

## Physical quality of weed silage *Wedelia Trilobata* (L.) hitc given pollard supplements with different levels for ruminant animal feed

Ajat Sudrajat<sup>1\*</sup>, Riky Setyo Wibowo<sup>1</sup>, Sundari<sup>1</sup>, Reo Sambodo<sup>2</sup>, Raden Febrianto Christi<sup>3</sup>, Fazhana Ismail<sup>4</sup>

<sup>1</sup> Faculty of Agroindustry, Universitas Mercu Buana Yogyakarta, Indonesia

<sup>2</sup> Faculty of Agroindustry, Universitas Mercu Buana Yogyakarta, South Bandung Livestock Cooperative (KPBS Pangalengan), Bandung, Indonesia

<sup>3</sup> Faculty of Animal Husbandry, Universitas Padjajaran, Sumedang, Indonesia

<sup>4</sup> Faculty of Technical and Vocational, Universiti Pendidikan Sultan Idris, Malaysia

**Corresponding Author:** Ajat Sudrajat

**DOI:** <https://doi.org/10.66856/ijfsn.2026.11.2.11098>

### Abstract

This study aims to determine the best quality of wedelia weed silage with different levels of pollard addition. This research was carried out on June 1-30, 2024, at the Laboratory of Nutrition and Animal Husbandry Technology, Animal Husbandry Study Program, Faculty of Agroindustry, Mercu Buana University Yogyakarta. The material used in this study is wedelia weed (*Wedelia trilobata* (L) Hitchc.) from Gunung Bulu, Argorejo, Sedayu, Bantul, Yogyakarta. As well as some additional ingredients such as pollard, EM4 (10g), molasses (6g), water and aquades. The research method used an experimental method with a complete randomized design (RAL) using 4 treatments and 3 replicates, each treatment was added a polar i.e. P0; 0%, P1; 1%, P2; 3%, and P3; 5% (0, 10, 30, and 50 grams). The variables observed were pH, aroma, color and texture. The data was analyzed using Analysis of Variance (ANOVA) and if there were differences, the Duncan Multiple Range Test (DMRT) test was performed. The results showed that the pH value in wedelia weed silage was 4.1 consecutively; 4,0; 4,1; and 4.4, aroma P0; 1.77±0.73, P1; 1.70±0.65, P2; 1.90±0.61, P3; 1.87±0.57. P0 color; 2.67±0.96, P1; 2.53±0.97, P2; 2.33±0.96, P3, 2.27±0.83. P0 Texture; 2.47±1.14, P1; 2.00±0.98, P2; 1.50±0.97, P3; 1.77±1.04. The results of variance analysis showed unreal results ( $P>0.05$ ) in pH and texture values. The color parameter showed a significant difference in results ( $P<0.05$ ). It was concluded that the addition of pollard to wedelia weed silage had no effect on the pH value and texture but could affect the color of the silage. The best silage quality is found in P2 with the addition of 3% pollard, which is as much as 30 grams.

**Keywords:** Silage, wedelia weeds, physical quality, feed, pollard

### Introduction

The main factor that determines success in the livestock business is the provision of feed. Feed is a single or mixed food ingredient, both processed and unprocessed, that is given to livestock for survival, production and breeding (Law on Livestock and Animal Health of the Republic of Indonesia No. 18, 2009). Feed is everything that livestock can consume as a source of energy and nutrition, with the note that it does not harm the health of livestock (Prabowo, 2016) [5]. Ruminant animal feed consists of forage feed and booster feed (concentrate). Forage feed is all feed ingredients derived from plants or plants in the form of leaves, sometimes including stems, twigs and flowers. The need for forage feed is absolute, in the livestock production system, ruminant livestock forage (HPT) as a feed material source of fiber is absolute, needed throughout the year (Vian DWI Chalisty, 2021) [10].

Forage feed given to livestock can be in two forms, namely fresh forage and dry forage. However, the availability of forage feed, especially fresh forage, is sometimes an obstacle in the maintenance of ruminant livestock. Handayanta *et al.*, (2015) [4] stated that the availability of feed is the main obstacle, especially in developing countries because the supply of animal feed forage (HPT) both in terms of quality and quantity always experiences scarcity and fluctuates throughout the year.

Indonesia has two different seasons, namely the rainy season and the dry season. During the dry season, farmers

find it difficult to find a source of forage for livestock (HMT), so farmers only provide makeshift feed to their livestock. Poor feeding can affect livestock productivity, which is characterized by a lack of weight gain in cattle. Meanwhile, during the rainy season, there is often an abundance of forage for livestock. In order for the forage to be durable, it is necessary to preserve fresh forage called silage (Fluent Khan, 2023) [3]. Silage is the process of preserving fresh feed forage in anaerobic conditions with the formation or addition of acids. The acids that are formed are organic acids including lactate, acetate, and butyrate as a result of the fermentation of dissolved carbohydrates by bacteria resulting in a decrease in acidity (pH). A drop in pH value will inhibit the growth of decaying microorganisms (Adriani *et al.*, 2016) [2]. Forage plants that can be used for making silage are grasses, legumes and weeds. One of the weeds that silage can make is weedelia weed.

Wedelia is one of the kind Wild plants who live in areas with a climatetropical. This plant is easily found in plantations and rice fields, grasslands and on roadsides/rivers. Wedelia belongs to the group of herbaceous plants. Herbaceous plants are plants that grow low and cannot get tall. Wedelia, still in the same family with daisies. Shirley (*Wedelia trilobata* (L) Hitchc.) is a ground cover plant in the form of a yellow-flowered shrub, dense leaf crown, and creeping from the family *Asteraceae*. The weedy plant is a weed that has a distribution from lowland to highland, and its use by the community is still limited. Weedelia weeds have a crude

protein content of 16-22% and crude fiber 23%, making it suitable for ruminant animal feed (Sudrajat *et al.*, 2023, 2024 and 2025) [3, 6, 8].

Weed silage was chosen because of the large number of weeds found around plantations and riversides. In addition, weed silage has not been widely made into silage and given to livestock. Weed silage is expected to be a solution to ruminant farming problems, especially the problem of feed sources in the dry season (Sudrajat *et al.*, 2023) [3]. Based on the various descriptions above, a study was carried out on the Evaluation of the Physical Quality of Wedelia Weed Silage (*Wedelia trilobata* (L) Hitchc.) which is Fermented Using the Addition of Different Pollard Levels. The purpose of this study is to find out the best quality of weed silage with different levels of pollard addition.

## Materials and Methods

This research was carried out from March to June 2024<sup>[8]</sup>. Located at the Laboratory of Nutrition and Livestock Product Technology of the Animal Husbandry Study Program, Faculty of Agroindustry, Mercu Buana University, Yogyakarta, Argomulyo Village, Sedayu, Bantul, D.I.Yogyakarta.

The research material used wedelia weed (*Wedelia trilobata* (L) Hitchc.) as much as 12 kg from Gunung bulu, Argorejo, Sedayu, Bantul, Yogyakarta. Some of the other materials used are pollard, EM4, molasses, water and aquades. The tools used are a scythe, pH meter, 5 kg plastic, trash bag, 250 ml beaker glass, measuring cup, SF-400 digital scale, raffia rope, scissors, duct tape, and stationery.

The research method is experimental with a Complete Random Design (RAL) using 4 treatments and 3 replicates, each treatment is added polar, namely P0; 0%, P1; 1%, P2; 3%, and P3; 5% (0, 10, 30, and 50 grams). The making of silage began with the taking of 12 kg of wedelia in Argomulyo, Sedayu, Bantul, Yogyakarta. The wedelia used are chopped to a size of 2-5 cm. Then it was weighed with each test consisting of 1000 g of wedelia, EM4 as a starter of 10 g, molasses of 0.6%, and pollard at different levels in each treatment, namely 0%, 1%, 3% and 5%. All ingredients in each treatment are mixed evenly and put into plastic in an aerobic condition and then stored for 14 days.

The observed variables are pH, aroma, color and texture. The sensory criteria score is presented in Table 1.

**Table 1:** Score Values for Each Silage Criterion

Criterion	Characteristics	Score
Aroma	Very rotten	5
	Rotten	4
	Not sour and not rotten	3
	Slightly acidic	2
	Sour	1
Texture	Mushallow slimy and watery	5
	Slightly mushy slimy slightly juicy	4
	Berlendir	3
	Does not clump slightly slimy	2
	Non-clumping and non-slimy	1
Color	Black	5
	Blackish-black brown	4
	Coklat	3
	Brownish yellow	2
	Yellowish-green	1

Source: (Hidayat, 2012)

## Data Analysis

The data was analyzed using *Analysis of Variance* (ANOVA) and if there were discrepancies, it was followed up with the *Duncan Multiple Range Test* (DMRT).

## Results and Discussion

### pH silase gulma wedelia

pH is the degree of acidity or alkaline of a solution which is one of the parameters to determine the physical quality of weed silage. The full data on the average pH value of weed silage can be seen in Table 1.

**Table 2:** Average pH value of weed silage in pollard addition variation

Treatment %	Deuteronomy			A verage
	I	II	III	
P0 (0)	4,0	4,2	4,2	4,1
P1 (1)	4,1	4,0	3,9	4,0
P2 (3)	4,2	4,0	4,1	4,1
P3 (5)	4,2	4,4	4,5	4,4

**Description:** ns = non significant

**P0:** Weedelia weed silage without pollard addition

**P1:** Weed silage with the addition of pollard 1% (10 grams)

**P2:** Weed silage with the addition of pollard 3% (30 grams)

**P3:** Weedelia weed silage with the addition of pollard 5% (50 grams)

Based on the results of statistical analysis, it was shown that the effect of pollard addition on all different treatments was not real ( $P > 0.05$ ) on the pH value of silage. The pH of weed silage in this study was classified as good (4.0-4.4). According to Aglazziyah *et al.*, (2020) [1] the quality of silage based on pH values is divided into four categories, namely very good (pH 3.2 – 4.2), good (pH 4.2 – 4.5), medium (pH 4.5 – 4.8) and poor (pH >4.8). During the fermentation process, the pH of the silage is interrelated with the production of lactic acid produced. High lactic acid production is indicated by a low pH of silage, while low lactic acid production indicates a high pH of the resulting silage (Aglazziyah *et al.*, 2020) [1].

## Sensory Tests

The data from the sensory analysis of the physical quality of weed silage is presented in Table 2.

**Table 3:** Results of sensory analysis of the physical quality of weed silage

Pollar administration treatment (%)	Parameter		
	Aroma	Color	Texture
P0 (0)	1,77 ± 0,73	2,67 ± 0,96	2,47 ± 1,14b
P1 (1)	1,70 ± 0,65	2,53 ± 0,97	2,00 ± 0,98from
P2 (3)	1,90 ± 0,61	2,33 ± 0,96	1.50 ± 0.97a
P3 (5)	1.87 ± 0.57	2.27 ± 0.83	1.77 ± 1.04a

**Remarks:** ns = non signignify in the Aroma and Color parameters. Meanwhile, the different superscript texture parameters in the same column show a noticeable difference ( $P < 0.05$ ).

### 1. Criteria for aroma assessment characteristics:

1. Acid.
2. Slightly acidic.
3. Not acidic and not rotten.
4. Rotten.
5. Very rotten.

## 2. Texture assessment characteristic criteria:

1. Non-clumping and non-slimy.
2. Does not clump slightly slimy.
3. It is clear.
4. Slightly mushy slimy slightly juicy.
5. Slimy and watery mushy.

## 3. Color judging criteria:

1. Yellowish-green.
2. Brownish-yellow.
3. Chocolate.
4. Blackish-brown brown,
5. Black.

## Aroma

Aroma is one of the parameters to determine the physical quality of reed silage. Good silage has the characteristics of a sour taste and aroma but is fresh and tasty. The aroma produced from silage is a sour aroma like the sour aroma of fermentation. Sour aromas such as fermentation are normal aromas that are formed in the process of making silage, while abnormal aromas appear in the process of making and aromas from the fermentation of silage are rotten aromas.

In Table 2, it can be seen that weed silage with the variation of pollard addition in all treatments showed no significant difference ( $P>0.05$ ). The score on the silage aroma parameter ranges from 1.70-1.90 which means it smells "sour". The aroma that appears comes from the acid produced during the ensilage process. This is in accordance with the research of Sumarsih *et al* (2009) which states that the acid is lactic acid produced by lactic acid bacteria during ensilage.

## Color

The color of silage is one of the parameters for assessing the quality of silage physically. Good silage has a green color like the original material or is yellowish-green in color. Based on the results of statistical analysis, it was shown that the average value of weed silage with the variation in pollard addition was not significantly different ( $P>0.05$ ). The average result of the color value obtained in the P0, P1, P2 and P3 treatment is that the silage has a yellow-brown color. The brown color of the silage is caused by the presence of the pigment phatophitin, a chlorophil derivative that does not have magnesium. The color of silage that is bright green or brownish-green is a normal color for grass silage Wati *et al* (2018) <sup>[11]</sup>. So that the silage made has good quality because it has a brownish-green color. While the abnormal color of silage is blackish, this is due to long respiration. Long respiration is caused by the presence of oxygen so that the fermentation process is not anaerobic. If silage is obtained that has a blackish color, the silage is not good.

## Texture

Texture is one of the parameters to determine the physical quality of weed silage. Based on the results of the variance analysis, it was shown that the average texture value of weed silage with the variation in pollard addition had a real difference ( $P<0.05$ ) between P0 and P1, P2 and P3. This can happen because P0 is not given the addition of polar so that the texture of the silage does not clump and is slightly slimy. Meanwhile, P1, P2 and P3 treatment were not significantly different ( $P>0.05$ ). This is due to the similarity

of the percentage of substrate in the form of molasses as much as 0.6% and EM4 as much as 0.10% added to all treatments, according to Rahayu (2017) stating that the addition of substrate with the same percentage amount in all treatments in making silage can produce the same silage texture. According to Niswathi Hasanah & Nanang Dwi Wahyono (2021), the texture of feed is influenced by the fineness of the raw materials, the amount of fiber and the type of binders used. The best silage texture is found in the P2 treatment with the addition of 3% polar with the criteria of non-clumping and non-slimy.

## Conclusion

Based on the results of the study, it can be concluded that the addition of pollard to weed silage can have an effect on improving the quality of weed silage. The best pollard addition level is found in the 3% addition treatment, which is as much as 30 grams, because it produces a good pH, color and texture.

## Thanks

We would like to express our gratitude to LPPM Universitas Mercu Buana Yogyakarta for providing funding in research and partners who assist in research.

## References

1. Aglazziyah H, Ayuningsih B, Khairani L. Pengaruh Penggunaan Dedak Fermentasi Terhadap Kualitas Fisik dan pH Silase Rumput Gajah (*Pennisetum Purpureum*) The Effect of Fermented Bran on the Physical Quality and pH Of The Elephant Grass (*Pennisetum Purpureum*) Silage. *Journal of Tropical Livestock Nutrition and Feed Science*,2020;2(3):156–166.
2. Adriani, Fatati, Suparjo. Application of local forage-based fermented feed on cattle farms in Geragai sub-district, East Tanjung Jabung Regency. *Journal of Community Service*,2016;31(3):1–8.
3. Fluent Khan RB. Making Silage Feed for Ruminant Livestock in Pait Village Farm, Kasembon District, Malang Regency. *Fordicate*,2023;2(2):101–108. <https://doi.org/10.35957/fordicate.v2i2.4743>
4. Handayanta E, Rahayu ET, Wibowo MA. Accessibility of Ruminant Animal Feed Sources in the Dry Season in Dryland Agricultural Areas. *Animal Science*,2015;13(2):105. <http://doi.org/10.20961/sainspet.v13i2.11486>
5. Prabowo A. The Use of Feed Fermentation Technology in the Cow-Corn Crop Integration System. *Triton Journal*, 2016, 7(2).
6. Sudrajat A, Syaharani R, Saputra W, Rasminati N. Effect of Corn Flour Addition on the Physical and Chemical Quality of *Wedelia Trilobata* (L.) Hitchc Weed Silage for Ruminant Livestock Feed. *Jurnal Ilmu Ternak Universitas Padjadjaran*,2025;25(2):8.
7. Sudrajat A, Christi RF. Edukasi Teknologi Pakan Untuk Meningkatkan Produktivitas Ternak Ruminansia Di Desa Pilangrejo, Nglipar, Gunung Kidul, DI Yogyakarta. *Farmers: Journal of Community Services*,2023;4(1):1-5.
8. Sudrajat A, Syaharani RG, Sambodo R, Khaerudin AR, Christi RF, Rahayu ERV. Potential Use of Weed *Wedelia Trilobata* (L.) Hitchc as an Alternative Forage Feed to Support Dairy Production. *International*

- Research Journal of Advanced Engineering and Science,2024:10(1):9-11.
9. Sudrajat A, Sambodo R, Christi RF, Khaerudin AR. Edukasi Kesehatan Ternak dan Pemanfaatan Gulma *Wedelia* Sebagai Pakan pada Peternak Kambing Perah di Giripurwo Kulonprogo DI Yogyakarta. *Farmers: Journal of Community Services*,2025:6(2):244-248.
  10. Chalisty VD. Effect of the addition of molasses, *Lactobacillus plantarum*, *Trichoderma virride*, and their mixtures on the chemical composition of total silage of forage mixtures. *Journal of Nusantara Animal Husbandry Science*,2021:1(01):29–36. <https://doi.org/10.53863/jspn.v1i01.187>
  11. Wati WS, Mashudi, Irsyammawati A. Quality of odot grass silage (*Pennisetum purpureum* CV. Mott) at different incubation times. *Journal of Tropical Livestock Nutrition*,2018:1(1):45–53.