ± 0.40^b
55°C	28.97 ± 4.92^b	19.50 ± 1.59^b	16.03 ± 1.42^{ab}	12.97 ± 1.10^a	8.72 ± 1.23^a	6.59 ± 2.33^a	3.26 ± 1.27^b	1.70 ± 0.90^b
65°C	40.15 ± 5.99^a	25.38 ± 2.10^a	17.06 ± 1.24^a	10.91 ± 1.82^a	3.96 ± 0.86^b	1.79 ± 0.15^b	0.42 ± 0.10^c	0.11 ± 0.01^c

b5.5 -10 h

Drying temperature	Drying time (h)							
	5.5	6	6.5	7	7.5	8	8.5	9
35°C	0.91 ± 0.24^a	0.55 ± 0.14^a	0.34 ± 0.10^a	0.23 ± 0.08^a	0.15 ± 0.09	0.12 ± 0.07	0.07 ± 0.05	0.04 ± 0.02
45°C	0.38 ± 0.02^b	0.25 ± 0.13^b	0.08 ± 0.04^b	0.06 ± 0.01^a	0.05 ± 0.01	0.08 ± 0.04	-	-
55°C	0.32 ± 0.27^b	0.17 ± 0.15^b	0.11 ± 0.11^b	0.20 ± 0.16^a	-	-	-	-
65°C	-	-	-	-	-	-	-	-

Note□Data (mean ± standard deviation) followed by the same letter are not significantly different (p > 0.05).

Table 2

The effect of different rehydration methods on the color of fruiting bodies and the rehydration water, and the PPO activity.

Rehydration methods	Wrap	Water color	White wood ear color	PPO activity
Cold water	Unwrapped	Reddish brown	Dark reddish brown	87.23±
	Film-wrapped	Reddish brown	Dark reddish brown	71.89±
Boiling water	Unwrapped	Light reddish brown	Light reddish brown	42.29±
	Film-wrapped	Light reddish brown	Light reddish brown	37.62±
Boiled	Unwrapped	Light yellow	White	39.87±
	Film-wrapped	Light yellow	White	36.68±

Note□Data (mean ± standard deviation) followed by the same letter are not significantly different (p > 0.05).

Table3

Effects of different drying temperatures on chroma of dried fruiting bodies and rehydration fruiting bodies.

Treatments	Dried fruiting bodies				Drying ratio	Rehydration ratio	Rehydration fruiting bodies		
	L*	a*	b*	ΔE			L*	a*	b*
SD	75.54±0.14 _e	2.21±0.05 _e	19.30±0.04 _c	-	11.15±0.63 ^a	10.77±1.68 _a	61.97±0.73 _a	-1.81±0.01 _c	6.67±0.01 _c
35°CHD	75.68±0.02 _{de}	2.50±0.03 ^a	19.48±0.04 _b	0.34±0.11 ^a	11.30±0.83 ^a	10.92±1.64 _a	62.25±0.44 _a	-1.85±0.03 ^c	6.72±0.01 _c
45°CHD	76.33±0.04 _b	2.35±0.03 ^b	19.64±0.11 _a	0.82±0.15 ^{ab}	10.95±0.15 ^a	10.83±1.70 _a	61.94±0.78 _a	-1.71±0.03 ^a	7.86±0.01 _c
55°CHD	75.85±0.08 _c	1.71±0.02 ^c	18.06±0.10 _e	1.16±0.10 ^b	11.02±0.68 ^a	10.43±1.92 _a	62.33±1.45 _a	-1.72±0.05 ^a	7.10±0.01 _c
65°CHD	76.85±0.15 _a	1.97±0.05 ^d	19.00±0.08 _d	1.42±0.07 ^c	11.01±0.87 ^a	10.80±2.44 _a	61.91±1.02 _a	-1.77±0.03 ^b	5.91±0.01 _c
Fresh	-	-	-	-	-	-	62.99±0.09 _a	-1.82±0.01 ^c	5.20±0.01 _c

Note—Data (mean $\pm$ standard deviation) followed by the same letter are not significantly different ($p > 0.05$). SD: Sun drying; HD: Hot-air drying.

Figures

Figure 1

Shape of dried fruiting bodies in different drying temperatures SD(a); 35°C HD (b); 45°C HD (c); 55°C HD (d); 65°C HD (e). HD, Hot-air drying; SD: Sun drying.

Figure 2

Effects of different drying methods on the contents of Amino acid, Total phenol, Protein and Total sugar of dried fruiting bodies. The same letters are not significantly different ($p > 0.05$).

Figure 3

Effects on fruiting bodies' color with different rehydration methods, fresh fruiting body (a); boiling water rehydration (b); room-temperature water rehydration (c); the fruiting bodies turned red following removal from the rehydration water solution consisting of low-concentration color protection reagents (d); the fruiting bodies turned light red after being removed from the rehydration solution containing low-concentration color protection reagents (e); the fruiting bodies showed no color change after being removed from the rehydration water solution containing appropriate concentrations of color protection reagents (f).

Figure 4

Effects on browning inhibition rate with different concentration of sodium erythorbate, ascorbic acid, L-cysteine and citric acid. The same letters are not significantly different ($p > 0.05$).

Supplementary Files

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