

EFFECTIVENESS OF FORMALIN, PERACETIC ACID AND THYMOL FOR AIR QUALITY ASSURANCE IN AN ICE CREAM PROCESSING PLANT

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Air flow acts as a major source of microbial contamination. Therefore, air quality assurance inside a food processing plant is a critical aspect. This study was conducted to evaluate the effectiveness of formalin, peracetic acid and thymol in controlling aerobic microorganisms in the ice cream processing plant at Milco (Pvt) Limited, Colombo with the assistance of Deming cycle. Mixture preparation area, balance tank and filling area were identified as Critical Control Areas (CCA) and aerobic Total Colony Count (TCC), Yeast and Mould Count (YMC) were obtained by culture setting plate technique in those Critical Control Areas. Formalin with potassium permanganate (100 g per 200 mL) as a fume, both peracetic acid at 50% concentration (30 mL per 3 L of distilled water) and thymol (2.87 g per 3 L of 95% ethanol) as a fog were applied at 27 – 29 °C temperature for filling area (141 m³) based on manufacturer's recommendations. Data were analyzed using Analysis of Covariance (ANOCOVA) in a Completely Randomized Design (CRD) with three replicates for each treatment. In addition, a questionnaire survey was conducted among randomly selected 30 employees in the factory to determine the current status of air quality assurance and willingness to adopt new chemical approach in controlling aerobic microorganisms. The results revealed that peracetic acid at 50% concentration was the most effective in aerobic microbial destruction ($p < 0.05$). However, there was no significant difference among three treatments on yeast and mould destructions ($p < 0.05$). Based on the survey, it was found that 76.6% of employees had a good awareness on air quality assurance and a considerable number of employees (77%) preferred to adopt a new chemical approach for air sterilization. In conclusion, peracetic acid at 50% concentration can be used to control aerobic microorganisms in an ice cream production plant, which was highly accepted by employees.

Keywords: Air quality assurance, Deming cycle, Effectiveness, Peracetic acid