

# GRADUATE SCHOOL



**O.2. Research results are published.**

**Master of Science in  
Animal Science**



## O.2. Research results are published.

Food Hydrocolloids 80 (2018) 264–273



Contents lists available at ScienceDirect

Food Hydrocolloids

journal homepage: [www.elsevier.com/locate/foodhyd](http://www.elsevier.com/locate/foodhyd)



### Characterization of gelatin from bovine skin extracted using ultrasound subsequent to bromelain pretreatment

Tanbir Ahmad<sup>a,f</sup>, Amin Ismail<sup>b,g</sup>, Siti Aqlima Ahmad<sup>c</sup>, Khalilah Abdul Khalil<sup>d</sup>, Elmutaz Atta Awad<sup>e,h</sup>, Teik Kee Leo<sup>a</sup>, Jurhamid C. Imlan<sup>e,i</sup>, Awis Qurni Sazili<sup>a,c,g,\*</sup>

<sup>a</sup> Department of Animal Science, Faculty of Agriculture, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

<sup>b</sup> Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

<sup>c</sup> Faculty of Biotechnology and Molecular Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

<sup>d</sup> School of Biology, Faculty of Applied Sciences, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia

<sup>e</sup> Laboratory of Sustainable Animal Production and Biodiversity, Institute of Tropical Agriculture and Food Security, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

<sup>f</sup> ICAR-Central Institute of Post-Harvest Engineering and Technology, Ludhiana, Punjab, 141004, India

<sup>g</sup> Halal Products Research Institute, Putra Infoport, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

<sup>h</sup> Department of Poultry Production, University of Khartoum, 13314, Khartoum North, Sudan

<sup>i</sup> Department of Animal Science, College of Agriculture, University of Southern Mindanao, Philippines

#### ARTICLE INFO

##### Article history:

Received 12 July 2017

Received in revised form

27 December 2017

Accepted 29 January 2018

Available online 7 February 2018

#### ABSTRACT

Bovine skin was pretreated with bromelain enzyme and ultrasound (53 kHz and 500 W) was used to extract gelatin for the time durations of 2, 4 and 6 h at 60 °C (samples were referred as UB2, UB4 and UB6, respectively). Control (UBC) gelatin was extracted using ultrasound for 6 h at 60 °C without enzymatic pretreatment. Gelatin yield increased significantly ( $P < 0.05$ ) as the time duration of ultrasound treatment increased with UB6 giving the highest yield of 19.71% followed by UBC (18.67%). Gel strength and viscosity of UBC were 603.24 g and 16.33 mPa.s, respectively. The corresponding values for UB6 were 595.51 g and 16.37 mPa.s, respectively. The amino acids content increased with longer duration of ultrasonic treatment and UBC exhibited the highest content of the glycine (27.06%) and hydroxyproline (17.21%) compared to other samples. Protein pattern of the gelatin samples showed the progressive degradation of polypeptide chains as the time duration of ultrasound extraction increased. As demonstrated by Fourier transform infrared (FTIR) spectroscopy, amide I band of gelatins extracted by ultrasound treatment exhibited higher wavenumbers than the commercial gelatin (CG) suggesting greater loss of molecular order in these samples. Longer duration of ultrasonic treatment resulted in denser, irregular, disorganized and more interconnected structure with increased porosity as revealed by

#### CSIRO PUBLISHING

*Animal Production Science*  
<https://doi.org/10.1071/AN17486>

### Electroencephalographic and blood parameters changes in anaesthetised goats subjected to slaughter without stunning and slaughter following different electrical stunning methods

A. B. Sabow<sup>A,F</sup>, Y. M. Goh<sup>B,C</sup>, I. Zulkifli<sup>A,B</sup>, M. Z. Ab Kadir<sup>D,C</sup>, U. Kaka<sup>B</sup>, K. D. Adeyemi<sup>A,H</sup>, A. A. Abubakar<sup>A</sup>, J. C. Imlan<sup>A</sup>, M. Ebrahimi<sup>C</sup> and A. Q. Sazili<sup>A,B,E,I</sup>

<sup>A</sup>Department of Animal Science, Faculty of Agriculture, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.

<sup>B</sup>Institute of Tropical Agriculture and Food Security, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.

<sup>C</sup>Department of Veterinary Preclinical Sciences, Faculty of Veterinary Medicine, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.

<sup>D</sup>Department of Electrical and Electronic Engineering, Faculty of Engineering, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.

<sup>E</sup>Halal Products Research Institute, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.

<sup>F</sup>Department of Animal Resource, Salahaddin University, Erbil, Kurdistan Region, Iraq.

<sup>G</sup>Centre for Electromagnetic and Lighting Protection Research (CELP), Malaysia.

<sup>H</sup>Department of Animal Production, University of Ilorin, Ilorin, Nigeria.

<sup>I</sup>Corresponding author. Email: [awis@upm.edu.my](mailto:awis@upm.edu.my); [awisqurni@gmail.com](mailto:awisqurni@gmail.com)

**Abstract.** Electrical stunning is the most widely used stunning method for sheep and goats. Because low frequency head-to-back electrical stunning induces cardiac arrest, it is non-compliant with halal requirements. In addition, conventional head-only electrical stunning method can have adverse effects on carcass and meat quality. To address these issues high-frequency electrical stunning systems were developed. High frequency head-to-back removes the potential for pain and distress compared with non-stunned slaughter and does not induce cardiac arrest like low frequency head-to-back stunning making it appropriate for halal. However, this claim is yet to be proven through a comprehensive neurophysiological study. Thus, the present study examined the effects of different pre-slaughter electrical stunning methods and slaughter without stunning on electroencephalographic and blood biochemistry changes. Thirty-two male Boer crossbred bucks were distributed into four groups of eight animals each and subjected to slaughter without stunning (SWS), low frequency head-only (LFHO) and low frequency head-to-back (LFHB) or high frequency head-to-back electrical stunning (HFHB).

## PHENOTYPIC CHARACTERISTICS OF PHILIPPINE MALLARD DUCK (*Anas platyrhynchos domesticus* Linn.) AT THE UNIVERSITY OF SOUTHERN MINDANAO, KABACAN, COTABATO

NORHANA D. ALAGASI AND MARY JOY S. CAÑOLAS

Respectively, former BSFS and Adviser/Associate Professor III, Department of Animal Science,  
College of Agriculture, University of Southern Mindanao, Kabacan, Cotabato,  
Tel. No. (064) 572-1339

### ABSTRACT

Information on the phenotypic characteristics of Philippine Mallard ducks (PMD) in Mindanao is very limited thus this study was conducted to determine the qualitative and quantitative traits of PMD at USM. A total of 200 ducks and drakes were subjected to phenotypic characterization. Descriptive statistics was used to analyse the qualitative traits while t-test on the quantitative traits. The male PMD had brown plumage color, black head color, without black eye line, brown eye color, black bean, plain neck feather marking and breast color, without neck ring, brown wing color with white primaries, dark brown speculum, either plain or brown body color, brown tail feather color and orange shank. The female PMD had brown plumage color, brown head color, without black eye line, brown eye color, black bill and bean colors, plain neck feather marking, without neck ring, black breast color, brown wing feather color and plain primaries, obscured speculum, brown body and tail feather color, without curl and orange shank. Slight variation was observed on quantitative traits between the male and female PMD.

**Keywords:** qualitative traits, quantitative traits, waterfowl

### INTRODUCTION

In the Philippines, ducks rank second to chickens in economic importance as source of animal protein and income. Around 70% of ducks are raised in the backyards by rural households (PSA 2015) because they provide good source of supplementary income and low-cost animal protein (Chang, et al. 2003; Chang, 2005).

Duck raising is concentrated mainly towards egg production, in which the eggs are made into popular street delicacies due to their unique taste such as balut (boiled partially incubated duck eggs) and penoy (boiled dead duck embryo). The Pateros type Mallard duck, locally called itik in Luzon and bibi in Visayas and Mindanao is the most commonly raised due to its ability to lay large size eggs, good layer and non-sterile which results to high egg egg

Khaki Campbell, CV 2000 etc., several plumage colors and patterns can be observed in the present-day Philippine Mallard ducks (PMD). Several authors had already reported its phenotypic characteristics, including those of the PMD select lines; however only the plumage patterns of PMD were reported from Northern Mindanao. Thus there is lack of information on the other important phenotypic characteristics of PMD in Mindanao. Thus this study attempted to describe the phenotypic characteristics of PMD in Southern Mindanao. The objectives of this study were to determine the qualitative and quantitative characteristics of the PMD at the University of Southern Mindanao, Kabacan, Cotabato. This study was conducted at the CA-NAFES Duck Project Area, University of Southern Mindanao, Kabacan, Cotabato on March 2018.

## QUALITY OF SUPER NAPIER GRASS (*Pennisetum purpureum* x *Pennisetum glaucum*) SILAGE WITH UREA AND MOLASSES AS ADDITIVES

BOIZAL D. GONZAGA AND JOSEPHINE R. MIGALBIN

BSA Major in Animal Science Thesis Student and Adviser/Prof. V, Department of Animal Science,  
College of Agriculture, University of Southern Mindanao, Kabacan, Cotabato.

### ABSTRACT

Super Napier grass is a perennial grass with high productivity, high crude protein content and a less itchy hair but not much work has been done on ensiling the grass. The incorporation of easily fermentable feed ingredients such as sugar or molasses to low DM sugar-limited tropical forages is a way to improve silage fermentation hence this study was conducted to determine the effect of urea and molasses as additives on the quality and physical characteristics of Super Napier grass silage. The age of the grass was 45 and 75 days while levels of urea used were 1, 2 and 3% and 1, 3, 5, and 7% for molasses. Ensiling was done in plastic bag silos. The pH of Super Napier silage with urea was higher compared to silage with molasses but both have pH values of 4.2 and below which are considered good quality silage.

No significant differences was observed among treatments on the color, taste and smell of Super Napier silages with varying levels of molasses and urea except for the color of silage with higher levels of molasses (5% and 7%) that resulted to greenish brown or golden.

Significant differences were observed on the chemical composition of silages with urea and molasses additives in terms of crude protein, crude fiber, crude fat, dry matter, moisture and ash. Urea and molasses can be used to enhance fermentation in 45 and 75-day old Super Napier grass.

### INTRODUCTION

Livestock is one of the major components of the economy of the country. The Philippines has estimated a very high requirement for their feeds, both derived from forage and agricultural waste. This potential has not met the national requirement of the sustainable quality feed because of various problems in terms of quality and quantity in meeting the nutrient requirement of an animal due to seasonal production, uneven distribution of rainfall throughout the year and the distance between the production site of the feed and the livestock production areas. Due to this problem many alternatives are made and one of them is the introduction of new breeds of high yielding forage crop variety.

Super Napier (*Pennisetumpurpureum* cv. *Pakchong*) is a perennial grass with high productivity, high crude protein content and having a less itchy hair compared to other varieties. In spite of these characteristics, feed security for our animal and sustainability of agriculture because of some factors like climate change that affects forage production

and quality of the feed. This can be solved by conserving feed into hay or silage. Silage is a product of ensiling which is a preservation method that has been widely used that dates back even in Biblical times.

Good quality silage is produced by converting water soluble carbohydrate (WSC) by lactic acid bacteria (LAB) to organic acid efficiently resulting in a high nutrient content (McDonald et al., 1991). But Lazzarini et al., 2009 stated that low-quality tropical forages normally have crude protein (CP) contents that are lower than 70 g/kg of dry matter (DM), which have adequate microbial growth on fibrous carbohydrates of basal forage. Therefore, it is necessary to add an additive that is capable of supporting the ensiling process.

Silage making is a different way of producing feed to animals to preserve its nutritive value. In the case of ensiling Super Napier grass, not much work has been done so far. Additives can be used in order to enhance silage fermentation and their nutritional quality. They are classified according to their