

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

Economic Analysis Of Effluent Control From Catfish Ponds

Craig S. Tucker, John A. Hargreaves



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Environmental Protection Research Catalog: Indexes Smithsonian Science Information Exchange, 1972 **Tilapia Culture** Abdel-Fattah M. El-Sayed, 2019-10-16 Tilapia Culture Second Edition covers the vital issues of farmed tilapia in the world including their biology environmental requirements semi intensive culture intensive culture systems nutrition and feeding reproduction seed production and larval rearing stress and disease harvesting economics trade marketing the role of tilapia culture in rural development and poverty eradication and technological innovations in and the environmental impacts of tilapia culture In addition the book highlights and presents the experiences of leading countries in tilapia culture thus making it ideal for tilapia farmers and researchers who seek the most relevant research and information The new second edition not only brings the most updated information within each chapter but also delivers new content on tilapia transfers introductions and their impacts the use of probiotics and other additives in tilapia culture tilapia trade including marketing and sustainability approaches and practices such as management practices ecosystem approaches to tilapia culture and value chain analyses of tilapia farming Presents the biology of tilapia including taxonomy body shapes geographical distribution introductions and transfers gut morphology and feeding habits Covers semi intensive tilapia culture in earthen ponds tanks raceways cages recirculating systems and aquaponics Provides the latest information on brood stock management production of monosex tilapia seed production and larval rearing under different culture systems Highlights the most common infectious and non infectious diseases affecting farmed tilapia with a full description of disease symptoms and treatment measures Provides an in depth exploration of tilapia economics trade and marketing **Masters Theses in the Pure and Applied Sciences** Wade H. Shafer, 2012-12-06 Masters Theses in the Pure and Applied Sciences was first conceived published and disseminated by the Center for Information and Numerical Data Analysis and Synthesis CINDAS at Purdue University in 1957 starting its coverage of theses with the academic year 1955 Beginning with Volume 13 the printing and dissemination phases of the activity were transferred to University Microfilms Xerox of Ann Arbor Michigan with the thought that such an

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Environmental Best Management Practices for Aquaculture Craig S. Tucker, John A. Hargreaves, 2009-03-03 Published in Cooperation with THE UNITED STATES AQUACULTURE SOCIETY The rapid growth of aquaculture worldwide and domestically has caused concerns over social and environmental impacts Environmental advocacy groups and government regulatory agencies have called for better management to address potentially negative impacts and assure sustainable aquaculture development Best Management Practices BMPs combine sound science common sense economics and site specific management to mitigate or prevent adverse environmental impacts Environmental Best Management Practices for Aquaculture will provide technical guidance to improve the environmental performance of aquaculture This book will be the only comprehensive guide to BMPs for mitigation of environmental impacts of aquaculture in the United States The book addresses development and implementation of BMPs BMPs for specific aquaculture production systems and the economics of implementing best management practices Written by internationally recognized experts in environmental management and aquaculture from academia government and non governmental organizations this book will be a valuable reference for innovative producers policy makers regulators research scientists and students

Aquaculture and the Environment in the United States U.S. Aquaculture Society, 2002 **Outdoor Recreation Research Register**, 1973 **Livestock and the Environment** Ralph H. Ramsey, M. L. Rowe, Linda Merryman, 1974 **Technical Information Appropriate for Developing Countries**, 1986 Miscellaneous Publication, 1981

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In a global defined by information and interconnectivity, the enchanting power of words has acquired unparalleled significance. Their power to kindle emotions, provoke contemplation, and ignite transformative change is actually awe-inspiring. Enter the realm of "**Economic Analysis Of Effluent Control From Catfish Ponds**," a mesmerizing literary masterpiece penned by a distinguished author, guiding readers on a profound journey to unravel the secrets and potential hidden within every word. In this critique, we shall delve into the book's central themes, examine its distinctive writing style, and assess its profound impact on the souls of its readers.

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