



***EFFECT OF EFFECTIVE MICROORGANISM (EM) ON THE NUTRITIVE
QUALITY OF NAPIER SILAGE***

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QUALITY OF NAPIER SILAGE**

BY

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CERTIFICATION

This project entitled “**The effect of effective microorganism (EM) on the nutritive quality of Napier silage**” was prepared by Hafis bin Othman and report submitted to the Faculty of Agriculture in partial fulfillment of the requirement of SHW 4999 (Final Year Project) for the award of the degree of Bachelor of Animal Science.

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TABLE OF CONTENTS

ACKNOWLEDGEMENT	i
TABLE OF CONTENTS	ii
LIST OF ABBREVIATION	vi
LIST OF FIGURES	vii
LIST OF TABLES	vii
Abstract	viii
Abstrak	x
CHAPTER 1: INTRODUCTION	1
1.1 Objective.....	2
1.2 Hypothesis.....	2
1.3 Significant of study.....	2
CHAPTER 2: LITERATURE REVIEW	3
2.1 Napier grass	3
2.2 Ruminant fiber digestion	4
2.3 Limitation of forage use by ruminant	4
2.4 Silage	5
2.4.1 Silage quality	5
2.4.2 Silage storage.....	5

2.4.3 Silage additives.....	6
2.4.4 Particle length.....	6
2.5 Aerobic stability.....	7
2.6 Bacteria Inoculants	7
2.6.1 Lactic acid bacteria	7
2.7 Effect of inoculants on fermentation	8
2.8 Result of substrate after bacteria treatment	8
CHAPTER 3: MATERIALS AND METHODS	9
3.1 Location of the experiment.....	9
3.2 Preparation the sample.....	9
3.3 Processing the Napier grass.....	9
3.4 Treatment of silage with EM.....	10
3.5 Monitoring silo	10
3.6 Collecting the substrate	11
3.7 Chemical analysis.....	11
3.7.1 Dry Matter (DM).....	11
3.7.2 Organic Matter (OM).....	12
3.7.3 Crude Protein (CP)	12
3.7.4 Neutral Detergent Fiber (NDF).....	12

3.7.5 Acid Detergent Fiber (ADF)	13
3.7.6 Acid Detergent Lignin (ADL)	14
3.8 pH value	14
3.9 Statistical analysis	15
CHAPTER 4: RESULTS.....	16
4.1 Dry Matter (DM) content	16
4.2 Crude Protein (CP) content.....	17
4.3 Neutral Detergent Fiber (NDF) content	18
4.4 Acid Detergent Fiber (ADF) content.....	19
4.5 Acid Detergent Lignin (ADL) content.....	20
4.6 pH value	21
4.7 Aerobic stability.....	22
CHAPTER 5: DISCUSSIONS.....	23
5.1 Dry Matter.....	23
5.2 Crude Protein	23
5.3 Neutral Detergent Fiber (NDF).....	24
5.4 Acid Detergent Fiber (ADF).....	24
5.5 Acid Detergent Lignin.....	25
5.6 pH value	25

5.7 Aerobic stability.....26

CHAPTER 6: CONCLUSION27

REFERENCES28

APPENDIX34



LIST OF ABBREVIATION

ADF	Acid Detergent Fiber
ADL	Acid Detergent Lignin
CP	Crude Protein
DM	Dry Matter
EM	Effective Microbe
NDF	Neutral Detergent Fiber
cm	centimeter
g	gram
ml	milliliter
°C	degree celcius
%	percentage

LIST OF FIGURES

- Figure 4.1: Dry matter content of 3 treatments of Napier silage at different stages of fermentation
- Figure 4.2: Crude protein content of 3 treatments of Napier silage at different stages of fermentation
- Figure 4.3: Neutral detergent fiber content of 3 treatments of Napier silage at different stages of fermentation
- Figure 4.4: Acid detergent fiber content of 3 treatments of Napier silage at different stages of fermentation
- Figure 4.5: Acid detergent lignin content of 3 treatments of Napier silage at different stages of fermentation
- Figure 4.6: pH values of 3 treatments of Napier silage at different stages of fermentation

LIST OF TABLES

- Table 3.3: Treatment and number of samples used
- Table 4.7: pH values on aerobic stability of 3 treatments of Napier silage at different stages of fermentation

**EFFECT OF EFFECTIVE MICROORGANISM (EM) ON THE NUTRITIVE QUALITY OF
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Supervised by: Tn. Haji Idris Bin Abu Bakar

Faculty: Agriculture

Keywords: silage, Napier grass (*Pennisetum purpureum*), effective microorganism (EM).

Abstract

Famers nowadays, are concern on the purpose of making silage to preserve the supply of feedstuff to the livestock for a long a period of time. This study was conducted to determine the nutritive value and the dry matter content of Napier silage inoculated with commercial EM. The Napier grass were cut back and fertilized at Ladang 2 and harvested randomly at 6 week of age. The Napier had been ensiled and divided into 3 different treatments. The treatment involved were Napier with water for treatment 1, Napier only for treatment 2 and Napier with EM for treatment 3 with total 15 containers where the containers were opened at five different time interval. The laboratory analysis were conducted at Nutrition Laboratory Animal Science Department to analyze for dry matter (DM), crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber

(ADF), and acid detergent lignin (ADL). pH value of the silage was also measured. There was significant difference ($P < 0.05$) observed in DM and NDF value when analyzed on same treatment with different periods of time. For DM, treatment 3 showed the highest percentage of DM (76.35%) compared to other treatment. Treatment 1 was significant compared to treatment 2 and treatment 3 in NDF. Meanwhile, there was no significant difference on CP, ADF and ADL. For the pH reading at time interval of 4 days, treatment 2 showed significant difference ($P < 0.05$) compared to treatment 1 and treatment 3. There was no significant difference during the periods of 8, 12, 16 and 20 days when pH readings were compared to other treatment. For the aerobic stability, it was shown that the pH of the inoculated Napier silage was more stable after a few openings compared to other treatment. In conclusion, the Napier silage treated with EM slightly increased the nutritive value contents of the silage. Better understanding in the uses of EM inoculants in the silage encourage farmer to use it as an additive that will improves silage quality.

**KESAN EFEKTIF MIKROORGANISMA (EM) TERHADAP NILAI KUALITI
PEMAKANAN SILAJ NAPIER**

Oleh

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Penyelia: Tn. Haji Idris Bin Abu Bakar

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Abstrak

Penternak pada masa kini, mula mengambil perhatian akan pentingnya mengenai tujuan membuat silaj untuk mengekalkan bekalan makanan kepada ternakan untuk tempoh masa yang panjang. Kajian ini dijalankan untuk menentukan nilai pemakanan dan kandungan bahan kering Napier silaj yang disuntik dengan komersial EM. Rumput Napier dipotong dan dibaja di Ladang 2 dan dituai secara rawak pada minggu ke 6. Napier telah diperam dan dibahagikan kepada 3 rawatan yang berbeza. Rawatan yang terlibat ialah Napier ditambah air untuk rawatan 1, Napier sahaja untuk rawatan 2 dan Napier ditambah EM untuk rawatan 3 dengan kesemuanya berjumlah 15 bekas di mana bekas-bekas tersebut telah dibuka pada lima tempoh masa yang berbeza. Analisis makmal telah dijalankan di Makmal Pemakanan, Jabatan Sains

Haiwan untuk menganalisis bahan kering (DM), protein kasar (CP), serat detergen neutral (NDF), serat detergen asid (ADF), dan asid detergen lignin (ADL). Nilai pH silaj juga telah diukur. Terdapat perbezaan yang signifikan ($P < 0.05$) bagi DM dan nilai NDF apabila dianalisis pada rawatan yang sama untuk tempoh masa yang berbeza. Untuk DM, rawatan 3 menunjukkan peratusan tertinggi (76.35%) berbanding rawatan lain. Rawatan 1 menunjukkan perbezaan yang signifikan yang ketara berbanding dengan rawatan 2 dan rawatan 3 untuk nilai NDF. Sementara itu, tidak ada perbezaan yang signifikan ke atas CP, ADF dan ADL. Untuk bacaan pH pada selang masa 4 hari, rawatan 2 menunjukkan perbezaan yang signifikan ($P < 0.05$) berbanding dengan rawatan 1 dan rawatan 3. Tidak ada perbezaan yang signifikan dalam tempoh 8, 12, 16 dan 20 hari apabila dibandingkan bacaan pH untuk kesemua rawatan. Dari sudut kestabilan aerobik, ia menunjukkan bahawa pH Napier silaj disuntik dengan EM adalah lebih stabil dan lewat berlaku kerosakan apabila dibuka semula berbanding rawatan lain. Kesimpulannya, silaj Napier yang dirawat dengan EM mempunyai sedikit peningkatan kandungan nilai pemakanan silaj tersebut. Pemahaman yang lebih baik dalam kegunaan inokulan EM dalam silaj menggalakkan petani untuk menggunakannya sebagai bahan yang akan meningkatkan kualiti silaj.

CHAPTER 1

INTRODUCTION

Silage is a fodder prepared by compressing and fermenting green forage crops under anaerobic conditions, usually in a silo. Basically, the purpose of making silage is to preserve the supply of feedstuff to the livestock for a long period if the farms do not have continuous supply of feed or forages. Silage is made by preserving the grass under naturally produced acidic conditions which effectively pickle the crop. Silage is quite moist and usually preferred by livestock to hay as it is more palatable and of higher feed value.

There are many types of silages being produced by farmers where it can be made from many field crops, and special terms may be used depending on type of contents, and one of that is Napier grass. Napier grass has been the most promising and high yielding fodder giving dry matter yields that surpass most tropical grasses (Orodho, 2006). Napier grass is a high yielding fodder crop with good palatability, and highly nutritious especially when young. Napier is easy to establish and persistent, drought tolerant, suitable for cutting and very good for silage making.

Silage inoculants are additives containing anaerobic lactic acid bacteria (LAB) that are used to manipulate and enhance fermentation in silage (Muck, 1996). The lactic acid bacteria present in the EM will help in ferment some of the sugars into lactic acid causing a decline in pH which results in a more stable silage. The EM contains selected species of microorganisms including predominant populations of LAB and yeasts as well as smaller numbers of photosynthetic bacteria, actinomycetes and other types of organisms (Amanullah *et al.*, 2014).

1.1 Objective

The general study on this experiment is to measure the nutritive quality of the silages by treating it with commercial EM.

The objectives of this experiment are:

1. To measure the dry matter (DM) content and chemical composition of Napier silage.
2. To compare the DM content and chemical composition of Napier silage and inoculated Napier silage at different intervals.

1.2 Hypothesis

By treating Napier grass with the inoculants will affect the nutritive contents of the silage.

1.3 Significant of study

Better understanding in the uses of effective microbe inoculants in the silage encourage farmer to use it as substances that will improved the silage quality. Farmer able to produce high quality ruminant feed to livestock. Hence, it will increase the animal production. Besides that, high nutritive silage will also help to improve animal health which will stimulate internal body resistance against the diseases. Farmer will be more aware in the usage of effective microbes in the silages.

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