



## Potency of Dregs Coconut Fermentation (*Cocos nucifera*) as an Alternative Feed for Fish and Poultry 'PA-BIO'

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### Abstract

People of Kolaka accustomed to using coconuts as well be used as a food supplement or a mixture of additives in processed foods, cakes and other confectionary. Therefore utilizing coconut pulp as feed fish and poultry should be made to minimize the potential for household waste. Feed from coconut pulp is a transfer of science and technology to the people who are expected to help poor people to be productive. Fermentation is one method to process coconut pulp into feed ingredients. The fermentation process is done by using spores of *Aspergillus niger*. The fermentation process is done in stages, by aerobic fermentation followed by anaerobic fermentation (enzymatic process). In short the process of making feed "PA-BIO" from coconut pulp is: Dregs of coconuts added water, stirred and steamed. Cooled and then stirred together with a mixture of minerals, *Aspergillus niger* spores are added and stirred again until evenly distributed. The mixture was then fermented aerobically and unaerobically. Dregs fermented and then dried and packaged for later in packing. Based on the results of research that the utilization of coconut dregs as cattle feed and fish is potential. Miskiyah et al. (2006), increase protein content after fermentation of coconut pulp 11.35% to 26.09%, or by 130% and decreased fat content of 11.39%. The results also showed that the feed produced quite safe for livestock, namely the aflatoxin content <20 ppb. Feed from coconut pulp is also good for fish farming. Goenarso et al. (2002) on tilapia (*Oreochromis niloticus* L.), the faster fish growth with increasing the feed protein content of 25%, 30%, 35%, 40% and 45%.

**Keywords:** coconuts dregs, fermentation

### A. Introduction

Plants coconuts (*Cocos nucifera* L) including plants that have a multi-function, this is because almost all parts of the plant can be utilized. Old coconut fruit contains high calories, amounting to 359 cal per 100 grams; old half coconut meat contains 180 calories per 100 grams 8 cal and young coconut meat contains calories by 68 cal per 100 grams. Medium average calorific value

contained in coconut water around 17 calories per 100 grams. Green coconut water, compared with other types of coconuts contains a lot of tannins or antidote (antivenom) is the highest. The content of other chemicals that stand out in the form of an enzyme that is able to break down toxic properties. Composition of chemical substances is contained in coconut water include ascorbic acid or vitamin C, protein, fat, carbohydrate, calcium or potassium. The minerals are contained in coconut water is iron, phosphorus and sugar consisting of glucose, fructose and sucrose. The water content is contained in coconuts amount of 95.5 grams per 100 grams (Direktorat Gizi Depkes RI, 1981).

Coconut dregs byproduct of the manufacture of pure coconut oil still has fairly high protein content. This led coconut pulp potential to be used and processed into feed. According to Derrick (2005), the crude protein contained in coconut pulp reached 23%, and the fiber content is easily digested is a distinct advantage to make good energy source that can be used as animal feed, such as feed material calf (calf), especially to stimulate rumen and animal origin is also proven coconut pulp, cattle can produce a more condensed milk and taste delicious.

Fermentation is one way to cultivate coconut pulp into feed ingredients. In the fermentation process in which the reaction occurs complex compound is converted into simpler compounds by freeing up water molecules. Fermentation using fungi allow the overhaul of component materials that are difficult to digest more easily digested, so it is expected to improve the nutritional. The quality depends on the type of microbial fermentation and a solid medium used. Treatment of fermentation in the manufacture of feed has been employed in previous studies. Research conducted Purwadaria et al. (1995) mentions that coconut meal fermented with *Aspergillus niger* able to increase the protein content and digestibility of feed produced. *Aspergillus niger* is used to produce the enzyme lipase, so that the fat contained in the cake can be reduced.

The fat contained in coconut cake may affect digestibility. Further, described by Helmi et al. (1999) that the lipase activity during fermentation will reduce levels of fat coconut cake of 52.3% and 61.6%. The process of making pulp to feed the fermentation is done using spores of *Aspergillus niger*. The use of this method can affect the nutrient content of feed products. Still high fat content can be reduced in the presence of lipase activity from *Aspergillus niger* during fermentation.

Coconuts can easily be found in Kolaka, based on data from the Central Statistics Agency (BPS) Kolaka (2014) oil production ranks second as smallholder tree crops: 4,842.50 (ha), therefore the utilization of coconut pulp is proper concern not to become waste. Fish and poultry are also many types of businesses run by people Kolaka. Poultry, in this case the chicken pieces, its availability throughout the year there are always in the market Kolaka, when the Lebaran arrived, the price of chicken in the traditional market will also increase by reason of feed prices go up, therefore seek alternative raw materials that can be used as poultry feed is an intelligent way to be able to suppress the rise in prices of poultry, especially chicken pieces are from year to year continue to increase. In the market Mekongga Kingdom, the traditional market Kolaka, the current price of broilers at 60,000 / tail rise of the price of 45,000 / tail.

Feed is the single food ingredient or a mixture, whether treated or untreated, which is given to the animal's survival, production, and breed. Feed is a major factor in business success factors in addition to seed farm development and management. Forage quality will support an increase in the production and reproduction of livestock. Miskiyah et al. (2006), states that increase protein content after fermentation of coconut pulp 11.35% to 26.09%, or by 130% and decreased fat content of 11.39%. Dry matter and organic matter increased respectively from 78.99% and 98.19% to 95.1% and 98.82%. The results also showed that the feed produced quite safe for livestock, namely the aflatoxin content <20 ppb. Feed from coconut pulp that has a high protein content is also very good for business to develop aquaculture, research Goenarso et al. (2002) on tilapia (*Oreochromis niloticus* L.), the faster fish growth with increasing the feed protein content is 25 %, 30%, 35%, 40% and 45%). It has been reported also that earthworms are mixed in the feed, as much as 10%, has been able to increase the weight of fish Gurame aged 6 months. Therefore obtain alternative feed raw materials are easy to obtain, if you lack the high protein (nutritious) and the cost will directly be able to support the successful development effort poultry and fish farming communities in Kolaka.

### **1. Partners' Problem**

The high price of feed is the reason that always echoed by the poultry farmers and poultry traders in the Pasar Raya Mekongga Kolaka thus raising poultry prices cut them from year to year. Therefore the search for alternative feed the raw material of its readily available, which is able to utilize the remaining major food were generally remnants of food are wasted and

become waste, has a high protein content (nutritious) and can be obtained at low prices is one of the solutions can be offered to suppress the increase in the selling price of poultry, especially chicken pieces and can support increased livestock production and reproduction. Coconut dregs is used as an alternative feed is not only good for poultry feed but also good to feed the fish because it has a protein content after fermentation.

Community Kolaka used to use coconuts as a mixture of main meal, or as a mixture of processed traditional cake, so no wonder the coconut is very easy encountered in selling in the market, even oil production ranks second after cashew as smallholder tree crops : 4,842.50 (ha) in Kolaka, so the utilization of coconut pulp is one of the steps that need to be taken to avoid the accumulation of coconut pulp which if not utilized will be able to be a waste, where the waste is waste or residue resulting from a process or activity of industrial and domestic (household).

The results of the last survey by the Central Statistics Agency (BPS) Kolaka (2014), there are 64,510 poor people in Kolaka or 20:46 percent of the total population of Kolaka as many as 210 060 people. Poor people in Kolaka on local partners are the people who are in the Village District of Latambaga Kolakaasi, the daily lives of their economies depend on marine products. While mothers and children inherit sell marine products are obtained in the market or for the results of certain marine they process into dried fish, this is what causes a lot of kids in the neighborhood dropped out of school, because it helps their parents to meet economic needs.

As Science and Technology for the Society (IbM program), the "Potency of Dregs Fermentation Coconut (*Cocos Nucifera*) as an Alternative Feed for Fish and Poultry 'PA-BIO" can be an alternative business community Kolaka. Broadly speaking, two main targets in the IbM program are women and children, women in this case is a group of mothers of households that are not economically productive and children are adolescent girls unmarried who have dropped out of school so expect two groups of partners this can be economically independent through the fish feed business and household-scale poultry.

## B. Solution and Target Outputs

Fermentation is one of the methods used in processing coconut pulp into feed using *Aspergillus niger* spores. The fermentation process is done in two stages, namely aerobic fermentation and anaerobic fermentation (enzymatic process), had previously been done on coconut cake (Purwadaria et al., 1995; Helmi et al., 1999).

The growth of *Aspergillus niger* in the fermentation process characterized by mycelium. Visually growth of mycelium can be seen with the onset of the fibers resembles fine threads and solidifying the dregs. Treatment of fermentation to produce the structure, color, odor, and also a different chemical composition of coconut pulp that has not been fermented, especially in increasing the levels of protein and lower in fat. Fermentation also causes loss of the dry weight of the dregs, i.e. 16.67% in the fermented dregs aerobically and 5% after enzymatic process. Analysis of the loss of dry matter represents a significant loss of water weight during the fermentation process. It is caused by the change of complex compounds into simpler compounds during the fermentation process, which at the time was also the release of water molecules. Visually the release of water molecules can be seen in the presence of water on the plastic that is used as a container / dregs place is fermented.

The use of coconut pulp to 12% Fermentation very real efficient than using coconut pulp, this shows the ability of chickens to consume 1 kg of ration can form an average of 0.59 kg live weight was using coconut pulp only able to form weighted average life 0.45 kg. Fermented coconut pulp can improve the quality of foodstuffs and easily digested by the broiler. Based on the above data, the utilization of coconut pulp as raw material for fish feed and poultry is worth doing.

## C. Methodology

Cultivate coconut pulp as feed material, i.e. through a fermentation process. Fermentation is a chemical change in the process of aerobically or anaerobic microorganisms to produce products. Mold that is used for the fermentation process coconut pulp is *Aspergillus niger*. In the fermentation process in which the reaction occurs complex compound is converted into simpler compounds by freeing up water molecules. The quality of fermentation depends on the type of microbes used (Miskiyah et al., 2006). *Aspergillus niger* is a member of the genus *Aspergillus* fungi. *Aspergillus niger* including mesophilic microbial with maximum growth at a temperature of 35 ° C - 37 ° c. The degree of acidity for microbial growth is 2 to 8.8 but growth would be better in acidic or low pH. Based on the research results Miskiyah et al. (2006), fermented coconut pulp have potential as feed because it has a protein content of 26.9%; In vitro dry

matter digestibility of 95.1% and organic matter digestibility in vitro 98.82%. The fermentation process can lower the fat content of coconut pulp amounted to 11.39%. Feed produced in the fermentation process is quite safe for consumption if the animals because it contains aflatoxin B1, B2, G1, and G2 feed <20 ppb.

Phase of fish and poultry feed manufacturing with raw materials coconut pulp to 3 kg of coconut pulp is as follows:

- a. mashed + 2.5l of water and 1 kg of chopped leaves of bean
- b. steamed for ½ hour
- c. refrigerate until the temperature reaches  $\pm 70^{\circ} \text{c}$
- d. add a mixture of 100 grams of urea, TSP 50 grams, 4 grams of KCl and mineral b12
- e. add 2.4 grams of *Aspergillus niger*
- f. toss well and fermented aerobically for 2 days
- g. enzymatic process anaerobically for 2 days
- h. dried and packaged

#### **D. Results**

The first step in the implementation of the IbM program methods to overcome the problems faced by partners:

- a. Partner of IbM program are people who are not economically productive is a group of mothers of households that do not work that also raise poultry or livestock on a small scale poultry in their homes and both partners are children in this case are women yet married / dropout.
- b. Furthermore, the dissemination to the program partners on the benefits and importance of information technology to broaden the knowledge to exploit the potential of the environment and natural resources available
- c. Activities in the form of training to partners of IbM program to achieve desired outcomes, namely Feed Products "PA-BIO"
- d. PA-BIO feed products made from coconut pulp, coconut pulp is household waste. Coconut pulp obtained approximately 30% of the weight of the solid oil processed, easily rotten and rancid, so in terms of the environment can cause water and air pollution, while from an economic standpoint coconut pulp as material to dispose of that potential becomes waste.
- e. Coconut dregs can be improved benefits for livestock feed of high nutritional value when added to other ingredients such as chopped leaves of beans, urea, TSP and KCl, through the process of fermentation. The purpose of fermentation is to reduce the water content and oil content; improve the nutritional value; and increase the price of waste.

##### **1. Activities of feed manufacturing of the coconut dregs PA-BIO**

Materials used are: coconuts dregs, bean leaves, Urea, TSP, KCl, mineral B12, and *Aspergillus niger*. The tools used are: Scales, cookers, steamers, stirrers, trays, nampah, cormorant, plastic barrel caps, plastic packaging and press equipment.

The processing of coconut dregs to feed the fermentative done, using spores of *Aspergillus niger*. For the manufacture of 3 kg of feed coconut dregs stages are: mashed + 2.5l of water and 1 kg of chopped leaves of bean. Steamed for ½ hour. Refrigerate until the temperature reaches  $\pm 70^{\circ} \text{c}$ . Add a mixture of 100 grams of urea, TSP 50 grams, 4 grams of KCl and mineral b12. Add 2.4 grams of *Aspergillus niger*. Toss well and fermented aerobically for 2 days and enzymatic process anaerobically for 2 days. Dried and packaged (Figure 1)



Figure 1. Feed "PA-BIO" in packs of 1 kg

Ways of feeding the coconut dregs on poultry: use the fermented feed about 3% of the weight of poultry. Give to the poultry in the morning and evening.

### E. References

- [BPS] Badan Pusat Statistik. Kolaka. (2014). Kolaka dalam Angka 2014. <https://www.kolakakab.bps.go.id/> Accessed on August 2016.
- Derrick. (2005). Protein in Calf Feed. <https://www.winslowfeeds.co.nz/pdfs/feedingcalvesarticle/> Downloaded on August 2016
- Direktorat Gizi Departemen Kesehatan RI. (1981). Jakarta: Daftar Komposisi Bahan Makanan. <https://Kemkes.go.id/> Accessed on August 2016.
- Goenarso, D. & Gunawan, G.G. (2002). Pengaruh Pencampuran Ampas Kelapa Pada Pakan Terhadap Laju Pertumbuhan ikan mas *Cyprinus carpio* L. PBI-XVII Seminar, Andalas University. Padang.
- Helmi Hamid, T., Purwadaria, T. Haryati & A.P. Sinurat (1999). Perubahan nilai bilangan peroksida bungkil kelapa dalam proses penyimpanan dan fermentasi. *JITV*, 4 (2), 102-106
- Miskiyah G, I. & Haliza Mulyawati, W. (2006). Pemanfaatan Ampas Kelapa Limbah Pengolahan Minyak Kelapa Murni Menjadi Pakan. *Proceedings. National Seminar on Technology Livestock and Verteriner*: 830-83
- Purwadaria, T., T. Haryati, J. Darma & O.I. Munazat (1995). In vitro digestibility evaluation of fermented coconut meal using *Aspergillus niger* NRRL 337. *Bul. Anim. Sci. pecial ed*.pp. 375- 382.