



# ADDING OF TELANG LEAF MEAL (*CLITORIA TERNATEA*) TO THE PHYSICAL QUALITY OF FEED AND RESPONSE TO EATING TILAPIA (*OREOCHROMIS NILOTICUS*) AND CATFISH (*PANGASIU HYPOPHTALAMUS*)

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## KeyWords

Clitoria ternatea, Antioxidant, Functional Feed, Physical Quality, Response, Tilapia, Catfish

## ABSTRACT

Clitoria ternatea contains high antioxidants and can be made functional feed that is useful as an preventive for free radicals. This research aimed to evaluate the physical quality of feed mixture of C.ternatea leaves meal with commercial feed for response of tilapia and catfish. This research includes physical quality (aroma, color, and texture) and the response of the fish to the feed. The results obtained are the aroma of C.ternatea is increasing, the color is more green, and the texture of the feed is getting softer, with response of the fish is slowing down along with the addition of C.ternatea leaves meal.

## INTRODUCTION

Butterfly Pea (*Clitoria ternatea*) is an ornamental plant that has purple, blue or white flowers. This plant grows wild in shrubs and yards by spreading on logs, branches or so on. This plant is increasingly used throughout the world for health purposes, where all parts of the plant including flowers, seeds, leaves, bark, sprouts to stems are used as medicine [1]. However, from the another results it was found that the extract of the leaves and roots is the most effective extract for all test organisms [2]. The great pharmacological potential due to the phytochemical content of *Clitoria ternatea* including as an antioxidant, antibacterial, anti-inflammatory, analgesic, antiparasitic, antitoxic, antidiabetic, anticancer, antihistamine, immunomodulator and effect the central nervous system [3].

Science and technology are currently developing rapidly, especially those that affect fish including treatment and prevention of diseases and stress. Disease prevention can be done by functional feeding, where the fish farming globally more than 70% of total production depends on the supply of external feed inputs [4]. According to another journal functional feed is food which contains nutritional value that can increase growth and also improve fish health. This additive for making functional feed has environmentally friendly properties and can be found in nature [5]. Among them are *Clitoria ternatea*, where the functional effects obtained from butterfly pea plants are antioxidant content that is useful for managing oxidative stress associated with chronic diseases [6].

A good feed is a food that besides having a positive effect on fish but also preferred by fish. It is useless when the feed contains good properties but not consumed by fish, therefore it is important to increase fish appetite. Each type of fish has its own feeding characteristics. This is adjusted to the fish food habits. The process of making feed must be through physical testing, including the color, texture, aroma and the response of the fish to the feed. Good physical test results and corresponding with the fish to be provided will make the feed conversion more better so it will increase fish growth [7].

This research supports to improve the physical quality of butterfly pea leaves meal mixture feed with commercial feed and the response of tilapia and catfish to the mixed feed.

## MATERIALS AND METHOD

This research was conducted in July 2019, located in Inland Fisheries Area Ciparanje, Faculty of Fisheries and Marine Sciences, Padjadjaran University.

The tools used are aquariums, aerators, blender, trays, filters, basins. The materials used are tilapia, catfish, leaf meal, commercial feed (PF 1000), water and CMC.

The method used in this research is the experimental method by using a completely randomized design (CRD) with five treatments and three replications. The treatment given is distinguished based on the concentration in the provision of butterfly pea leaf meal mixed with commercial feed :

- treatment A = commercial feed (control)
- treatment B = 5% butterfly pea leaf meal
- treatment C = 10% butterfly pea leaf meal
- treatment D = 15% butterfly pea leaf meal
- treatment E = 20% butterfly pea leaf meal

The procedure of the research was started by taking butterfly pea, leaves are picked and cleaned, afterwards dried in the sun by aerating for 3 days. Dried leaves blend to get butterfly pea leaf meal. Butterfly leaf meal mixed according to the fomulation, with commercial feed and carboxymethylcellulose added (CMC) as 1% binders. In these materials added warm water, and made into pellets.

Parameters observed included the physical quality of feed (aroma, color and texture), and fish responses to test the feed. Aroma testing is done using the sense of smell, by comparing the two materials named *Clitoria ternatea* leaf meal and Commercial feed. Color and texture testing is done by looking at the color gradient and feel the feed whether soft or hard with every addition of butterfly pea leaf meal.

## RESULTS AND DISCUSSION

### Feed Aroma

The addition of butterfly pea leaf meal gives a different aroma to the control feed (commercial feed) (Table 1).

Table 1. Aroma scoring feed butterfly test and commercial feed

Treatment	Butterfly pea aroma	Commercial feed aroma
Control (0%)	-	5
5%	1	5
10%	2	4
15%	3	3
20%	4	2

Note : Figures 1-5 show the aroma score level of the feed, the higher number indicates the more concentrated the aroma contained in the feed

Good feed is not only determined by its nutritional value but also influenced by the aroma of the feed, because aroma of the feed can stimulate the fish appetite [8], it would be useless if the food made has very good quality but not eaten by fish. Each type of fish has a different level of preference for the aroma of the feed, increasing the aroma in the feed is determined by the amount and type of attractant added, which in addition also increases the growth and amount of fish feed consumption [9].

In Table 1. can be seen with the addition of flour, the aroma of the original smell of pellets is reduced, a good aroma artificial feed should be closer to the aroma of feed commonly eaten by fish, namely the natural odor of feed (fish meal) [10].

#### Feed Color and Texture

Color testing and texture of feed using *Clitoria ternatea* leaf meal can be seen in Table 2. The addition of *Clitoria ternatea* leaf meal in feed changes the color and texture which increases with the number of additions made.

Table. 2. Color and texture of feed with additional *Clitoria ternatea* leaf meal

Treatment	Color	Texture
Control	Light Brown	Hard
5%	Brown	A Little Harf
10%	Dark Brown	A Little Hard
15%	Dark Brown	Soft Little Hard
20%	Greenish Brown	Soft Little Hard

The color of feed depends on the type of raw material used. Using large amounts of vegetable material will produce greenish colored feed. From Table 2 it was found that the increase of *Clitoria ternatea* leaf meal in the formulation of the test feed will make the feed become more green. This will make the crude fiber content increase. The crude fiber content of the leaves of butterfly pea plant is 29% dry weight, and the crude protein content of 21.5% dry weight [11]. The feed structure will decrease if the crude fiber content contained is more than 8%, but the level of the feed consumption has something to do with the level of fish appetite to the feed given in terms of color and aroma. To attract tilapia eats the food given, not originated from the nutritional content contained but rather the level of acceptance of feed by the fish [12].



Commercial Feed (Control)



5% *Clitoria ternatea* leaf meal

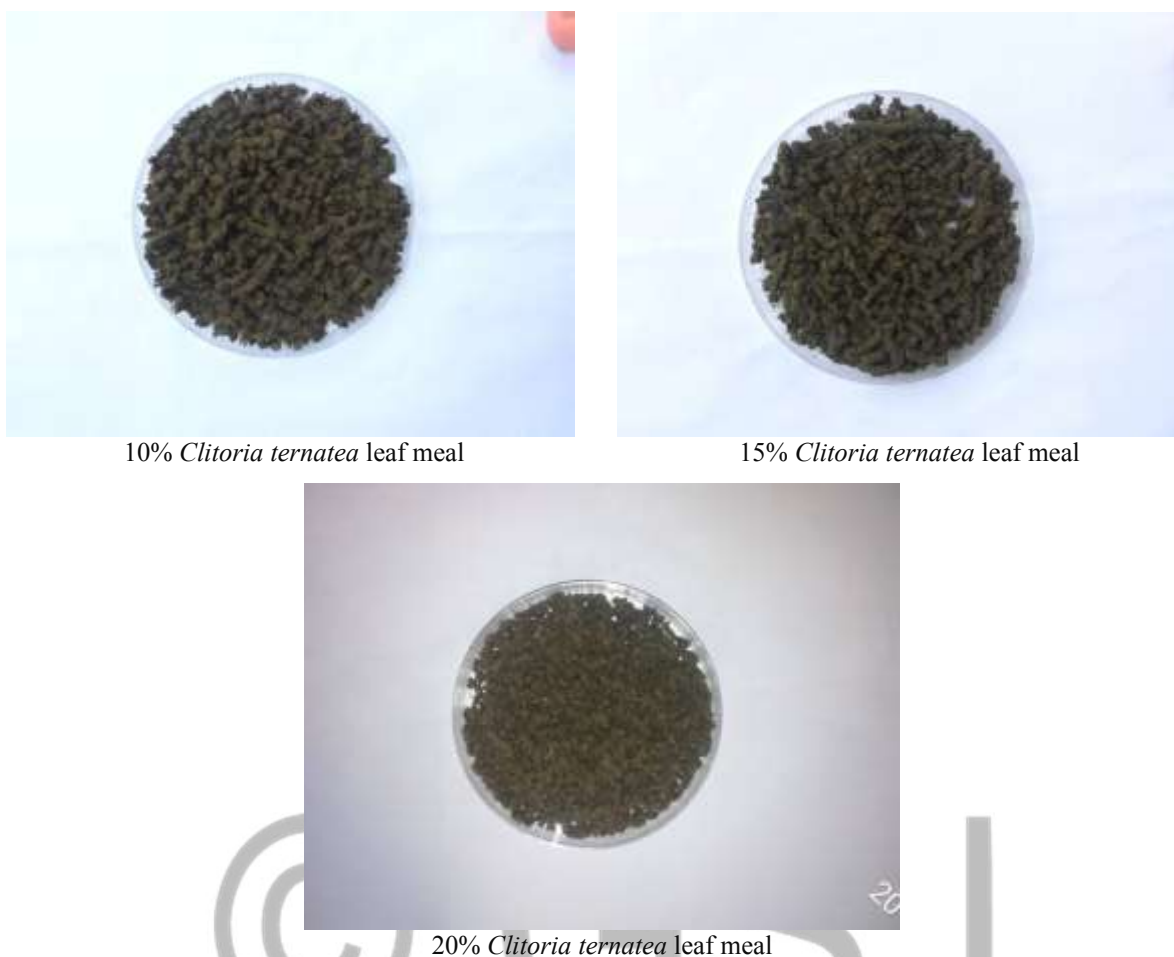


Figure 1. Feed color in various additional *Clitoria ternatea* leaf meal

Feed texture is determined by observing, holding and pressing the test feed. Feed texture will determine whether or not the amount of leftover feed contained in the bottom of the container, in the form of broken pieces or smaller than they should be given to the fish. The texture of the feed made is determined by the fineness of the raw material, the amount of fiber, and the type of binder [13].

#### Fish Response to Feed

The response of the fish to the feed is the desire caused by the fish to eat the feed that had been given [14]. Some factors that influence the amount of the feed consumption include palatability of fish to the feed and nutrient content in it. Palatability or response of the fish to the feed is influenced by several factors, which are size, shape, color, aroma, and taste of the feed [15]. The response of the fish to the feed can be seen from the time it takes for the fish to touch the feed for the first time since entering the water. Table 3 shows that the addition of more *Clitoria ternatea* meal in the feed formulation will affect the increase in the response time of the fish to the feed.

Table 3. the response of tilapia and catfish to the *Clitoria ternatea* leaf meal test and commercial feed.

Adding <i>Clitoria ternatea</i> Meal (%)	Fish Response (Second)	
	Tilapia	Catfish
Control	0.73	3.10
5	1.06	3.25
10	1.44	3.26
15	1.26	4.36
20	3.39	4.5

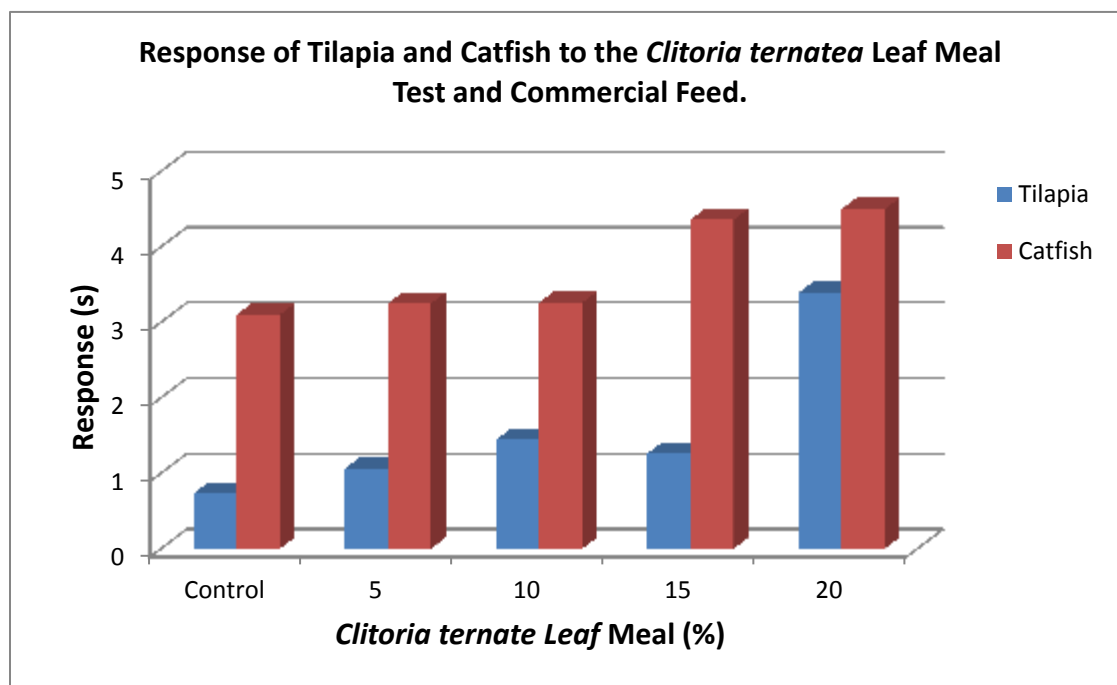


Figure 2. the response of tilapia and catfish to the *Clitoriaternatea* leaf meal test and commercial feed.

The response of catfish to the best feed decreases with the amount of starch in the feed formulation. This is due to the content of forage materials that form aromas and flavors that are less liked by fish [16].

## Conclusion

Based on the results of the research that has been done, it can be concluded that the physical quality of feed with the increasing addition of *Clitoria ternatea* leaf meal will affect the aroma and color of the feed and decrease response of tilapia and catfish to the feed that had been given

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