

# EFFECT OF *Pleurotus ostreatus* COLONIZED SUBSTRATE ON BROILER CHICKEN GROWTH

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# Introduction

- Several compounds have been used to prevent common bacterial infections and/or enhance growth performance to poultry
- *Pleurotus ostreatus* produce edible mushrooms recognized as a functional food due to its biological activity in the immunological system
- Could it be an alternative to improve poultry production?

# Introduction

Several fungi have been used on chicken production such as:

- spent substrate from *Pleurotus sajor-caju* or *Agaricus blazei*
- Bottom part of mushrooms from *Agaricus bisporus*
- mushroom extracts from *Lentinula edodes* and *Tremella fuciformes*
- *L. edodes*-colonized substrate (sorghum grain)

# Introduction

What about using *P. ostreatus* colonized substrate for feeding chickens?

- Vegetative mycelium can be produced in a shorter time than mushrooms with high hygiene control
- It has biological activity (functional food)
- it can produce laccase, an enzyme used for lignin hydrolysis, facilitating exposure and access to nutrients to animals

# Objective

The objective of this study was to evaluate broiler chicken production with partial replacement of the standard diet by *P. ostreatus*-colonized substrate.



# MATERIALS AND METHODS

- 150 one-day-old male Cobb chicks were randomly distributed into five treatments with three replicates
- Period of production was from zero-to-21-days old
- Control diet was the standard diet
- *P. ostreatus*-colonized substrate of 5, 10, 100 or 200 g kg<sup>-1</sup> was used for partial replacement of standard diet
- Approved by the Ethics Committee of Research with Animal Experimentation of Paranaense University

**TABLE 1:** Composition of the standard diet to feed broiler chickens from zero-to-21 days old

Ingredients (g kg <sup>-1</sup> )		Analytical characterization (g kg <sup>-1</sup> )	
Ground maize grain	544.8	Dry matter	886.731
Soybean meal	379.3	Protein	214.000
Refined soybean oil	36.2	Raw fiber	30.137
NaCl	5.2	Total phosphorus	6.707
CaCO <sub>3</sub> (38%)	7.3	Available phosphorus	4.500
CaHPO <sub>4</sub> 2H <sub>2</sub> O	17.7	Potassium	9.025
L-lysine (78.8%)	1.42	Lysine	12.591
DL-methionine (84%)	2.54	Methionine	5.534
Choline chloride (60%)	0.44	Methionine + Cystine	9.237
Ethoxyquin (C <sub>14</sub> H <sub>19</sub> NO)	0.10	Gross energy (MJ kg <sup>-1</sup> )	12.557
Mineral vitamin <sup>a</sup>	5.00		

<sup>a</sup> Mineral vitamin contained in 1 kg: iron (100 g); copper (10 g); cobalt (1 g); manganese (40 g); zinc (100 g); iodine (1.5 g); vitamin A (6.000.000 UI); vitamin D3 (1.500.000 UI); vitamin E (15.000 UI); vitamin B1 (1.35 g); vitamin B2 (4 g); vitamin B6 (2 g); pantothenic acid (9.35 g); vitamin K3 (1.5 g); nicotinic acid (20.0 g); vitamin B12 (0.02 g); folic acid (0.6 g); biotin (0.08 g) and selenium (0.3 g) and excipient for 1 kg.

# RESULTS AND DISCUSSION

## Broiler Chicken Production

- Feed intake of P100 and P200 was 35% and 40% higher, respectively, than the control.
- Body mass of P100 and P200 was 51% and 58% higher, respectively, than control.
- It is suggested that colonized substrate promoted better nutrient absorption associated to the biological activity of the fungus.



**TABLE 2:** Broiler chicken production at 21 days old fed with standard diet (control) or standard diet partially replaced by *Pleurotus ostreatus*-colonized substrate

	Treatment*					P value	RSD (%)
	Control	P5	P10	P100	P200		
<b>Feed intake (g)</b>	1041 <sup>a</sup>	1051 <sup>a</sup>	1263 <sup>a</sup>	1401 <sup>b</sup>	1456 <sup>b</sup>	≤0.001	3.84
<b>Body mass gain (g)</b>	573 <sup>a</sup>	609 <sup>a</sup>	715 <sup>a</sup>	861 <sup>b</sup>	905 <sup>b</sup>	≤0.001	4.66
<b>Feed conversion ratio</b>	1.81 <sup>a</sup>	1.73 <sup>b</sup>	1.76 <sup>b</sup>	1.63 <sup>c</sup>	1.61 <sup>c</sup>	≤0.001	3.25

\* 0, P5, P10, P100 or P200: replacement of 0 (control), 5, 10, 100 or 200 g kg<sup>-1</sup> of standard diet by *Pleurotus ostreatus*-colonized substrate, respectively. The averages (g) followed by the same letter in the same row do not differ statistically by Scott-Knott's test ( $P \leq 0.05$ ); RSD (%) = Relative standard deviation by analysis of variance.

# Conclusions

- Replacement of *P. ostreatus*-colonized substrate in standard diet is effective for chicken body mass gain and production.
- Feed conversion ratio is more effective when replacement in standard diet is equal or higher than 100 g kg<sup>-1</sup> of colonized substrate.

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*Thank you*

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