

ABSTRACT

Corona plasma is a non-thermal plasma produced by a high-voltage electrical discharge in an uneven electric field. This plasma produces Reactive Oxygen Species (ROS) and Reactive Nitrogen Species (RNS) that are capable of decomposing pollutant gases and inhibiting microorganisms in the air. Corona plasma technology has the potential to be applied to open-house broiler chicken coops that are susceptible to increased ammonia levels and microorganism growth due to humid environmental conditions and open air circulation. This study aims to evaluate the effectiveness of the corona plasma reactor in reducing the concentration of ammonia gas and pathogenic microorganisms in open-house broiler chicken coops and its application for post-harvest. The study was conducted from February 20, 2026, to April 2, 2026, in an open-house broiler chicken coop in Karanggawang, Demak, and at the Center for Plasma Research Laboratory, Diponegoro University. The plasma system uses four corona plasma generator units in a 10 m × 5 m coop area with a population of approximately 1,500 17-day-old broiler chickens. Ammonia concentration measurements were conducted using an ammonia meter at five observation points with varying plasma exposure times of 30, 60, and 90 minutes. Airborne microorganism measurements were conducted using MAS-100 NT and Nutrient Agar media to count the number of airborne bacterial colonies. The results showed that corona plasma was able to reduce ammonia concentration by 96% from 2.5 ppm to approximately 0.1 ppm after 90 minutes of treatment. In cage conditions when chickens were present, the number of bacterial colonies at the 90th minute decreased in the range of 65.0% to 98.3%, with an average of 87.8%. Sample 7 showed the highest effectiveness with a reduction of 98.3%, while sample 8 had the lowest effectiveness at 65.0% and a reduction efficiency of 67.5%. Post-harvest The reduction in bacterial colonies ranged from 38.2% to 89.3% with an average of 62%, where the highest reduction occurred in sample 10 and the lowest in sample 7. The results of the study showed that corona plasma was effective as an air quality control technology for broiler chicken coops in the open house system.