

## Artikel Asli/Original Article

Cytotoxic Assessment of African Catfish (*Clarias gariepinus*) Pond Farm EffluentPenilaian Sitotoksik Air Sisa Kolam Penternakan Ikan Keli Afrika (*Clarias gariepinus*)FARAH DIYANA ARIFFIN, AZHAR ABDUL HALIM, MARLIA MOHD HANAFIAH,  
NORMAH AWANG & MOHD SHAM OTHMAN

## ABSTRACT

There are various pharmaceutical substances such as antibiotics, estrogenic compounds and agricultural chemicals that have been used in the aquaculture industry to prevent and control infectious diseases and increase the productivity of cultured species. However, the accumulation of pharmaceuticals in aquaculture species ultimately threatens human health through biomagnification/bioaccumulation. This study aimed to assess the cytotoxic effect of African catfish (*Clarias gariepinus*) pond farm effluent. Water samples were taken at the African Catfish Pond Farm, Sg Kesang. The cytotoxicity assessment was performed via MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay using Chinese hamster fibroblast V79 cell line (V79). The results of the MTT assay found that African catfish pond farm effluent in February and March have a cytotoxic effect where the  $IC_{50}$  was 34% and 40%, respectively. This study conclusively found that the effluent from the African catfish pond farm could pose health risks to the Sungai Kesang consumer due to its cytotoxic characteristics.

**Keywords:** African catfish, aquaculture, cytotoxicity,  $IC_{50}$ , wastewater

## ABSTRAK

Terdapat pelbagai bahan farmaseutikal seperti antibiotik, sebatian estrogenik dan bahan kimia pertanian yang telah digunakan dalam industri akuakultur untuk mencegah dan mengawal penyakit berjangkit serta meningkatkan produktiviti spesies akuakultur. Walau bagaimanapun, pengumpulan farmaseutikal dalam spesies akuakultur akhirnya mengancam kesihatan manusia melalui biomagnifikasi/bioakumulasi. Kajian ini bertujuan untuk menilai kesan sitotoksik air sisa kolam penternakan ikan keli Afrika (*Clarias gariepinus*). Sampel air telah diambil di Pusat Penternakan Ikan Keli Afrika, Sg Kesang. Penilaian sitotoksik dilakukan melalui ujian MTT (3-(4,5-dimetiltiazol-2-il)-2,5-difeniltetrazolium bromida) menggunakan sel V79 fibroblas hamster China (V79). Keputusan ujian MTT mendapati air sisa kolam penternakan ikan keli Afrika pada bulan Februari dan Mac boleh memberi kesan sitotoksik di mana  $IC_{50}$  masing-masing adalah 34% dan 40%. Kajian ini secara ringkasnya mendapati bahawa air sisa daripada kolam penternakan ikan keli Afrika boleh mendatangkan risiko kesihatan kepada pengguna Sungai Kesang kerana ciri-ciri sitotoksiknya.

**Kata Kunci:** Air sisa, akuakultur,  $IC_{50}$ , ikan keli afrika, sitotoksikiti

## INTRODUCTION

Aquaculture is defined as the farming of aquatic organisms such as fish, crustaceans, shellfish and aquatic plants (Ottinger et al. 2016). The Department of Statistics Malaysia (2011) defines aquaculture as a production process that involves the cultivation (including harvesting) of aquatic organisms by using techniques designed to increase the production of those organisms beyond the capacity of their natural environment. Therefore, aquaculture is the culturing of aquatic organisms whether animals or plants under a controlled

environment where it serves to increase the production of aquatic organisms beyond their natural production. The aquaculture industry in Malaysia has become the 15th largest producer of aquaculture livestock in the world (Sharhan Fathi et al. 2018) with aquaculture production of 391 000 metric tons in 2018 where the total estimated value of the production was as much as RM 3.1 billion or USD 724 million (Azra et al. 2021). In 2020, the total production of aquaculture livestock increased to 400 000 metric tons with an estimated market value of RM 4.2 billion (Department of Fisheries Malaysia 2020). The increase in aquaculture

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