

Review Article

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## Haematological Parameters and Behavioural Responses of *Clarias gariepinus* Exposed to Sub-Acute *Senna occidentalis* Ethanol Leaf Extract

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**Abstract** The health of fish largely depends on the quality of their blood, which is relevant in indicating the state of the fish's health. The present study was conducted to evaluate the effects of sub-acute exposure to *Senna occidentalis* ethanol leaf extract on the haematological parameters and behavioural responses of *Clarias gariepinus* juveniles. The study was carried out at the Fish Hatchery Complex, FUNAAB. One hundred and eight (108) juveniles of *Clarias gariepinus* with an initial average body weight of  $16 \pm 2$  grams and length of  $8.5 \pm 0.5$  cm were used. The leaves of *Senna occidentalis* were obtained at Old Bola Ahmed Tinubu Road, off Iju Road, Ifako-Ijaiye LGA, Lagos State. The experiment had four treatments and three replicates, each with 9 fish per treatment tank. During the 23-day subacute toxicity test, *C. gariepinus* exposed to graded doses of *Senna occidentalis* were closely observed for behavioural responses. Haematological parameters such as Red Blood Cell, White Blood Cell, Packed Cell Volume, Haemoglobin, and White Blood Cell Differential Counts were also carried out. Analysis of variance was used to assess the data. The results showed that the values of Mean Corpuscular Volume (115.15-112.33 fL), Hemoglobin (12.31-9.50 g/dL), Red Blood Cell ( $3.30-2.13 \times 10^{12/L}$ ), White Blood Cell ( $15.82-10.90 \times 10^9/L$ ), Packed Cell Volume (38.31%-28.11%), and Mean Cell Hemoglobin concentration (34.71-32.27 g/dL) decreased as *Senna occidentalis* concentrations increased in relation to the control treatment. These findings provide a baseline that what is natural may not be automatically safe, as the results of this research showed poor growth and fish deaths. These findings indicate that *Senna occidentalis* ethanol leaf extract may pose sub-acute toxic effects to *Clarias gariepinus*, and the results may provide useful baseline information for fish health assessment and the safe use of medicinal plant extracts in aquaculture environments.

**Keywords** *Clarias gariepinus*; *Senna occidentalis*; Haematology; Behavioural response; subacute toxicity; Plant extract

## 1 Introduction

Aquatic ecosystems are fundamental to global biodiversity, food security, and ecological stability; however, they are increasingly compromised by contamination from a broad spectrum of anthropogenic substances (Thanigaivel et al., 2023). These environmental pollutants enter the aquatic systems through runoffs and discharges (Amoatey and Baawain, 2019; Das et al., 2024) and have been widely reported to disrupt multiple physiological systems in fish (Mustafa et al., 2024) and biochemical processes (Rocha et al., 2018). Their impact includes impairments to immune balance, reproduction, and metabolism, with effects often under concurrent environmental stressors such as hypoxia and pH fluctuations.

Recent studies have increasingly examined environmental pollutants and their effects in aquatic environments (Adeleye et al., 2024; Sefali et al., 2026). While most of this research is centered on conventional contaminants such as heavy metals, pesticides, and pharmaceuticals, comparatively less research has been done on plant-derived bioactive compounds.

Plants and their derivatives serve as key sources of nutrients for humans and animals while also providing medicinal benefits (Diouf et al., 2019; Samtiya et al., 2020). They contain bioactive compounds whose effects are either