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Review article: Effect Of Providing Carrot Flour On Feed Against The Brightness Of Guppy Fish Color (Poecilia Reticulata)

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ABSTRACT

Fish are included in animals that cannot synthesize carotene directly in their bodies, so that the increase in color in fish must continue to be supplied with the addition of feed that contains high carotene. The use of carrot flour is considered quite efficient in adding color to guppy fish. Carrots are well-known for their high content of Vitamin A, apart from that carrots also contain beta-carotene. While the function of carotenoids is the pigmentation in the skin of the fish which is responsible for the coloration of the fish. Carotenoids are the main source of fish skin pigmentation. Natural fish coloring works better than synthetic or chemical dyes. The purpose of this article is to present information about the effect of giving carrot flour on color brightness in fish

Keywords: carrots, carotenoids, pigmentation

1. INTRODUCTION

Guppy fish are currently very popular as ornamental fish. Guppy fish, also known as Million fish or Rainbow Fish, are fish that are widely distributed to various countries, especially tropical areas (Panjaitan et al. 2015). Ornamental fish is a fishery commodity that has the opportunity to be developed (Saputri and Mutiasari 2017). One of them is guppy fish, because it is one of the freshwater ornamental fish that has high commercial value in the domestic and domestic markets (Malik 2019). The appeal of ornamental fish usually lies in the bright and varied colors. Color is one of the reasons that ornamental fish is in demand by the community, so that farmers need to maintain the color of ornamental fish, namely by providing feed containing color pigments (Rahmawati, 2010). The beautiful color of fish is caused by chromatophores (pigment

cells) which are located in the epidermis layer (Indarti et al. 2012). Fish are included as animals that cannot synthesize carotene directly in their bodies, so that the increase in color in fish must continue to be supplied with the addition of feed that contains high carotene (Saputri and Mutiarasari 2017).

Currently many sources of synthetic pigments have been made and have been widely distributed, for example Cantaxanthin Amazing Red which can be added to fish feed, but the results are not as good as natural pigment sources in increasing color brightness in ornamental fish (Maolana et al. 2017). The use of carrot flour can increase feed efficiency, and increase the brightness rate in fish. According to research (Maolana et al. 2017), the addition of carrot extract will have a very strong effect on the addition of the color intensity value of koi fish, a positive sign on the correlation coefficient value shows that the higher the carrot extract also increases the color of the fish body.

2. THE CONTENT IN CARROT IS USED FOR FISH COLORING

Color is one of the major factors, which determine the price of the ornamental fish in the world market (Saxena, 1994; Torrissen, 1989). According to Maiti et al. (2017) said that the different synthetic carotenoids include (b- Carotenoids, canthaxanthin, zeaxanthin and astaxanthin) and natural carotenoids such as plant materials, bacteria, algae, crustaceans, microalgae etc.) are mostly used as color enhancer.

Maiti et al. (2017) stated that adding 1% carrot flour to artificial feed would increase the growth and coloring of koi fish. According to Pardosi (2015), increased pigment and coloration quality in koi fish occurs when only adding a dose of 5% to the artificial feed of koi fish (Cyprinus carpio).

Khairunnisa et al. (2020) in testing the highest number of carotenoids using the completely randomized design method (CRD), four additional doses were added to the artificial feed supplement with treatment P1 (feed with 15% pumpkin flour), P2 (feed with 5% carrot flour), P3 (feed with 1.2% spirulina flour). And it can be observed that the carotenoid content is different in each treatment, and for the highest carotenoid content is the addition of carrot flour (Daucus carota) by 5%.

a) Carrots (Daucus carota, L)

Carrots are well-known for their high content of Vitamin A, apart from that carrots also contain beta-carotene (Lidiyawati et al. 2013). Vitamin A in carrots itself has benefits, among others, to maintain immunity in fish. Carrot plants are more suitable in loose and

fertile soils with a pH of 5.5-6.5 and an altitude of> 600 m above sea level. At an altitude of 1200m it will grow much better (Soewito 1991).

The nutritional content and beta-carotene of carrots for every 100 grams can be seen in Table 1 (Source: Pardosi 2015):

Table 1. Nutritional Content in Carrots

Types of Nutrients	amount
Water	87.7 g
Energy	43 kcal
Fat	0.19 g
Carbohydrate	10.14 g
Fiber	3 g
Potassium	323 mg
Phosphor	44mg
Sodium	35 mg
Calcium	27 mg
Magnesium	15 mg
Vitamin C	9.3 mg
Vitamin A.	28000 IU
Vitamin B6	0.14 mg
Niacin	0.92 mg
Folic acid	14 mg
β - carotene	8285 µg

b) Carotenoid Content in Carrots

Carrot (Daucus carota, L) is one of the carotene-producing ingredients that can beautify and also emphasize the color of the fish. With a high content of carotenoids, carrots can be used as natural colorants in fish (Maolana et. Al 2017). Carrots are also a cheap and natural source of β-carotene, which is a source of β-carotene which has a molecular structure almost the same as astaxanthin, it's just that there are differences.

The difference is small in the single-chain structure -OH and double-chain -O, but this difference does not affect their work function (Satyantini et.al 2009). In addition, beta carotene in carrots also acts as a precursor to vitamin A (Ikawati 2005). Vitamin A can also play a role in improving survival and can play a role in increasing fish immunity (Rahmiati et al. 2018). Carrots (Daucus carota, L) are a type of vegetable that contain lots of β-carotene. In the body, β-carotene is converted into vitamin A. β-carotene in carrots, besides being able to meet the needs of vitamin A, also functions as an antioxidant in reducing the effects of free radicals (Agustina et al. 2019), indirectly it can also maintain fish immunity. According to Riki and Irwanmay (2014) carrots are a source of natural beta carotene which can function as natural colorants in fish, which can increase and brighten the color of fish. The more β-carotene content in plants and fruit, the darker the resulting color will be (Ardyanti et al. 2020).

c) Carotenoids

Carotenoids are the pigmentation in the skin of the fish which is responsible for the coloring of the fish. Carotenoids are the main source of fish skin pigmentation. Carotenoids also give a yellow, orange, to red color. Basically, there are several types of carotenoids, including beta-carotene, alpha-carotene, and astasantin. In natural environments, fish encounter their carotenoids through consumption of aquatic plants or through their food chain. Fish coloring is very important in its disguise and development (Wagde et. Al 2018). However, carotene cannot be synthesized by fish but must come from the feed consumed.

Most sources of vitamin A are carotene, which is found in many vegetable ingredients. Carrots, sweet potatoes, and pumpkin are rich in carotene (Ikawati 2005). Carotenoids can come from chemicals or natural substances that come from plants or animals. Carotenoids derived from chemicals tend to be less safe for fish consumption and have a negative impact on the aquatic environment, while carotenoids from natural materials are safer (Solihah et al. 2015). Sources of carotenoids for fish are found in plants and animal products (Davis 1985).

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