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(RESEARCH ARTICLE)

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Performance of broilers supplemented with pandan leaf (*Pandanus amaryllifolius* roxb) water extract in drinking water

I Made Mela Antara [1], Desak Putu Mas Ari Candrawati [2,*] and I Gusti Nyoman Gde Bidura [2]

[1] *Bachelor Program, Faculty of Animal Husbandry, Udayana University, Denpasar, Indonesia.*
[2] *Faculty of Animal Husbandry, Udayana University, Denpasar, Indonesia.*

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Abstract

The prohibition of Antibiotic Growth Promoters (AGP) has encouraged the use of natural feed additives such as pandan leaf (*Pandanus amaryllifolius* Roxb) water extract. This study aims to evaluate the effect of administering pandan leaf water extract in drinking water on broiler performance. A total of 100 one-day-old broiler chicks with uniform body weight were randomly divided into 4 treatment groups, each with 5 replicates, and each replicate consisted of 5 broilers. The treatments included broilers provided with drinking water without pandan leaf extract (P0), while groups P1, P2, and P3 were given drinking water containing 3%, 6%, and 9% pandan leaf water extract, respectively. The results showed that the addition of pandan leaf water extract at levels of 3%, 6%, and 9% had no significant effect (P>0.05) on feed intake, water intake, final body weight, weight gain, and Feed Conversion Ratio (FCR). It was concluded that the addition of pandan leaf water extract up to a level of 9% in drinking water does not influence broiler performance, however there is a trend of increasing feed efficiency when adding 3-6% pandan leaf water extract to broiler drinking water.

Keywords: Broiler; Pandan Leaf Extract; Performance; Drinking Water; Natural Feed Additive

1. Introduction

The use of Antibiotic Growth Promoters (AGP) has been prohibited due to their impact on bacterial resistance in livestock and the potential for residues in meat [1]. Therefore, an innovative substitute for AGP is needed, utilizing the aqueous extract of fragrant pandan leaves as a natural feed additive [2].

Fragrant pandan leaves (*Pandanus amaryllifolius* Roxb) contain phytochemical compounds with antimicrobial activity that can degrade the cell membranes of pathogenic bacteria in chicken intestines [3, 4]. Research [5] states that fragrant pandan leaves contain flavonoids, saponins, and alkaloids, which function as antibacterial and antioxidant agents. Saponins exhibit soap-like (foamy) properties that can clean intestinal walls and improve nutrient absorption [6].

Research [7-9], indicates that administering 5% of *Moringa oleifera* leaf extract and *Allium sativum* (garlic) extract in drinking water can increase feed intake, water consumption, final body weight, weight gain, and efficient FCR values in broilers. Research [10] also reports that providing 2-6% *Moringa oleifera* leaf meal in feed can enhance broiler performance and carcass quality.

The aim of this study is to evaluate the effectiveness of adding *Moringa oleifera* leaf extract to drinking water on broiler performance.

* Corresponding author: Desak Putu Mas Ari Candrawati.

2. Materials and methods

2.1. Materials

The study was conducted at Sesetan Farm, Faculty of Animal Science, Denpasar, Bali, and received approval from the Ethics Committee of the Faculty of Veterinary Medicine, Udayana University. The cages used were battery colony cages.

2.2. Methods

A total of 20 cages were used, with each cage containing 5 one-day-old broilers of homogeneous body weight. 4 treatment groups were randomly assigned, with 5 replicates per group.

The treatments included:

- P0: Feed with drinking water without pandan leaf extract,
- P1: Feed with drinking water containing 3% of pandan leaf extract,
- P2: Feed with drinking water containing 6% of pandan leaf extract,
- P3: Feed with drinking water containing 9% of pandan leaf extract

All cages were equipped with feed and water containers with a capacity of 5 liters. The study used a commercial ration, 511 Bravo, produced by PT. Charoen Pokphand, Tbk Indonesia.

Feed intake, water consumption, body weight, and weight gain were measured weekly. FCR was calculated by dividing feed intake by weight gain. Feed and water were provided ad libitum (always available).

2.3. Fragrant Pandan Leaf Extract

Fragrant pandan leaf extract was prepared by mixing 1 kg of pandan leaves with 1 liter of water. After blending, the extract was filtered and stored in bottles in a refrigerator until used according to the treatments:

- 0 cc (no extract),
- 30 cc pandan leaf extract in 970 cc of drinking water,
- 60 cc pandan leaf extract in 940 cc of drinking water,
- 90 cc pandan leaf extract in 910 cc of drinking water.

The data were analyzed using variance analysis, and if significant differences were observed ($P<0.05$), Duncan's Multiple Range Test was applied [11].

3. Results and Discussion

The performance of 5-week-old broilers given pandan leaf (*Pandanus amaryllifolius Roxb*) extract in drinking water is shown in Table 1. During the 5-week study, feed intake showed that treatment P0 resulted in feed consumption of 3615.4 g/head, while treatments P1, P2, and P3 had feed consumption reduced by 0.64%, 2.79%, and 0.41%, respectively, compared to P0. These differences were not significant ($P>0.05$).

The pandan leaf extract did not significantly alter the nutritional composition of the feed across the four treatments, resulting in no significant difference in feed intake. Research [12], indicates that feed intake is influenced by the nutritional composition of the diet. Similarly, another study [13] found that adding synbiotic tape yeast and *Moringa oleifera* leaves to the diet did not affect broiler feed intake. Research [14] also showed that using papaya seeds as an antimicrobial did not affect broiler feed intake.

The average water consumption of broilers given pandan leaf extract over the 5-week study ranged from 5477.43 ml/head to 5288.29 ml/head. Statistically, water consumption among the four treatments did not differ significantly ($P>0.05$). Research by [15] stated that water consumption is directly proportional to feed intake. Similarly, [14] found that administering papaya seeds as an antimicrobial did not affect water consumption in broilers.

The final body weight of broilers given pandan leaf extract in treatments P1 and P2 was 3.57% and 4.53% higher than P0, respectively, while treatment P3 was 2.38% lower than P0. Statistically, these differences were not significant (P>0.05). Weight gain in broilers receiving pandan leaf extract in treatments P1 and P2 was 3.66% and 4.60% higher than P0, respectively. However, in treatment P3, weight gain was 2.43% lower than P0, and these differences were also statistically insignificant (P>0.05).

Table 1 Performance of 5-week-old broilers given fragrant pandan leaf (*Pandanus amaryllifolius* Roxb) extract in drinking water

Variable	**Treatment**				**SEM[1)]**
	P0	**P1**	**P2**	**P3**	
Initial Body Weight (g/head)	47.55[a2)]	47.45[a]	47.25[a]	47,45[a]	0.23
Feed Intake (g/head)	3615.4[a]	3592.4[a]	3514.7[a]	3600.4[a]	45.06
Water Consumption (ml/head)	5463.71[a]	5477.43[a]	5441.71[a]	5288.29[a]	103.96
Final Body Weight (g/head)	2121.5[a]	2197.25[a]	2217.5[a]	2071.0[a]	49.61
Weight Gain (g/head)	2073.95[a]	2149.9[a]	2169.45[a]	2023.55[a]	49.55
FCR *(*feed conversion ratio*)*	1.76[a]	1.63[a]	1.62[a]	1.79[a]	0.006

SEM=Standard Error of the Treatment Means; Values with the same superscript letters in the same row are not significantly different (P>0.05)

The possibly low dosage of fragrant pandan leaf extract may have rendered the phytochemical compounds in the extract suboptimal in acting as antibacterial agents within the digestive tract. According to [16], an increase in beneficial microbes in the digestive tract can enhance nutrient absorption, leading to better growth in broilers. Research by [14] showed that administering papaya seeds as an antimicrobial did not affect weight gain in broilers. Similarly, [13] found that adding synbiotic tape yeast and *Moringa oleifera* leaves to broiler feed, intended to maintain digestive health, did not influence body weight or weight gain.

The Feed Conversion Ratio (FCR) values of broilers given fragrant pandan leaf extract over the 5-week study for treatments P1, P2, and P3 were 7.39%, 7.95%, and 3.41% lower than P0, respectively. However, these differences were not statistically significant (P>0.05). Since both feed intake and weight gain across all treatments did not differ significantly, feed conversion efficiency also showed no significant differences. Furthermore, the fragrant pandan leaf extract primarily functioned as an antimicrobial agent promoting digestive tract health without significantly affecting feed digestion efficiency or conversion.

Research by [17] indicated that administering dragon fruit juice at levels up to 6% as a feed additive did not affect the FCR values of broilers. Similarly, [18] reported that providing dragon fruit peel juice in drinking water at levels up to 6% did not alter the FCR of broilers.

4. Conclusion

Based on the results of this study, it can be concluded that administering fragrant pandan leaf extract at levels of 3%, 6%, and 9% in drinking water has not yet improved broiler performance, however there is a trend of increasing feed efficiency when adding 3-6% pandan leaf water extract to broiler drinking water.

Compliance with ethical standards

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Disclosure of conflict of interest

There are no conflicts of interest.

Statement of ethical approval

This study has been approved by the research ethics committee of the Faculty of Veterinary Medicine, Udayana University.

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