



“Gheorghe Asachi” Technical University of Iasi, Romania



AMENABILITY OF POULTRY ABATTOIR WASTEWATER FOR SEQUENTIAL ANAEROBIC-AEROBIC BIOLOGICAL TREATMENT PROCESSES

Ahmed Rahomi Rajab¹, Ameer Badr Khudhair², Zainab Malik Ismael³, Yasir Al-Ani^{4*},
Mohd Razman Salim⁵, Johan Sohaili⁶, Aznah Nor Anuar⁶

¹Department of Civil Engineering, Faculty of Engineering University of Anbar, 31001 Ramadi, Anbar province, Iraq

²Civil Engineering Department, Al Mansour University College, Baghdad, Iraq

³Department of Computer Engineering Tech., Al-Maaref University College, 31001 Ramadi, Anbar province, Iraq

⁴Department of Dams & Water Resources Engineering, Faculty of Engineering University of Anbar, 31001 Ramadi, Anbar Province, Iraq

⁵Faculty of Engineering, UCSI University, 56000 Kuala Lumpur, Malaysia

⁶Department of Environmental Engineering, Universiti Teknologi Malaysia, 81310 Johor Bahru, Malaysia

Abstract

The scarcity of potable water availability worldwide is enhancing the search for innovative water resources to mitigate the effects of this problem. Reuse of wastewater is one of the resolutions that has a promising alternative to reduce the impact of water shortening. The wastewater from poultry slaughterhouses in western Malaysia was characterized in this study in order to check its suitability for sequential anaerobic-aerobic biological treatment and to produce secure water for environmental disposal. Three poultry slaughterhouses were selected according to their maximum capacity of 30000, 45000, and 12500 birds per day for Ayam Kempas, Ayamas, and PPNJ plants, respectively. To reduce contamination in the wastewater generated, these plants separate blood from wastewater. The parameters BOD₅ (range 271-1033 mg/L), TDS (range 275-1458 mg/L), TSS (range 237-1017 mg/L), TVSS (range 234-1006 mg/L), alkalinity (range 47-318 mg/L as CaCO₃), FOG (range 159-550 mg/L), TCOD (range 940-3402 mg/L), TN-N (range 42-205 mg/L), and PO₄³⁻-P (range 17-64 mg/L) were measured in the laboratory. The characteristics of wastewater in these plants were fluctuating. However, the organic matter concentrations among these three selected plants were adopted to order them. Ayamas's wastewater occupies the first rank in the contamination level, followed by Ayam Kempas's and PPNJ's wastewater, respectively. The low strength of PPNJ wastewater is due to the lower production capacity of the slaughterhouse and the high usage of freshwater per bird slaughtered (24 L/bird) compared to the other two slaughterhouse plants.

Key words: organic pollutants, poultry abattoir characterization, poultry slaughterhouse wastewater, sequential anaerobic-aerobic biological treatment

Received: December, 2023; Revised final: March, 2024; Accepted: March, 2024; Published in final edited form: June, 2024

* Author to whom all correspondence should be addressed: e-mail: aniyaser@uoanbar.edu.iq; aniyaser@yahoo.com; Phone: +964 7830821878