

Cannabidiol improves Nile tilapia cichlid fish welfare

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In artificial environments, it is common for animals to experience negative states that compromise their welfare. Therefore, investigating ways to improve captive animals' welfare is an urgent concern. A substance that has the potential to increase reared animals' welfare is cannabidiol (CBD). CBD is derived from the *Cannabis sativa* and is widely studied in medicine to control human neural diseases. Besides positive effects on humans, CBD presents anxiolytic properties, regulates reproduction, and decreases aggressiveness and stress in mammals. Therefore, we tested the effect of different CBD doses (0, 1, 10, and 20 mg/kg) on aggressiveness, stress, and reproductive development of the Nile tilapia (*Oreochromis niloticus*), a fish reared worldwide for farming and research purposes. CBD mixed with fish food was offered to isolated male Nile tilapias for five weeks. The 10mg/kg dose efficiently decreased the fish's aggressiveness over time, while the 20mg/kg dose attenuated the non-social stress. Both doses decreased the baseline cortisol level of fish and increased the testis size (gonadosomatic index). However, CBD 1 and 10 mg/kg doses decreased the spermatozoa number. No CBD dose affected any feed ingestion or growth variables, showing evidence that it is not harmful to the meat production amount. Thus, despite the effect on spermatozoa, CBD supplementation exhibits a high potential to increase animals' welfare in artificial environments. Therefore, we showed for the first time that CBD could be used as a tool to increase non-mammal welfare, presenting the great potential to be explored in other husbandry and captivity species.

Keywords: animal welfare, aquaculture, *Cannabis sativa*