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# "The Nutritional Potential of Ari Soybean Hulls as an Alternative Feed Ingredient Poultry: A Literature Review"

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**ABSTRACT**

Soybean hulls are agro-industrial waste from soybean processing, especially in the tofu and tempeh industries. This waste is often ignored and has not been optimally utilized, even though it has potential as a feed ingredient for poultry. This article aims to assess the nutritional potential of soybean hulls and its feasibility as an alternative ingredient in poultry feed. Based on the results of a literature study, soybean hulls contain crude fiber, protein, and a number of minerals that are important for poultry growth, although the crude fiber content is quite high which can limit digestibility. Several processing techniques such as fermentation and chemical treatment can increase its nutritional value. With proper processing, soybean hulls have great potential to be an economical and environmentally friendly alternative feed ingredient.

**Keyword : soybean hulls, poultry feed, nutrition, agro-industrial waste, crude fiber**



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## 1. INTRODUCTION

Feed is the largest component in the production cost of poultry farming, accounting for 60-70% of the total cost. Therefore, the search for alternative feed ingredients that are cheap and easily available has become a major focus in animal husbandry research. Soybean hulls, as waste from the tofu and tempeh industries, are one of the ingredients that have the potential to be utilized. This waste contains nutritional components that can still be utilized by livestock, especially poultry. However, limited information and research on its nutritional value means it has not been widely utilized.

One way to find alternative sources of feed ingredients for livestock is by utilizing agricultural industry waste. One of the alternative feed ingredients that can be used is feed ingredients derived from waste derived from agro-industrial waste.Waste that has considerable potential as a feed ingredient includes soybean seed coat (Kleci).

Waste utilization can reduce the use of conventional feed ingredients, as long as the material still contains food substances that can be utilized by livestock for their survival. One waste that has prospects as an animal feed ingredient is soybean hulls. Many researchers have reported on the nutritional content of soybean hulls that are utilized as poultry feed.

Soybean hulls are the waste of the tempeh making industry which is obtained after the boiling and soaking process and then the soybean hulls will be separated and usually just thrown away as waste. Soybean hulls still have the potential to be utilized as animal feed given their high protein and energy content.

Soybean hulls have enormous potential, because the process of making tempeh always produces soybean hull waste. One of the efforts to utilize waste as animal feed, but the low nutritional content, namely high crude fiber, is a limiting factor in the use of soybean hulls as animal feed so that processing is needed for optimal use.

## 2. Nutrient Composition of Ari Soybean Skin

Soybean hulls contain various nutrients such as crude protein, fat, crude fiber, and ash. According to research by Mahfudz et al. (2013), soybean hulls contain about 11.47% crude protein and 5.36% crude fat. Iriyani (2001) also reported that soybean hulls contain 17.98% crude protein, 5.5% crude fat, 24.84% crude fiber and 2829 kcal/kg metabolic energy.

The obstacle in using soybean hulls as poultry feed is the high content of crude fiber. Crude fiber is a component that is difficult to digest by the digestive organs of poultry so that it will affect the digestibility of other food substances such as protein, fat, minerals and vitamins. Undigested crude fiber will carry some food substances, especially protein and energy out with feces so that ration protein cannot be optimally utilized for body tissue formation so that livestock growth will be disrupted.

### Benefits of Ari Soybean Skin in Poultry Feed

Soybean hulls can be used as an additional source of energy and protein in feed formulations. Its high protein content makes it a potential ingredient, especially in conditions of limited raw materials such as soybean meal. In addition, fiber from soybean hulls can play a role in improving the function of the poultry digestive tract if managed properly.

### Challenges and Solutions for Using Ari Soybean Hulls

The main challenge of using soybean hulls is their high crude fiber content, which can reduce digestibility. Several efforts can be made to improve its nutritional quality, such as fermentation with microbes (Lactobacillus sp., Aspergillus sp.) or chemical treatment with alkali. Research by Damayanti et al. (2020) showed that fermentation of soybean hulls can reduce crude fiber content and increase protein content.

## 3. RESULTS AND DISCUSSION

To increase the nutritional content of a feed ingredient, especially increasing the value of protein, reducing or eliminating anti-nutritional content which is a limitation in the use of ingredients can be done with fermentation technology. This method is not only effective for increasing the nutritional value of ingredients but also a cheap technology. Some research cited from several journals in improving the nutrition of soybean hulls as follows;

Research conducted by Widiastuti et al. (2018) showed that the use of soybean hulls up to 10% in broiler rations did not have a negative effect on growth performance. Similar results were also found by Ramadhan et al. (2015) which stated that soybean hulls can be used to a certain extent without reducing feed consumption and feed conversion efficiency. These results are far above the results of research by Sattie (1991), which states that soybean hulls can be used in broiler rations up to a level of 7.5% because the use of high amounts can increase the crude fiber content of the ration. The digestibility of food substances from soybean hulls can be increased if the fiber fraction is broken down first and one of them is through simple applied technology, namely fermentation using Aspergillus niger.

Fermentation is carried out on food ingredients to obtain new food products that can extend shelf life (Farnworth, 2008). According to Jay et al. (2005), fermentation is a process of chemical change, from complex compounds to simpler ones with the help of enzymes produced by microbes. Microbial activity in fermentation will cause changes in pH levels and form inhibitory compounds such as alcohol and bacteriocins that can inhibit the growth of spoilage microbes (Waites et al., 2001). Fermentation can increase the nutritional value of low-quality ingredients and functions in preserving ingredients and is a way to remove anti-nutritional substances or toxins contained in a food ingredient.

Research by Mairizal (2009) fermented soybean seed kernel can be used as a substitute for corn and soybean meal up to 40% in broiler rations. Rohmawati, D., et al. (2015) in their research,

fermentation with yeast tape can increase crude protein, crude fat, and ash content of soybean hull flour and a decrease in dry matter and crude fiber. Fermentation of soybean rind flour with tape yeast is best with an incubation time of 72 hours to increase crude protein levels and reduce crude fiber. The results of research by Auza et al, (2017) of this study are fermentation using EM-4 can increase ash content and reduce crude fiber in soybean seed coat but does not increase dry matter and crude protein but there is an improvement in crude protein from soybean seed coat flour at the level of 3cc EM-4 and 72 hours incubation time.

While the results of research by Adhiansyah (2013), fermentation of soybean seed coat using EM4 can increase protein levels from 9.23% to 18.75%. fermentation process is to utilize microorganisms as inoculants to decompose organic materials into simpler compounds. One of the inoculants that can be used is EM4, the microorganisms contained in EM4 are photosynthetic bacteria, lactic acid bacteria, yeast, Actinomycetes sp and fungi that can work effectively in accelerating the fermentation process in organic matter.

Research by Ginting et al (2024) Processing soybean hulls with the soaking method of husk ash water filtrate can affect nutritional quality. The concentration of 30% FAAS with a soaking time of up to 72 hours resulted in ash content of 4.41%, crude protein 12.38%, crude fiber 37.32%, and fat 1.94%.

## 4. CONCLUSION

Soybean hulls have potential as an alternative ingredient for poultry feed due to their promising nutritional content. However, it requires prior processing to reduce crude fiber content and increase digestibility. By utilizing the right processing technology, soybean hulls can be an economical and environmentally friendly solution in the development of poultry feed.

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