Application of Plasma System for Air Quality improvement in a Swine House

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Abstract: The study was set to develop an air purification system for a swine house. This system was used to sterilize disease and improving the air quality inside and outside the swine house. The plasma with oxygen was mixed to produce the ozone gas with raging 4-10 ppm that active for the sterilize performance. The vacancy time is reduced from 7 days to 4 days. This show that 42 percent was reduced in this system. The weight of pigs increased from 100 kilograms per one pig to 104 kilograms, increasing by 4 percent. Pig house It was found to be more satisfying compared to pre-installed plasma systems for disinfection and improved air quality.

Keywords: Swine house, air quality improvement, plasma system, ozone.

1. Need Assessment

This plasma air quality improvement system increases the potential for killing germs caused by viruses and bacteria[1]. Which the system will create or increase confidence in preventing diseases caused by viruses in pigs. Which is expected to reduce the rest rate by at least 10 percent and increase the weight of the pig not less than 3-4 percent

2.Experimental Setup

The plasma generator was designed with the condition of high voltage and high frequency. The system was tested to confirm stability safety and may cause harm to workers. Germs were measured after resting, cleaning, and sterilization using plasma systems. The plasma source was determined that the number of plasma source points that are suitable for ozone and the duration of sterilization as shown in Fig.1.

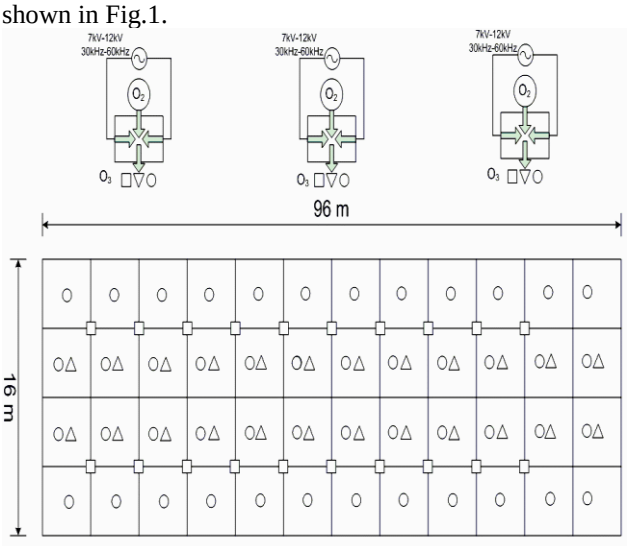

Fig.1 Plasma Source Position.

3. Results

In Fig.2, it was found that the ozone quantity is high when the frequency and speed of air flow rate are high. The amount of relationship between physical and biological values Pathogenic bacteria are important factors. In the persistence and spread of endemic diseases in pigs and animal pathogens. Resistance to infectious diseases in swine MRSA, although the lowest concentration and bactericidal (MIC and MBC) tolerance remains lower than the recommended concentration of disinfectants, resulting in lower levels of active ingredients.

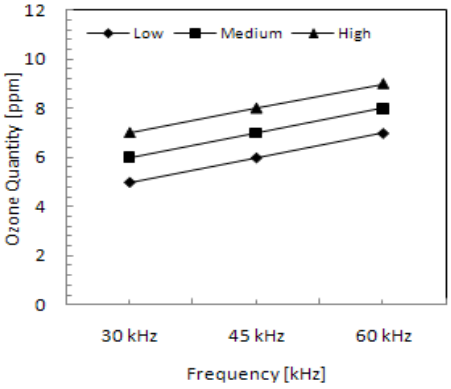

Fig.2. Ozone quantity vs Frequency at 7 kV at various of flow speed.

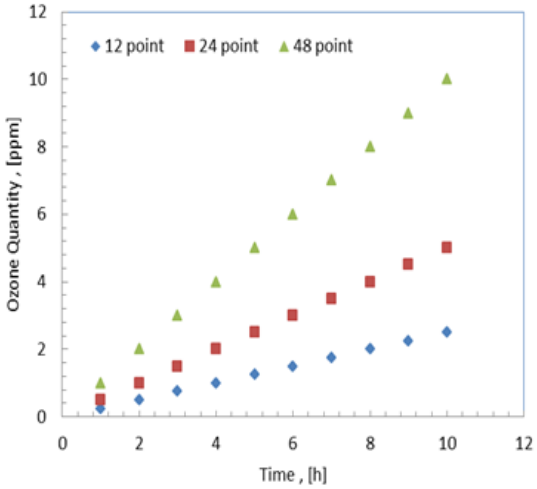

Fig. 3. The relationship of the amount of ozone, the number of plasma sources and the time of origin.

It was found that the maximum value for ozone values was 3 ppm, 5 ppm and 10 ppm for 12 points, 24 points and 48 points for plasma sources that lasted 10 hours.

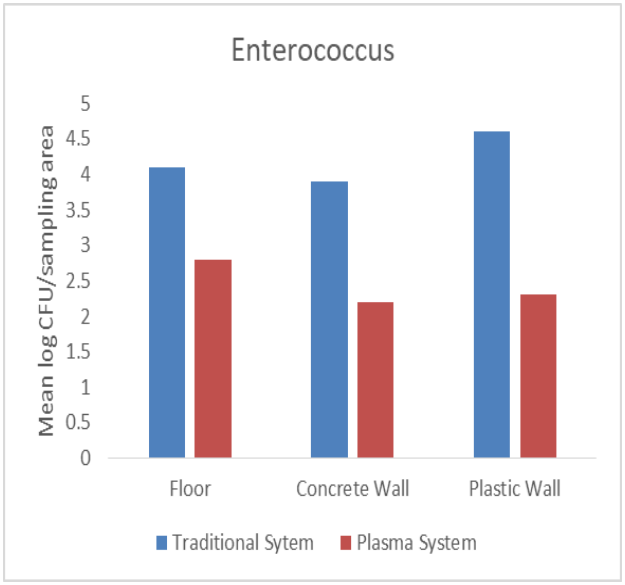

Fig.4. Shows the average Enterococcus count for normal sampling and plasma-based sampling.

These substances make the species more resistant as shown in Fig.4. It was discovered that the values obtained from each random position. The value of the floor is the most valuable. The secondary value is a concrete wall. And the least is the plastic wall. Sterilization using plasma that is more effective than conventional type.

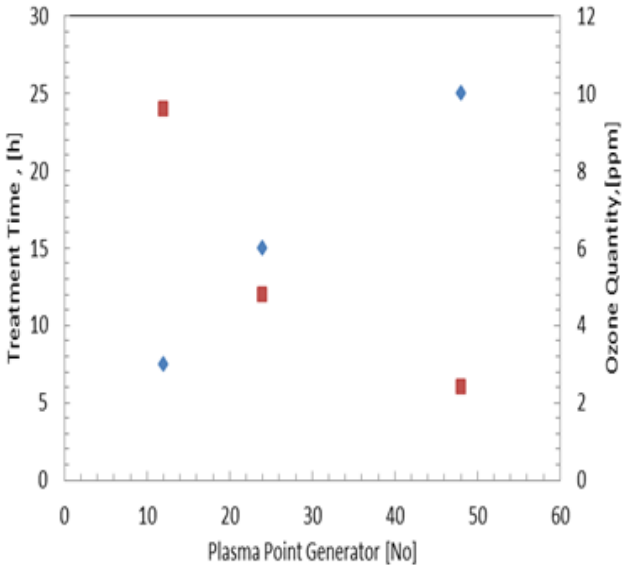

Fig.5. The number of plasma generators, the amount of ozone and the duration of disinfection

It was found that the maximum disinfection period was 24 hours and the minimum 6 hours for 48 plasma generators. The maximum ozone value is 10 ppm and the minimum is 3 ppm. With the number of times for There are 3 sterilization cycles.

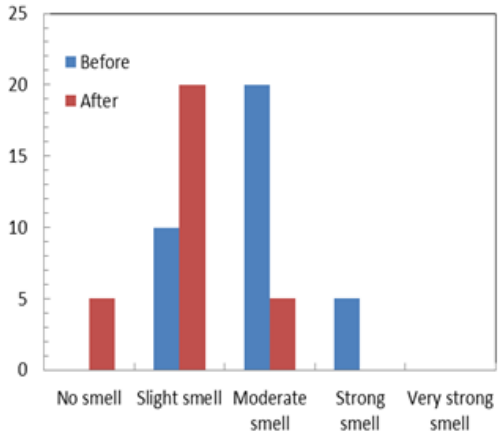

Fig.6. The satisfaction survey of odor levels from the sorting plant.

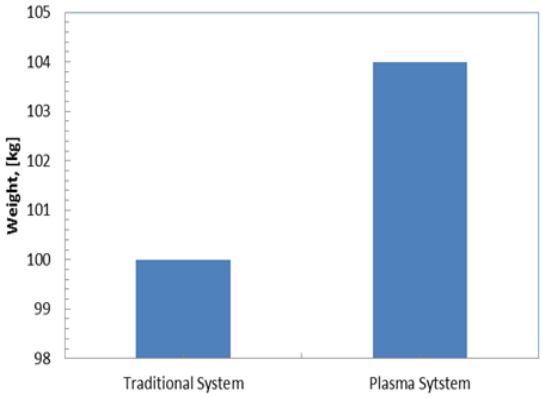

Fig.7. The weight of the whole pig system

4.Conclusions

We found that the weight of pigs using plasma systems has more body weight than the conventional method used today. Can specify that creating an operation at proper ventilation, with air disinfection, air flow control, resulting in weight gain for pigs using the newly created plasma system.

References

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