

**BIOCHEMICAL STUDIES FOR  
NUTRITIONAL UPGRADING OF  
SOME MILLS RESIDUES**

**By**

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**B.Sc. Agric. Sci. (Agricultural Biochemistry), Fac. Agric., Cairo Univ., 1997  
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APPROVAL SHEET

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#### ABSTRACT

This study was carried out to improve the nutritive value of wheat milling residues (wheat spike glumes and wheat stem node) as animal feed. Improvement in the nutritive value of milling residues was achieved by some chemical treatments; using urea, ammonium hydroxide and sodium hydroxide at different concentrations. Urea treatments caused an increase in crude protein and decrease lignin content when compared with control so IVDMD was enhanced for both wheat spike glumes and wheat stem node from 35.9 and 25.63% (control) to 57.07 and 33.87%, respectively and IVOMD was enhanced from 39.6 and 27.3% (control) to 60.79 and 39.12 %, respectively at 3% urea concentration. Ammonium hydroxide treatments caused an increase in crude protein and decrease lignin content when compared with control. IVDMD was enhanced for both wheat spike glumes and wheat stem node from 35.9 and 25.63% (control) to 40.87 and 30.6%, respectively and IVOMD was enhanced from 39.6 and 27.3% (control) to 49.65 and 38.3%, respectively at 3% ammonium hydroxide concentration. Sodium hydroxide treatment caused a decrease in lignin content , IVDMD was enhanced for both wheat spike glumes and wheat stem node from 35.9 and 25.63% (control) to 65.87 and 33.34%, respectively and IVOMD was enhanced from 39.6 and 27.3% (control) to 66.69 and 36.79%, respectively at sodium hydroxide 5% concentration. Improvement by biological treatments achieved by using different amounts (2, 4, 6, 8, 10 and 12g) of *Pleurotus ostreatus* / 100g milling residues and incubated for four weeks at 28° C, the best amount was 10g and the best period was four and three weeks for wheat spike glumes and wheat stem node, respectively which gave the highest IVDMD (49.93 and 58.3 and IVOMD (55.44 and 52.86%), respectively. Some additives from vegetable processing wastes such as pea straw, potato jacket, artichoke leaves or cucurbit husk at different ratios 1:1, 1:3 and 3:1 were mixed with wheat spike glumes and wheat stem node. The treated 1:3 mixture was the best ratio for each milling residues.

**Key words:** Wheat Milling Residues, *Pleurotus ostreatus*, Urea, Ammonium Hydroxide And Sodium Hydroxide, Vegetable Processing Wastes

## DEDICATION

*I dedicate this work to whom my heart and feeling missed him to my father for his soul and to my lovely mother and my brother for all the support and patience they lovely offered along the period of my post graduation.*

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## LIST OF ABBREVIATIONS

A	Ash
ABV	Apparent biological value
ADF	Acid-detergent fiber
ADG	Average daily gain
ADL	Acid-detergent lignin
ALF	Alfalfa hay
APD	Apparent protein digestibility
B	Barley
BCE	Bioconversion efficiency
BF	Barley fiber
BR	Biomass recovery
C	Cellulose
CB	Corn bran
CP	Crude protein
CPO	Crude protein obtained
CSB	Corn soybean meal diet
CW	Citrus waste
DCP	Digestible crude protein
DDGS	Distiller's dried grains with soluble
DM	Dry matter
DMI	Dry matter intake
DRC	Dry-rolled corn
DS	Degraded substrate
GAX	Glucuronoarabinoxylans

GE	Gross energy
GRB	Glucose supplemented rice bran
IVDE	<i>In vitro</i> apparent digestible energy
IVDMD	<i>In vitro</i> dry matter digestibility
IVOMD	<i>In vitro</i> organic matter digestibility
HC	Hemi-cellulose
HMC	High-moisture corn
L	Lignin
LSD	Least significant difference test
MDGS	Modified distillers grains plus soluble
NDF	Neutral-detergent fiber
NGP	Net gain protein
NPV	Net protein value
NSP	Non-starch polysaccharides
OCW	Oil cake wood
OM	Organic matter
OMD	Organic matter digestibility
PDA	Potato dextrose agar medium
PS	Palm seeds
RB	Rice bran
RMW	Rice milling waste
SBM	Soybean meal
SBP	Sugar beet pulp
SCO	Single cell oil
SCP	Single cell protein
SFC	Steam-flaked corn

SRB	Supplemented rice bran
SSF	Solid state fermentation
SOC	Sesame oil cake
SOP	Stoned olive pomace
SSS	Sunflower seed shell
TDN	Total digestible nutrients
US	Undegraded substrate
VFAs	Volatile fatty acids
WB	Wheat bran
WC	Whole corn
WCGF	Wet corn gluten feed
WM	Wheat middlings
WMR	Wheat mill run
WS	Wheat straw
YE	Yeast extraction

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