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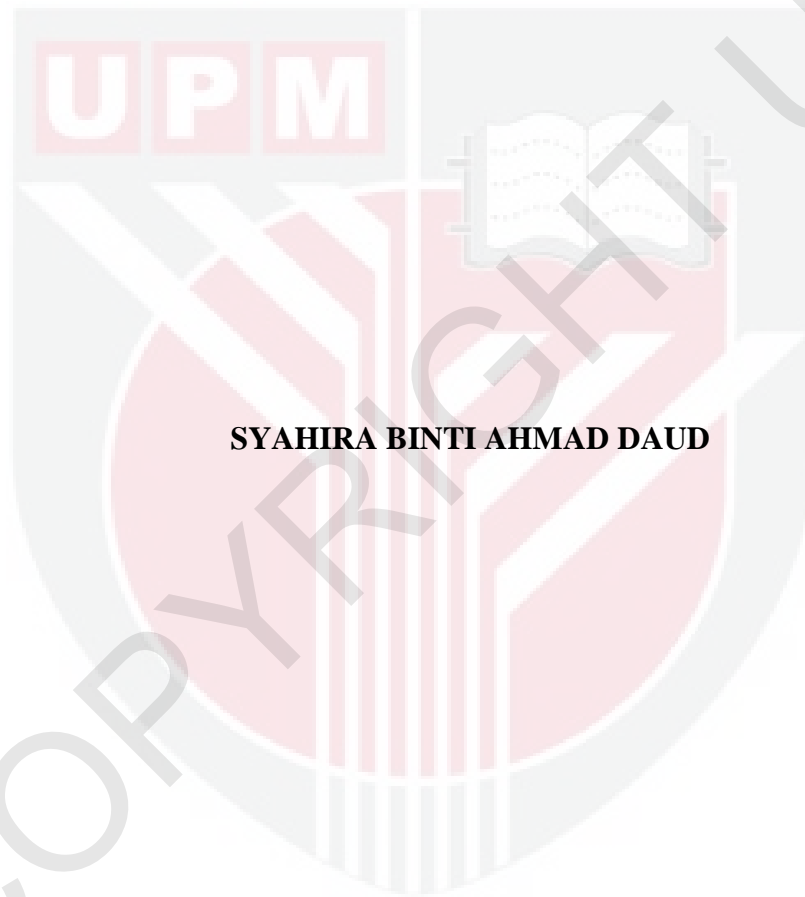
**IN VITRO STUDIES OF THE DIGESTIBILITY OF WATERMELON
(*Citrullus lanatus*) PEEL VIA GAS PRODUCTION METHOD**

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2015/2016

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**FACULTY OF AGRICULTURE
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CERTIFICATION

This project entitled “*In Vitro* Studies of the Digestibility of Watermelon (*Citrullus Lanatus*) Peel via Gas Production Method” is in prepared by Syahira binti Ahmad Daud and submitted to the Faculty of Agriculture in fulfilment of the requirements of the course SHW 4999 (Final Year Project) for award of the degree of Bachelor of Agriculture (Animal Science).

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LIST OF ABBREVIATIONS

DM	Dry Matter
CP	Crude Protein
NDF	Neutral Detergent Fibre
ADF	Acid Detergent Fibre
ADL	Acid Detergent Lignin
IVDMD	<i>In Vitro</i> Dry Matter Digestibility
gm	Gram
ml	Milileter
L	Liter
SPSS	Statistical Package for the Social Sciences

IN VITRO STUDIES OF THE DIGESTIBILITY OF WATERMELON

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BY

SYAHIRA BINTI AHMAD DAUD

ABSTRACT

From time to time, Malaysians are always looking for watermelon as one of their favourite fruits. The flesh is appealing to eat freshly or being blended into a refreshing drinking juice. However, the peels are left abundantly. As one of the agriculture-by-products, the excess watermelon peel are then being carried into a study to determine the digestibility of watermelon (*Citrullus lanatus*) peel via dry matter (DM), ash, crude protein (CP), crude fibre (CF), neutral detergent fibre (NDF), acid detergent fibre (ADF), acid detergent lignin (ADL), *in vitro* gas production (IV) and *in vitro* dry matter digestibility (IVDMD). Napier grass (*Pennisetum purpureum*) is used in this experiment acting as the basal diet for the ruminants. First treatment consists of (T1 = 100% Napier grass + 0% watermelon peel; n=3) followed by Treatment 2 consists (T2 = 90% Napier Grass + 10% Watermelon Peel; n=3), Treatment 3 consists of (T3 = 80% Napier grass + 20% Watermelon peel; n=3), and Treatment 4 consisting (T4 = 70% Napier grass + 30% Watermelon peel; n=3). Meanwhile, 100% of watermelon peel (n=3) act as control for this experiment. Based on the analysis, it shows that the Dry Matter (DM), ash, crude

protein (CP), *in vitro* gas production (IV) and *in vitro* dry matter digestibility (IVDMD) has shown significant results ($P < 0.05$) compared to the neutral detergent fibre (NDF), acid detergent fibre (ADF), acid detergent lignin (ADL). In IVDMD, Treatment 4 shows the best results (47.50%) indicate that it has the highest digestibility compare to other treatments. Hence, it is proved that watermelon peel is a good agriculture-by-products. In the study of *in vitro* gas production, watermelon peels in Treatment 4 shows good results proving that it can easily being digested by ruminants. As recommendation, the excessively abundant watermelon peels should be utilized as animal feed as one of agriculture by-product. In conclusion, as a high digestibility feed ingredient, watermelon peel should be recycled as the animal feed of small ruminants as it gives a good digestibility and highly nutritious to the animal.

KAJIAN *IN VITRO* TERHADAP KULIT TEMBIKAI (*Citrullus lanatus*)

MELALUI KAEDAH PENGELUARAN GAS

OLEH

SYAHIRA BINTI AHMAD DAUD

ABSTRAK

Tembikai merupakan buah-buahan tropika yang menjadi salah satu kegemaran rakyat Malaysia. Isinya yang manis dan menyegarkan menjadi pilihan sama ada di makan begitu sahaja atau sebagai jus minuman. Walau bagaimanapun, selepas isinya digunakan sebagai produk, kulit tembikai hanya dibiarkan begitu sahaja dengan banyaknya. Oleh yang demikian, lebih kulit tembikai kajian untuk menentukan penghadaman kulit tembikai melalui bahan kering (DM), abu, protein kasar (CP), gentian neutral detergen (NDF), gentian asid detergen (ADF), lignin detergen asid (ADL), pencernaan *in vitro* (IV) dan pencernaan *in vitro* bahan kering (IVDMD). Rumput Napier (*Pennisetum purpureum*) digunakan dalam eksperimen ini yang bertindak sebagai diet asas untuk ruminan. Rawatan pertama yang terdiri (T1 = 100% rumput Napier + 0% kulit tembikai; n = 3) diikuti dengan Rawatan 2 terdiri (T2 = 90% rumput Napier + 10% kulit Tembikai; n = 3), Rawatan 3 terdiri daripada (T3 = 80% rumput Napier + 20% kulit Tembikai; n = 3), dan Rawatan 4 terdiri daripada (T4 = 70% rumput Napier + 30% kulit Tembikai; n = 3). Sementara itu, 100% daripada tembikai kulit (n = 3) bertindak sebagai sampel kawalan untuk eksperimen ini. Berdasarkan analisis yang dilakukan, keputusan

menunjukkan bahawa bahan kering (DM), abu, protein kasar (CP), pencernaan *in vitro* (IV) dan pencernaan *in vitro* bahan kering (IVDMD) telah menunjukkan hasil yang signifikan ($P < 0.05$) berbanding dengan gentian neutral detergen (NDF), gentian asid detergen (ADF) dan lignin detergen asid (ADL). Oleh itu, kulit tembikai adalah bahan sampingan pertanian yang sesuai sebagai makanan haiwan kerana ia mempunyai kadar penghadaman yang tinggi melalui kajian IVDMD (47.50%). Dalam kajian pengeluaran gas *in vitro* pula, kulit tembikai menunjukkan keputusan yang baik dan membuktikan bahawa ia boleh dicerna oleh bakteria di dalam rumen. Sebagai cadangan, kulit tembikai hendaklah digunakan dengan bijak sebagai makanan haiwan hasil dari produk sampingan pertanian. Kesimpulannya, lebih kulit tembikai yang banyak tidak harus terus dibuang begitu sahaja. Ia hendaklah dikitar semula sebagai makanan ruminant kecil kerana ianya mempunyai kadar penghadaman dan nutrisi yang tinggi.

CHAPTER 1

INTRODUCTION

Fruit wastes, which had been disposed from most kitchens, fruit stalls and juice dealers in Malaysia is considered as one of feed source and agriculture by-products for ruminant in order to recycle environmental waste and reduce the cost of animal feed production. The nutritive value of fruit skins, specifically watermelon (*Citrullus lanatus*) residues are attractive sources of dietary fibre and of course highly digestible by ruminants. The digestibility by ruminants can be measured by using *in vitro* gas production technique. *In vitro* gas production technique was initially proposed by Menke et al., (1979) to assess digestibility and metabolizable energy (ME) content of feeds commonly fed to ruminants. This technique is one of the easiest ways to measure gas production as it is less time consuming and less expensive. This technique enables selection of feed or feed constituents for high efficiency of microbial protein synthesis in the rumen along with considerable dry matter digestibility, and provides a basis for development of feeding strategies to maximise substrate fixation into microbial cells. The purpose of this study was to measure the digestibility of watermelon peels (*Citrullus lanatus*) via *in vitro* gas production technique by rumen fluid fermentation.

1.1 Objectives

1.1.1 General objectives

To measure the digestibility of watermelon peels (*Citrullus lanatus*) via *in vitro* gas production technique.

1.1.2 The specific objectives are:

- To determine the effect of fruit waste (watermelon peel) as digestible animal feed by measuring the gas production under anaerobic condition.
- To determine the optimum percentage of the watermelon needed in animal diet.
- To measure IVDMD at post *in vitro* gas production.

1.2 Significance of the Study

To use fruit wastes as animal feed. The excessive watermelon peel should be used into something beneficial to animals.

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