

Project: Zero-Waste Poultry Processing with Sequential Membrane Separation and Anaerobic Digestion, Kommalapati, Du, Awal (PVAMU) and C. Coufal (TAMU), US Department of Agriculture, 05/20-04/23, \$500,000

Poultry processing requires large quantities (98 billion gal/year) of fresh water for sanitizing the equipment and cleaning the meat, resulting in process wastewater (PPW) contaminated with blood, lipids, protein and feces. The continuously increasing production of poultry meat in USA, inflicts severe strain on depleting fresh water resources and burden on municipal wastewater treatment plants (WWTP). Conventional WWTP are not capable of removing trace levels of emerging contaminants and high levels of nitrogen and phosphorus (nutrients) present in PPW. We propose to address the dual challenge of sustainability and food safety of poultry processing with a novel zero-waste approach to handling PPW and biosolids separated from processing water. In our proposed project, PPW will be treated with an innovative sequential ultrafiltration, forward & reverse osmosis (UF-FO-RO) system and the solid waste separated from PPW pretreatment will undergo 2-stage solid state anaerobic digestion (SS-AD) to produce renewable energy methane and fertilizer as by-product. The clean water obtained from sequential membrane process will be recycled back to the poultry processing stage, and the renewable methane generated from SS-AD will partially cover energy requirement of the membrane process. Our proposed goal of attaining zero-waste poultry processing to improve food safety and sustainability during poultry processing addresses key areas of ecological/environmental concerns such as: (1) depleting freshwater resources, (2) spread of foodborne contaminants via inefficiently treated wastewater, (3) rising operating costs of poultry processing plants and (4) growing nutrient pollution in watersheds.

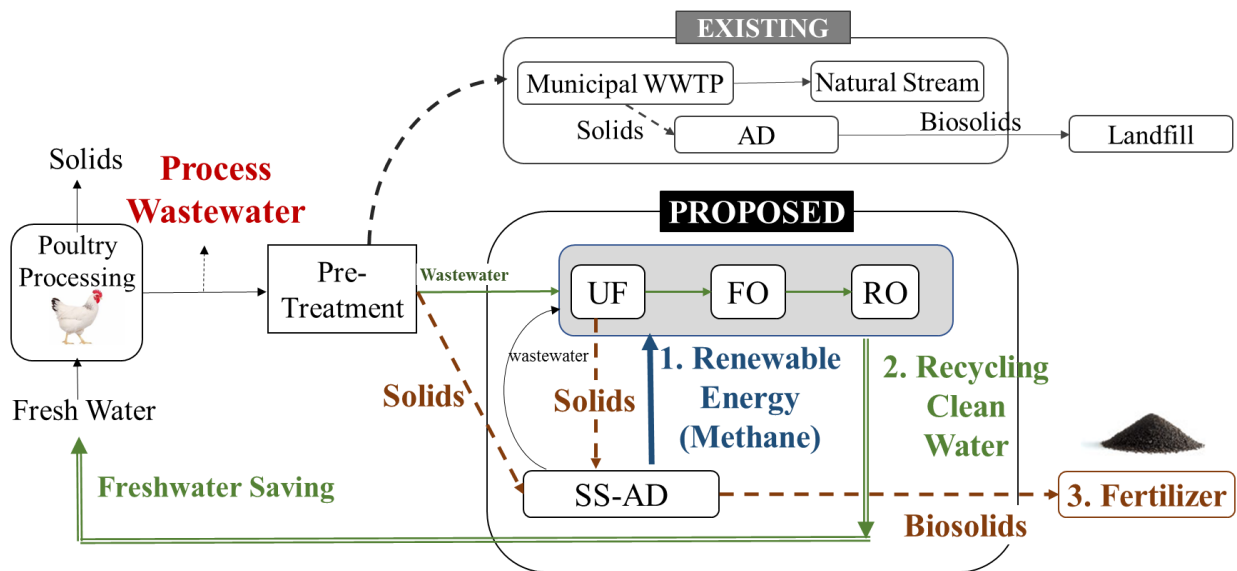


Figure: Existing and proposed process wastewater handling system in poultry processing