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Working Conditions and Exposure to Dust and Bioaerosols in Sisal Processing Factories in Tanzania

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Abstract

Information was collected on working conditions and personal exposures to dust, bacteria, and fungi in sisal fiber processing factories in Tanzania to identify health hazards and possible needs for preventive measures. Walkthrough surveys were performed in the brushing and decorticating departments of six sisal factories. The number of departments showing adequate scores for ergonomics and work organization, physical working environment, and occupational health items were determined. Personal thoracic dust samples were collected during sisal processing and analyzed for concentration of dust (n = 24) and for fungi and bacteria (n = 32). In both departments, most items considered to be a prerequisite for a good working environment were either missing or inadequate. Ergonomic and physical hazards were observed. Repetitive strenuous tasks, awkward work postures, and high noise levels were found. Visible dust and inadequate ventilation were seen in the brushing departments, and wet floors were observed in the decortication departments. Personal protective equipment was hardly used. The arithmetic mean exposure of sisal processors was 1.2 mg thoracic dust/m^3, 43 × 10^6 bacteria/ m^3, and 2.35 × 10^6 fungal spores/m^3. The highest exposure levels were measured in the decortication departments when machines were cleaned of waste. Significant differences were found for mean thoracic dust exposure and bacteria counts between the brushing and decortication departments and the security guards. Within individual departments, there were no significant differences in exposures between the different work tasks. A linear mixed effect model of thoracic dust including department as fixed effect explained 65% of the between-worker variability for thoracic dust exposure. The study shows that workers in sisal processing in Tanzania are exposed to bioaerosols, and suitable control measures should be implemented. More exposure studies are needed in this type of industry.

Keywords: Bioaerosols, checklist, exposure assessment, exposure variability, sisal, walkthrough survey