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Carbohydrate And Energy Content Of Soybean Hulls Soaked In Husk Ash Water Filtrate (FAAS)

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Abstract. *This study aims to determine the energy and carbohydrate content of soybean hulls soaked with husk ash water filtrate (FAAS). The study used an experimental method with a randomized complete block design (RAL) Factorial, Factor I; the concentration of husk ash water filtrate consists of F1: 10%, F2: 20% and F3: 30%. The second factor is the length of soaking time consisting of W1: 24 hours, W2: 48 hours, and W3: 30 hours. Each treatment was repeated three times. Based on the results of statistical analysis showed that there was no interaction (P<0.05) between the concentration of FAAS and the length of soaking time on the Energy and Carbohydrate values of soybean hulls.*

Keywords *Soybean Hulls, Husk Ash Water Filtrate, Carbohydrates, Energy, Nutrients*

INTRODUCTION

Soybean hulls are waste from the process of making tempeh, tempeh is made through the process of soaking and boiling, after going through the process, the process of separating soybean seeds with hulls is carried out, by stepping or by machine. So that the seed coat will float and be thrown away. This epidermis is still potentially utilized as animal feed given its high nutritional content. Soybean hulls contain 14.45% crude protein, 3.04% crude fat, 3.15% ash, 47.01% crude fiber, 3,060.48 kcal/kg metabolic energy (Rohmawati et al., 2015).

Carbohydrates have a chemical structure that contains C, H and O. The more complex the chemical structure, the more difficult it is to digest. Hydrogen and oxygen are usually in the same ratio as found in water molecules, H2O (2H and 1O). The classification of carbohydrates in order of complexity consists of monosaccharides, disaccharides, trisaccharides and polysaccharides.

Energy in feedstuffs (gross energy) cannot all be used by livestock, because not all nutrients consumed by livestock can be completely digested, there are still some contained in feces and this energy is referred to as fecal energy, and the energy contained in digested nutrients is called digestible energy (DE). Furthermore, the amount of DE can not all be used by the body, but some are excreted or released with urine called urine energy (UE) and some are released in the form of methane gas called methane energy or methane energy.

To maximize the use of soybean hulls as poultry feed ingredients, it is necessary to process them first. One way of processing that can be done is by soaking method using husk ash water filtrate. Sutardi et al (1980) in Ginting, (2022) stated that efforts that can be made to improve the quality of industrial and plantation waste are by processing; physical, biological, and chemical. And to maximize waste in its utilization as poultry feed ingredients, the crude fiber content must be degraded through physical processing, chemical or biological treatment (Rizal and Mahata, 2009).

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Rice husk ash is the residue of burning rice husks that can be obtained easily and in large quantities from rice mills. After the combustion process, compounds such as sellulose, hemicellulose, and organic acids will be converted into CO2 and H2O. The fine ash produced from the combustion process of rice husk is whitish in color as much as 13.16-29.04%. The combustion results contain silica as the main component, where the silica content reaches 86.90 - 97.30% dry basis (Houston, 1972). According to Haryanto (2002), rice husk ash has a cellular structure, with many closed pores.

Rice husk ash is a source of alkaline KOH (Rahayu, 2003) which is cheap, easily available and not polluting to the environment. According to Suprayuki (1997), rice husk ash solution can act as a hydrolyzer of crude fiber so that soaking with rice husk ash can stretch the bond between lignin/silica and cellulose/hemicellulose so as to increase digestibility. Apart from being the result of self-burning, rice husk ash can also be obtained from the waste of burning bricks and ceramics.

The use of chemicals can actually be avoided by using a non-pollutant (alkaline) husk ash water filtrate solution. The results of research by Mirzah, (2006), showed that soaking shrimp waste in 10% husk ash water filtrate (FAAS) solution for 48 hours and steaming for 45 minutes can reduce chitin from 15.2% to 9.87% and increase crude protein digestibility from 50% to 70.50%, While the content of other food substances did not change much, namely dry matter 86.40%, crude protein 38.98%, fat 4.12%, calcium 14.63%, phosphorus 1.75%, and critical amino acids such as methionine 0.86%, lysine 1.15%, tryptophan 0.35%, as well as nitrogen retention 66.13% and thermetabolic energy 2204, 54 kcal/kg.

This study aims to determine the carbohydrate and energy content of soybean hulls treated with husk ash water filtrate.

METHODS

This experiment was conducted using an experimental method and a 3 x 3 factorial complete randomized design with 3 replications. The first factor is the concentration of husk ash water (10%, 20%, and 30%). The second factor was the soaking time (24, 48 and 72 hours). Each treatment was repeated 3 times. Mathematical model of Randomized Complete Factorial Design according to Stell and Torrie (1991).

RESULTS

Carbohydrates

The average carbohydrate content of soybean hulls soaked with husk ash water filtrate (FAAS) can be seen in Table 1.

Table 1. Average Carbohydrates Of Soybean Hulls Treated With Husk Ash Water Filtrate (FAAS)

Husk Ash Water Filtrate (FAAS)	Time			Average
	W1 (24 Hours)	W2 (48 Hours)	W3 (72 Hours)	
A1 (10%)	40,47	40,75	40,61	40,61^{tn}
A2 (20%)	38,93	39,57	39,25	39,25^{tn}
A3 (30%)	37,55	37,54	37,54	37,54^{tn}
Rata-Rata	38,98^{tn}	39,29^{tn}	39,14^{tn}	

Description: A (Filtrate concentration of husk ash water (FAAS))
W (Soaking Time)
tn = not significantly different (P < 0.05)

The results showed that there was no interaction ($p<0.05$) between the treatment of husk ash water filtrate (FAAS) concentration and soaking time on the ash content of soybean hulls. Although the results of the analysis of variance showed no interaction between FAAS concentration and soaking time, there were differences in the amount of carbohydrates produced. The results showed that the carbohydrates from the FAAS concentration treatment were A1; 40.61%, A2 39.25%, and A3: 37,54%. While the soaking treatment obtained the amount of carbohydrates produced is W1; 38.98%, W2; 39.29% and W3: 39,14%.

Carbohydrates (in this case starch, sugar, or glycogen) are the most important energy source nutrients for living things because their molecules provide carbon elements that are ready to be used by cells. Chemically, carbohydrates can be defined as aldehyde or ketone derivatives of polyhydric alcohols (because they contain more than one hydroxy group), or as compounds that produce these derivatives when hydrolyzed (Poedjiadi, 2006).

Energy

The average Energy content (cal/100g) of soybean hulls soaked with husk ash water filtrate (FAAS) can be seen in Table 2.

Table 2. Average Energy Kcal/100g) Of Soybean Hulls Treated With Husk Ash Water Filtrate (FAAS)

Husk Ash Water Filtrate (FAAS)	Time			Average
	W1 (24 Hous)	W2 (48 Hours)	W3 (72 Hours)	
A1 (10%)	218,36	218,72	218,54	218,54^{tn}
A2 (20%)	214,67	213,47	214,07	214,07^{tn}
A3 (30%)	213,32	213,43	213,38	213,38^{tn}
Rata-Rata	215,45^{tn}	215,21^{tn}	215,33^{tn}	

Description: A (FAAS Concentration)
W (Soaking Time)
tn : not significantly different ($P < 0.05$)

The results showed that there was no interaction ($p<0.05$) between the treatment of husk ash water filtrate concentration (FAAS) and soaking time on soybean hull energy. Although the results of the analysis of variance showed no interaction between the treatment of husk ash water filtrate and soaking time, the amount of carbohydrates differed between treatments. The results showed that the energy content of each filtrate treatment was A1; 218.54 kcal/100g, A2: 214.07 kcal/100g, A3: 213.38 kcal/100g, while for the treatment of soaking time the energy obtained was W1: 215.45 kcal/100g, W2: 215.21 kcal/100g, and W3; 215.33 kcal/100g.

The role of feed energy sources for chicken growth is between 1.5 - 3.0 kcal per gram for body weight growth. It also depends on the amount of fat present in the body and its relationship to protein in daily weight gain (ADG = Average Daily Gain).

CONCLUSION

Processing soybean hulls with husk ash water filtrate affects the carbohydrate and energy values, and there is no interaction between FAAS concentration and soaking time on the carbohydrate and energy content of soybean hulls.

REFERENCES

Cherney, D. J. R. 2000. Characterization of Forage by Chemical Analysis. Dalam Given, D. I., I. Owen., R. F. E. Axford., H. M. Omed. Forage Evaluation in Ruminant Nutrition. Wollingford: CABI Publishing : 281-300.

Farida Fathul, dan Liman, Y. R. E. (2020). Pengaruh Penambahan Multi Nutrient Sauce Dalam Ransum Terhadap Kecernaan Bahan Kering Dan Bahan Organik Pada Domba. *Jurnal Riset Dan Inovasi Peternakan (Journal of Research and Innovation of Animals)*, *4*(1), 1–6. https://doi.org/10.23960/jrip.2020.4.1.1-6

Ginting, R. B. (2022). Kandungan Nutrisi Kulit Ubi Kayu yang di Rendam FAAS (Filtrat Air Abu Sekam). *Journal of Innovation Research and Knowledge*, *1*(10), 1225–1232.

Ginting, R. B. (2023). *Content of Crude Protein , Crude Fiber , and Crude Fat Kepok Banana Peel Fermented with SOC at Different Times*. *2*(2), 257–265.

Hastuti, D., A, S. N., & M, B. I. (2011). Pengaruh Perlakuan Teknologi Amofer (Amoniasi Fermentasi) Pada Limbah Tongkol Jagung Sebagai Alternatif Pakan Berkualitas Ternak Ruminansia. *Jurnal Ilmu Pertanian*, *7*(1), 55–65.

Mirzah. (2007). Pemakaian Tepung Limbah Udang yang Diolah dengan Filtrat Air Abu Sekam Dalam Ransum Ayam Broiler.[The Use of Shrimp Head Waste Meals by Soaking with Dusk Rice Husk Solution in Broiler Diets]. *J.Indon.Trop.Anim.Agric*, 262–269.

Mirzah, M. (2006). Pengaruh Pengukusan Terhadap Kualitas Protein Limbah Udang Yang Telah Direndam Dengan Filtrat Abu Sekam. *Jurnal Peternakan Indonesia (Indonesian Journal of Animal Science)*, *11*(2), 141. https://doi.org/10.25077/jpi.11.2.141-150.2006

Poedjiadi. (2006). *Dasar-Dasar Biokimia*. UI Press.

Rohmawati, D., Djunaidi, I., & Widodo, E. (2015). Nilai Nutrisi Tepung Kulit Ari Kedelai Dengan Level Inokulum Ragi Tape Dan Waktu Inkubasi Berbeda. *TERNAK TROPIKA Journal of Tropical Animal Production*, *16*(1), 30–33. https://doi.org/10.21776/ub.jtapro.2015.016.01.5

Satie, D.L. 1991. Kulit Ari Biji Kedelai Sebagai Campuran Ransum Broiler. Poultry Indonesia. Nomor 42 : 9.

Siregar, D. J. S., Julianti, E., & Suryanto, D. (2023, May). Pemanfaatan Limbah Organik Terhadap Produksi dan Kandungan Nutrisi dari Larva Lalat (Hermetia illucens). In Prosiding Seminar Nasional Fakultas Pertanian UNS (Vol. 7, No. 1, pp. 664-671).