Bioprospects From Clamshell Of Geloina Sp As Calcium Substitution Material for Poultry In Indonesia

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Abstract. In Indonesia the use of clamshell for calcium substitution of poultry has not been implemented. Some research results suggest that clamshell have very high calcium levels. Clamshell can be used as an enhancer of calcium levels in animal feed, especially in poultry. Increased calcium levels in poultry will help in the process of forming eggshells. The calcium needs of poultry farmers in Indonesia meanwhile are being met from snail intake. This intake is needed by farmers, especially for improving the quality of the yolk, in addition to the formation of eggshells. Clamshells of Geloina sp. In Indonesia there is still not much utilization. Thus this study aims to analyze the calcium content of Geloina sp mussels as calcium substitution material for poultry and the condition of poultry eggs produced by farmers. The design or approach in this study was a quantitative research with survey and experiment. The method used in this study was a laboratory and farmers. Activities applied in laboratory during the study consisted of two activities, namely: 1) sample preparation and 2) analysis of substance elements and chemical compounds with Atomic Absorption Spectrophotometer method (AAS). The results showed that the Powder Clamshell of Geloina sp. had and average elements and chemical compounds contained were Ca level (94.90%), Na level (0.48%), P level (not detected), and CaCO$_3$ level (7.76%). Element and chemical compounds levels contained in the Powder Clamshell of Geloina sp. had a great potential if it was used and treated as good as possible. It can be an alternative solution in the prevention of waste powder clamshell of Geloina sp.) untapped, furthermore it could be applied to the manufacture of products to give added value to support the economy of rural communities in Indonesia. The results of poultry eggs in the third treatment (addition of rations with shellfish powder as much as 35%) have the ability to lay eggs every day with an average frequency of 1 day 1 egg. From the results of this activity it was proven that 65% of poultry had an increased frequency of laying eggs.

1. Introduction
Indonesia is one of the countries with the longest coastline. This condition causes Indonesia to have many types of shellfish, for example Geloina sp. This type of clam lives in estuarine...
areas, mangrove forests, and large rivers that become a meeting between sea water and fresh water. *Geloina* sp. live in rivers in Indonesia are at depths ranging from 3.5-10.7 meters with muddy and sandy substrates (Endang & Chrisna 2005). Satria (2017) suggested a suitable substrate for *Geloina* sp habitat, a substrate containing 80% -90% muddy coarse sand, a diameter greater than 40 µ and having a pH ranging from 5.35-6.40. The majority of people who live in the area (estuarine, mangrove forest, and large rivers that become a confluence of sea water and fresh water) are the main livelihoods as farmers, with a percentage of 50%-55%, and the rest are livelihoods as sand or rock miners, and fish and poultry farmers. The community will switch professions as fishermen seeking *Geloina* sp if the tide.

The amount of *Geloina* sp captured by fishermen depends on the season. There are two seasons that affect the number of *Geloina* sp namely in the rainy season and the dry season. In the rainy season, the amount of *Geloina* sp each fisherman is an average of 5 buckets (1 bucket = 5 kg) per day. The amount of *Geloina* sp each day each fisherman reaches around 25 kg (Satria, 2017).

In the dry season, the average number of *Geloina* sp each fisherman is on average less than in the rainy season which is around 2 buckets each day. The amount of *Geloina* sp can be assumed to be only around 10 kg each day each fisherman. The difference in catch is due to the rainy season (October-March) an increase in water discharge due to increased rainfall. This causes the water flow to be swift, making it easier for fishermen to take *Geloina* sp attached to the substrate at the bottom of the water (Satria, 2017).

In the dry season (April-September) there is a decrease in water discharge due to decreased rainfall. The reduced water discharge directly decreases the speed of the water flow, so that in this condition it is difficult for fishermen to take *Geloina* sp attached to the substrate at the bottom of the water (Satria, 2017).

The processing clamshell of *Geloina* sp in Indonesia is currently not well utilized by the local community. People usually only use clamshell *Geloina* sp as a mixture of additives in the construction of building foundations without prior processing. This is due to the lack of public knowledge of the potential contained in the clamshell of *Geloina* sp. Agustini et al. (2011) explained that the use of *Geloina* sp can be done by utilizing the nutrients contained in it. The clamshell *Geloina* sp as a source of mineral elements and natural chemical compounds can be produced, so as to increase added value.

2. Literature Review

2.1 Description of *Geloina* sp

Corbiculidae family shells are divided into 3 types namely *Polymesoda erosa*, *Polymesoda eksansa*, and *Polymesoda bengalensis*. The three types of shells are often found in the Indo-Pacific region (Morton, 1984). In general, this type of *Polymesoda erosa* is also referred to as (*Geloina erosa*) or (*Geloina* sp) (Uswatul et al., 2014). *Geloina* sp in Indonesia, namely is Totok shells. All types of shells including Totok shells (*Geloina* sp) have a unique morphological part, which is a pair of shells (also called a graft or valve). The only organs are the kidneys, heart, mouth and anus. Morton (1976) states that *Geloina* sp Can move with "legs" in the form of flattened organs that are removed from the shell at any time or by opening the shell cover in a shock, and the circulation system is open because it has no blood vessels, and Oxygen supply comes from blood which is very liquid which is rich in nutrients and oxygen which envelops its organs.

*Geloina* sp is one type of shell that lives by immersing itself in its muddy and sandy substrate. *Geloina* sp as described have a pair of shells to protect their soft body, and do not
have a mouth to chew food, but have two chifrons to get food and remove food scraps (Dwiono, 2003). *Geloina sp* are also shells that have characteristics as marine aquaculture. This is due to the fact that *Geloina sp* have high adaptability and are able to survive extreme environmental changes (Morton, 1976).

*Geloina sp* have triangular or triangular shaped shells toward the oval. The outer surface is a shell with a circular line that shows the growth line. The color combination of the shell is a slightly shiny greenish yellow (Arbanto, 2003).

According to Romimohtarto & Sri (2001), shells morphologically consist of 3 layers from the outside to the inside, namely:

a. Periostracum, the outermost layer that serves to protect parts of the body inside it is made of horn material called Cocchiolin.

b. Prismatic, the middle layer composed of calcium carbonate crystals (lime-shaped prisms).

c. The nacreas layer, the innermost layer which is also composed of calcium carbonate crystals but the composition have more dense, is formed by the mantle membrane in the form of a thin layer. This thin layer makes the shell thicken as you age.

Following are the layers of the *Geloina sp* from the outside inward (Figure 1) taken from the catch of the people in Indonesia:

2.2 Potential in Utilizing Meat and Shellfish

The potential of shellfish resources in Indonesia has a high economic value with a total economic value in 2007 reaching 1.86 trillion and the development of production in the period
from 2005 to 2007 increased from 144,634 tons in 2005 to 171,595 tons in 2007, an increase of 18.64% (Bengen, 2009).

Geloina sp. is one type of shell that has economic value and the potential to be developing because it has a very high nutritional value (Bengen, 2009). Dwiono (2003) suggested that the nutritional content of shellfish included: protein of 7.06% -16.87%, fat of 0.40% -2.47%, carbohydrate of 2.36% -4.95%, and energy amounted to 69-88 kcal /100 gram conch meat.

According to Agustini et al. (2011) protein content contained in shellfish is around 25.5 gr/100 gr, amino acids with the highest amount per 100 grams are glutamate 3474 mg, aspartate 2464 mg, lysine 1909 mg, arginine 1864 mg and leucine 1798 mg, further it was mentioned that shellfish also contain high vitamin B12 of around 98.9 mg / 100 mg, as well as omega-3 (396 mg /100 gr) and omega-6 (32 mg /100 gr). Yudiati (2002) argues, nutritional content in meat and gonads of Scallops (Amusium pleuronectes) namely muscle (72.4% protein, 12.1% carbohydrate, and 6.1% fat), and gonad (61.6% protein, carbohydrates 19.5%, and fat 10.8%). Syahfril et al. (2004) states that the proximate content of Jago shells (Anadara inaequivalvis) is protein at 13.22%, fat at 3.02%, carbohydrates at 3.77%, and minerals at 3.04%.

3. Research Method

The place of the study consisted of 3 places, namely: 1) place of taking Geloina sp sample, 2) place of sample preparation, namely making clamshell of Geloina sp powder and analysis of Geloina sp sample, and 3) experiment on poultry. The place of sampling is conducted in nine waters points. This is because in general people dispose clamshell of Geloina sp from the rest of the processing clamshell around the waters. The place for sample preparation is the manufacture clamshell of Geloina sp powder and the analysis of elemental and chemical compounds was carried out conducted in the Laboratory. The last place as an experiment on egg quality is carried out in ungags farmers.

Elemental and chemical compound analysis of the clamshell Geloina sp powder (Ca, Na, P, and CaCO3) shells was carried out through the Atomic Absorption Spectrophotometer (AAS) analysis method. Data analysis of experimental activities on poultry was carried out descriptively including: eggshell color, thick and thin eggshell, egg quantity and egg white color.

4. Results and Discussion

The clamshell of Geloina sp. have processing produces very high (Figure 2). Each fisherman can produce around 25 kg within a week of an average of 10 fishermen can produce one tons or more. Until now, the accumulation clamshell of Geloina sp spheres around the waters reaches a radius of 62.3 meters. The results of the laboratory analysis clamshell of Geloina sp contain calcium (Ca) 94.90%, sodium (Na) 0.48%, phosphorus (P) 0% and CaCO3 7.76%. The chemical elements were analyzed 2 times. Calcium is a macro mineral element, which is a mineral element needed by the body in large quantities. Compositions of calcium from Clamshell powder are influenced by environmental factors. Abdullah & Wardhani (2010) in general calcium content in clamshell is influenced by environmental conditions such as salinity and temperature. Calcium levels in Geloina sp are also possible because of the age factor of old shellfish.
Figure 2. Geloina sp Shell Conditions along the Waters

In poultry given an additional clamshell powder, producing eggs with thicker shells and larger size with an egg diameter of 6-7.5 cm wide and an egg length of 7-8 cm (Figure 3). From the results of observations of the color of the yolk showed a very striking color difference, namely: the color of the yolk of a duck with a clamshell powder ration is older than that without a clamshell powder ration. From the results of the measurement of the yolk diameter also showed a difference) namely the size of the yolk with rations of clamshell powder is greater than those without the clamshell powder ration. Based on the overall egg weight, it shows that duck eggs with additional ration of clamshell powder are heavier (56.00-78.00 gram) than duck eggs without conch shell powder (56-65 grams).

Rivan et al (2018) the content of Calcium and P (phosphor) in the ration with the addition clamshell powder of Gelonia sp that enter the body of poultry is relatively the same. The content of Calcium and P (phosphor) in the ration is very instrumental in the process of egg formation. Egg weight is influenced by the content of calcium, protein and energy contained in the feed and the age of poultry.

Figure 3. Egg Yolk Size After Giving Calcium Of Clamshell Powder

5. Conclusion

Calcium from Clamshell Powder Gelonia sp has good benefits to help increase the frequency of laying eggs of poultry. If assessed from the condition of poultry eggs, giving calcium to poultry will produce eggs with larger egg yolks. This will directly increase the size of the egg.
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