



An optimized water reuse and waste valorization method for a sustainable development of poultry slaughtering plants

Carlos Morales-Polo*, María del Mar Cledera-Castro

Escuela Técnica Superior de Ingeniería (ICAI), Universidad Pontificia Comillas, Madrid, Spain, Tel. +34 915422800;

emails: cmorales@upcomillas.es (C. Morales-Polo), mcledera@upcomillas.es (M.d.M. Cledera-Castro)

Received 15 October 2014; Accepted 12 March 2015

A
B
S
T
R
A
C
T

The primary aim of this study is to find a solution to four of the major environmental and energy problems that currently exist in the poultry industry: (a) high water consumption, (b) emissions from excessively contaminated wastewater, (c) intensive consumption of electric and thermal energy, and (d) production of non-recoverable by-products and organic waste. It was decided that a wastewater treatment plant (WWTP) would be designed, which would, in addition to treating the water, create an effluent that meets the water quality standards, so that the water can be reused in plant processes. As part of this, a closed water circuit was created to reduce water consumption and the emission of wastewater. In order to address the issue of high-energy consumption and waste production, the construction of a biomethane production plant was proposed. Given that most of the waste is organic, the waste had to undergo anaerobic digestion processing. This resulted in biogas production, as well as subsequent use of the said biogas primarily as a thermal energy source, which was used to reduce external consumption. Both the WWTP and the biomass power plant required an anaerobic digester. The final aim of this study was to propose the implementation of a hybrid co-digestion system for wastewater and organic waste that would allow water to be treated and, at the same time, produce biogas, which could subsequently be used as an energy source.

Keywords: Poultry industry; Wastewater; Anaerobic co-digestion; Waste; Biogas