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Microbiological hazard analysis during manufacturing of food packaging materials

Refae Ibrahim Refae
Cairo University, Egypt

This research was conducted to explore the plant hygiene and package quality during manufacturing of food packaging materials made of paper during the years 2013 and 2014. Experimental samples were monthly collected from a packaging material-manufacturing plant located near the city of Cairo. The following chemical and microbiological measurements were determined: (i) the bacteriological quality of the water used in the plant, (ii) sanitation tests i.e. swabs from hands of workers and machines to measure the bacteriological condition of both, (iii) the microbiological quality of the air inside the plant, (iv) the bacteriological quality of packaging materials, (v) the potency of the disinfectants used in the cleaning and (vi) the heavy metal content in packaging materials. Coliforms were detected on ca. 43% of the workers hands. *Escherichia coli* cells could be isolated from 14% of hand swabs with average count 122 CFU/25 cm² while *Staphylococcus aureus* was found on ca. 30% of hand samples with an average count of 160 CFU/25cm². The results showed that 19% (19/100) of the samples collected from machine surfaces were contaminated with coliforms, while only 2.3% (3/126) of the samples contained *E. coli* cells. As to *Staph. aureus*, it could be isolated from 9.5% (12/126) points of the production line. Detergents were chosen and evaluated by estimation of phenol coefficient. Total coliforms were found in 15 out of 20 air plant samples with counts 1 - 30 CFU/ plate after 15 minutes exposure, while *E. coli* could not be detected in either the analyzed air samples. Examination of different types of food packages showed that 90% of the samples were within the US criteria, since the aerobic counts ranged from undetectable levels to 90 CFU/ 100 cm². Examined packages did not contain either *E. coli* or *Staph. aureus*. The heavy metal content in the packaging materials was within the standard limits. According to the results obtained, precautions were considered to prevent or minimize the contamination of the packaging materials.

Key words: water, packaging materials, food, hazard analysis, bacterial pathogens, sanitation, detergents, heavy metals.

refae_ibrahim@yahoo.com