Available online at
www.agrospheresmagazine.com

ISSN: 2582 – 7022

Agrospheres:e-Newsletter, (2020) *1*(3), 7-8

Article ID: 127

Role of Charcoal as a Feed Additive in Aquaculture

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Article History
Received: 3 August 2020
Revised: 14 August 2020
Accepted: 20 August 2020

INTRODUCTION

It is now extensively predictable that the increasing demand for fisheries products will have to be met by aquaculture. Fish feed is one the essential factor in the aquaculture sector, with a special reference to the protein Content, source, and availability. Fishes need variable amount of protein contents in their feeds to maintain good survival and growth rate, But the existence of elevated protein contents in the feed of fish adds more toxic nitrogenous remains, such as ammonia through the decomposition of the uneaten feeds and also through the excretion by the fishes into the aquatic environment, . Ammonia has been found of being toxic to the fishes and causes stress, which leads to immune-suppression and becoming prone to the secondary infections, which limits their growth and survival. In order to mitigate the effects of ammonia in the aquaculture sector, extensive researches have been conducted and have been found that Charcoal have a beneficial effects in adsorption of ammonia gas and heavy metals, Thereby improving the water quality. Charcoal also has beneficial effects in the health and growth.

Charcoal

Charcoal is a substance which is crystalline in nature and comprises of carbon, and is usually formed as a carbonaceous remains of bamboo, wood and many plants residue left behind after being heated, which comprises of 70 to 90% of pure carbon and comprises of multiple minerals like iron (Fe), zinc (zn), manganese (Mn), calcium (Ca), sodium (Na), potassium (k), magnesium (Mg), copper (Cu) etc (Brouwer et al., 1996). Charcoal is an odourless, tasteless, very fine black powder, which acts as an adsorbent of various toxins, gases, and drugs, owing to its large surface area which gives it numerous bonding sites, which adsorb many toxins and unwanted gases (Osol, 1975).

Charcoal for Ammonia mitigation

The carbide present in the trees such as wood charcoal, bamboo charcoal has been used as a source of fuel for many generations, but with the advent of research and technologies, they were used as adsorbent and wastewater purification..In order to mitigate the ammonia problem in the culture environment of the fishes, several researches have been done. charcoal have been found to have an excellent capability to adsorb many Heavy metals, toxins, and unwanted gases.

Charcoal for fish Health

Fish health is an important factor in aquaculture business; as the water bodies in which the fish lives contain many microbes, so it is very important to build the immunity of the fishes against many diseases. Activated Charcoal additions as feed additive, can improves the fish performance, antioxidant activities and reduces the Heavy Metal bioaccumulation into the fish body system (Abdel-Tawwab et al., 2017). Similarly, Bamboo Charcoal added as the feed additive in the feed of the juvenile of *Cyprinus carpio* helps in improving the gut functions and overall health of the juvenile fish (Mabe et al., 2018).

Charcoal for Fish growth

Charcoal has multiple advantages by maintaining a healthy aquatic environment for the fishes, besides they also help in promoting the health of the fishes and most importantly help to accelerate the growth of the fishes. A dosage of 30 g/ kg dietary Commercial Wood Charcoal, was found to help in promoting normal growth of red tilapia juveniles and also enhanced the water quality of the culture system (Michael et al., 2017).

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