PAPER • **OPEN ACCESS**

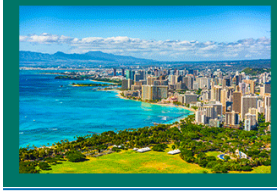
The Effects of Probiotic from *Hymenachne Acutigluma* Silage in Feed to the Length of Small Intestine and Caeca in Pegagan Ducks

To cite this article: S Sandi *et al* 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **810** 012007

View the article online for updates and enhancements.

You may also like

- Isolating and characterizing bacteria in the intestine of wild sandfish, *Holothuria scabra* as probiotics candidate
S B M Sembiring, J H Hutapea, I N A Giri et al.
- A simple method to reduce halitosis: tongue scraping with probiotics
Berk Gurpinar, Güven Yildirim, Tolgar Lütfi Kumral et al.
- Evaluate the efficacy of Probiotic Lactobacilli on growth and biofilm formation in *Streptococcus mutans* isolated from gingivitis
Abbas Mayar Hezam

245th ECS Meeting
San Francisco, CA
May 26–30, 2024

PRiME 2024
Honolulu, Hawaii
October 6–11, 2024

Bringing together industry, researchers, and government across 50 symposia in electrochemistry and solid state science and technology

Learn more about ECS Meetings at
http://www.electrochem.org/upcoming-meetings

Save the Dates for future ECS Meetings!

This content was downloaded from IP address 182.1.231.179 on 07/04/2023 at 11:42

The Effects of Probiotic from *Hymenachne Acutigluma* Silage in Feed to the Length of Small Intestine and Caeca in Pegagan Ducks

S Sandi[1*], E Sahara[1], A T Novitasari[1], A I Munawar Ali[1], A Susanda[1], F Yosi[1], Asmak[2]

[1]Animal Husbandry Program, Faculty of Agriculture Agriculture Sriwijaya University, Jl. Palembang-Prabumulih KM-32, Inderalaya, Ogan Ilir, South Sumatera
[2]Agricultural Technology Assessment Center, Jln Raya Padang Solok KM 40 Sukarami Kab, Solok West Sumatera.

*sofiasandi_nasir@yahoo.com

Abstract. This study aims to determine the effect of giving probiotics from (hymenachne acutigluma) silage in feed to the length of smallintestine and caeca in Pegagan ducks. The object of this research is sixty 5 months Pegagan ducks. The research design used was a Completely Randomized Design (CRD) with 5 treatments and 4 replications. There is 3 Pegagan ducks as a variable unit: P0 (Control); P1 (Ration + Probiotics with a dose 0,2%); P2 (Ration + Probiotics with a dose 0.4%); P3 (Ration + Probiotics with a dose 0.6%); P4 (Ration + Probiotics with a dose 0.8%). The observed variables were length of small intestine, length of duodenum, length of jejunum, length of ileum, and length of caeca. The results of this study indicate that administration of probiotics from (hymenachne acutigluma) silage in feed can increase the percentage of small intestine length and caeca. The conclusion of this research is the provision of probiotics from (*Hymenachne acutigluma*) silage with a dose 0.2% can increase the percentage of small intestine length and caeca in Pegagan ducks.

1. Introduction

Lactic acid bacteria (LAB) are live bacteria that can be obtained from various sources, one of which is isolated from the silage (*Hymenachne acutigluma*). The results of Sandi et al. showed that lactic acid bacteria originating from Kumpai Tembaga grass were included in the Lactobacilius plantarum type with a similarity level of 87.3-99.9% [1]. These bacteria have the potential as probiotics in animal feed, this can be seen from the results of Jannah's research which shows that bacteria from Kumpai Tembaga grass are resistant to pH, bile salts and anti-microbes [2].

This probiotic from swamp forage has the ability to stimulate lactic acid bacteria in the intestine so that it can create an acidic atmosphere by suppressing the growth of pathogenic bacteria and can improve the balance of the intestinal microflora. Acidic conditions (pH) in the digestive tract have different pH levels, but probiotic bacteria can still survive well, this can be seen from the results of Sandi et al. 's research on the resistance of lactic acid bacteria isolates from Kumpai Tembaga grass silage as a probiotic distributed into digestion in vitro, it has shown that lactic acid bacteria are able to survive by growing and developing at different pH levels [1].

Lactic acid bacteria that are able to survive in the intestine have a role in the growth and development of the intestinal villi by expanding the surface of the absorption area so that they can increase the ability to absorb nutrients in the intestine, however, Asep's research results show that by in vivo of probiotics into the feed of Pegagan ducks with a dose of 0.02% was not able to improve the performance of these ducks [3]. Based on this, it is necessary to do further research by increasing the

Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.
Published under licence by IOP Publishing Ltd

dosage of adding probiotics to the feed to determine the effect of probiotics from Kumpai Tembaga grass silage isolates on the percentage of small intestine length and caeca of Pegagan ducks.

2. Methodology

This research was conducted for 3 months. The materials used were 60 of Pegagan ducks with 5 month old, probiotics from the silage isolate of Kumpai Tembaga grass (Hymenachne Acutigluma) which has been made in the form of flour. The rations used consisted of fine corn, rice bran, global layer duck concentrate 544, MBM flour, premix, methionine and lysine with a metabolic energy content of 2750.80 kcal / kg and crude protein 20.94%. Probiotics were mixed into the ration and drinking water was given ad libitum for 2 months of the maintenance period.

Sampling was carried out at the end of the maintenance period at the age of 7 months with a cutting technique carried out on ducks in accordance with the USDA (1977), after being cut, the ducks were cleaned of blood and feathers only then all the digestive organs were removed and part of the small intestine was taken and caeca [4]. The small intestine fluid is removed first and then cut and measured in length using a measuring tape (tape measure). This research method is an in vivo experiment using a completely randomized design (CRD) with 5 treatments and 4 replications. Each experimental unit was filled with 3 Pegagan ducks. The treatment consists of P0 (Control / rations without probiotics), P1 (Ration+probiotics at a dose of 0.2%), P2 (Ration+ probiotics at a dose of 0,4%), P3 (Ration+probiotics at a dose of 0,6%), P4 (Ration +probiotics at a dose of 0,8%). The data were analyzed using analysis of variance and if it had a real effect, a further test of the least significant difference (LSD) was carried out [5].

3. Results and Discussion

Table 1. Average percentage of small intestine length and caeca of Pegagan ducks given probiotics from Kumpai Tembaga grass silage

Variable (%)	Treatment				
	P0	**P1**	**P2**	**P3**	**P4**
Small Intestine	$8,26^{c} \pm 0,43$	$9,82^{b} \pm 0,53$	$9,81^{b} \pm 0,64$	$11,97^{a} \pm 0,66$	$11,86^{a} \pm 0,77$
Duodenum	$1,54^{d} \pm 0,15$	$1,82^{c} \pm 0,09$	$1,83^{c} \pm 0,02$	$2,73^{b} \pm 0,08$	$3,30^{a} \pm 0,21$
Jejunum	$4,18^{b} \pm 0,40$	$4,49^{b} \pm 0,30$	$4,43^{b} \pm 0,22$	$5,32^{a} \pm 0,13$	$5,43^{a} \pm 0,22$
Ileum	$2,61^{ab} \pm 0,36$	$3,49^{a} \pm 0,33$	$3,54^{a} \pm 0,45$	$3,94^{a} \pm 0,68$	$3,07^{ac} \pm 0,48$
Caeca	$1,46^{c} \pm 0,22$	$1,71^{b} \pm 0,06$	$1,70^{b} \pm 0,09$	$1,81^{b} \pm 0,22$	$2,08^{a} \pm 0,23$

Information : P0= control (feed without probiotics), P1= giving probiotics with a concentration of 0.2%, P2= giving probiotics with a concentration of 0,4%, P3= giving probiotics with a concentration of 0,6%, P4= giving probiotics with a concentration of 0,8%. Different superscripts on the same line indicate significant differences ($P<0,05$)

The results showed that the addition of probiotics from Kumpai Tembaga grass silage into the ration had a significant effect ($P <0.05$) on the small intestine length of Pegagan ducks with an average percentage value ranging from 8.26-11.97%. The increase in the percentage of small intestine length indicates that the higher the level of probiotics, the longer the length of the small intestine, this is presumably because the provision of probiotics into the ration is able to work optimally in the small intestine with its ability to stimulate lactic acid bacteria to create an acidic atmosphere in the small intestine. According to Purwati et al. (2005) that giving probiotics will create a balance in the intestinal microflora, because of the presence of lactic acid bacteria in the intestine which can create acidic conditions in the intestine by suppressing the growth of pathogenic bacteria [6]. Another research reported the use of probiotic isolates derived from the silage of Kumpai Tembaga grass shows that

lactic acid bacteria are still able to survive in different acidic conditions in the digestive tract of poultry [7].

The results showed that the addition of probiotics from Kumpai Tembaga grass silage into the ration had a significant effect (P <0.05) on the duodenal length of Pegagan ducks. The increase that occurs in the percentage of duodenal length is closely related to the development of the intestinal villi. The increase in villi size can be affected by the presence of short-chain fatty acids which stimulate duodenal villi growth. Ahmad (2006) stated that probiotics can produce short chain fatty acids which are useful for increasing the growth of height and width in the villi [8]. The research results of Sandi et al (2019) proved that non-pathogenic bacteria from the use of probiotics isolated from Kumpai Tembaga grass silage were able to survive in the duodenum in pH 6 conditions with an average population range of 7.68 cfu / g [6]. This suggests that the activity of non-pathogenic bacteria that survive in the duodenum has an impact on increasing the performance of the duodenum in absorbing food nutrients and with the increased growth of villi, the length of the duodenum will increase.

The results showed that the addition of probiotics from the silage of Kumpai Tembaga grass into the ration had a significant effect (P <0.05) on the length of the jejunum with the persentase range of jejunum length, namely 4.18-5.43%. The increase in the length of the jejunum indicates that the provision of probiotics from copper kumpai grass silage isolates is able to work optimally in the jejunum so that it can increase the absorption area of the absorption of nutrients. This is in line with the another opinion which states that probiotics can have a positive effect on the morphology of the intestinal wall of the jejunum [9]. The use of probiotics in poultry rations can affect the growth and condition of the digestive tract of the jejunum because of their role in producing short-chain fatty acids in sufficient quantities, resulting in an increase in the length of the jejunum by affecting the development of the intestinal villi.

The results showed that the addition of probiotics from Kumpai Tembaga grass silage into the ration had a significant effect (P <0.05) on the percentage of length of the ileum with a long range of 2.61-3.94%, this is presumably because probiotic bacteria were still able to reach the ileum. with a sufficient amount, although not as much as in the deodenum and jejenum, so that the performance of the ileum in the process of absorption of nutrients can still work properly. Damron (2003) states that the intensive digestion process occurs in the duodenum and jejunum, but with the provision of probiotics from Kumpai Tembaga grass silage isolates, the ability of non-pathogenic bacteria in the ileum is still able to live and work well in stimulating intestinal villi, although not as much [10]. In the jejunum and ileum, this is supported by the results of the research by Sandi et al (2019) that by providing probiotics from Kumpai Tembaga grass silage isolates in the ileum with a pH of 7.5, non-pathogenic bacteria are still able to grow and survive [7].

The results showed that the addition of probiotics from the silage of Kumpai Tembaga grass into the ration had a significant effect (P <0.05) on the percentage of Pegagan duck bagging length. The increase in the percentage of swab length indicates that the administration of probiotics can affect the activity of bacteria in the intestine by stimulating the development of villi in the wipe area, thereby increasing the surface area of the intestine as a place for absorption of food nutrients. Rahmawati (2016) states that, with the expansion of the surface of the intestine, the absorption of nutrients will increase and the growth of pathogenic bacteria such as Escherichia coli will be suppressed [11]. Increased absorption of nutrients in the intestinal wall due to the provision of probiotics from copper kumpai grass silage plays a role in triggering microbial activity in the wipe section. This proves the existence of beneficial bacteria from the provision of probiotics that can survive to the wipe section [7].

4. Conclusion

Giving probiotics from Kumpai Tembaga grass silage into the ration at a dose of 0.2% was able to increase the percentage of small intestine length and caeca of Pegagan ducks at the age of 5 months.

References

[1] Sandi S, Meisji L S, Eli S, Adi S, Miksusanti, Nuni G and Asmak 2019 Acid Resistance Test of Probiotic Isolated from Silage Forage Swamp on in Vitro Digestive Tract *Indonesia Journal of Fundamental and Applied Chemistry* **4** (1) 15-19

[2] Jannah, R F 2017 *Karakteristik Bakteri Asam Laktat Sebagai Probiotik Pada Silase Berbahan Rumput Kumpai Tembaga (Hymenachne Acutigluma) dan Legum Kemon Air (Neptunia oleracea lour)* Skripsi Program Studi Peternakan, Fakultas Pertanian, Universitas Sriwijaya
[3] Asep S L 2018 *Pengaruh Garam Asam Organik dan Probiotik Dari Silase Kumpai Tembaga Terhadap Performa Itik Pegagan* Skripsi Program Studi Peternakan, Fakultas Pertanian Universitas Sriwijaya
[4] United states departement of agriculture (USDA) 1977 Poultry Grading manual US goverment Office,Washington DC
[5] Steel R G D and Torrie J H 1991 *Prinsip dan prosedur statistika* (Jakarta: Penerbit Gramedia Pustaka Utama)
[6] Purwati E S, Syukur and Hidayat Z 2005 *Lactobacillus, Isolasi dari Biovicophitomega Sebagai Probiotik* (Jakarta: Lembaga Ilmu Pengetahuan Indonesia)
[7] Sandi S 2018 The Characteristics and Potential of Lactic Acid Bacteria as Probiotics in Silage Made from Hymenachne acutigluma and Neptunia oleracea lour. *In:* Fitra Y, Meisji L S and Nuni G eds. *Proceedings, E3S Web of Conferences, 1st SRICOENV,* South Sumatera, 2018.
[8] Ahmad I 2006 Effect of probiotics on broiler performance *International Journal Science,* **5**, 593-597.
[9] Wu B Q, Zhang T, Guo L Q and, Lin J F 2011 Effect of Bacillus Subtilis KD1 on Broiler intestinal flora. *Poultry Science,* **90**, 2493-2499
[10] Damron 2003 *Introduction to Animal Science* (Ohio: Prentice Hall)
[11] Rahmawati 2016 *Histologi Saluran Cerna Ayam Buras Hasil in ovo Feeding Asam Amino L-Arginine* Skripsi. Fakultas Peternakan Universitas Hasanuddin Makasar. South Sumatera: Universitas Sriwijaya. 1-4.