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# Chemical Hazard and Risk Assessment in Flour Manufacturing Plants

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## Abstract

**Background:** Chemical Health Risk Assessment (CHRA) is a systematic approach used to identify, evaluate, and control health risks related to chemical exposure in the workplace. In Malaysia, CHRA is mandated under the Occupational Safety and Health (Use and Standards of Exposure of Chemicals Hazardous to Health) Regulations 2000, which assign the employers responsibility to protect workers health. In flour manufacturing facilities, inhalation is the main route of exposure due to airborne particulates, vapors, and mists, generated during fumigation, cleaning, and maintenance activities. Exposure to chemicals such as fumigants, disinfectants, and solvents may lead to respiratory effects, skin irritation, and long-term occupational health problems if control measures are inadequate.

**Methods:** Data were collected through workplace observations, document review, and worker interviews to identify the chemicals used. Chemical hazards and exposure routes mainly inhalation were assessed. Exposure levels were estimated based on the frequency, duration, and magnitude of exposure during work activities. Risk levels were determined by combining hazard and exposure ratings. Existing control measures, such as ventilation, work procedures, and personal protective equipment (PPE), were reviewed. Based on the findings, recommendations were proposed to reduce chemical exposure and improve worker safety.

**Results:** This study showed that workers may be exposed to chemicals through three main routes namely Inhalation, dermal contact, and ingestion. However, inhalation and dermal exposure were identified as the most significant routes in the assessed work unit due to spraying, cleaning, and handling activities. When both inhalation and dermal exposures were considered together, several chemicals still posed a significant overall risk, indicating the need for more effective control measures.

**Conclusion**: The findings indicate that workers in the flour manufacturing facility are exposed to chemical health hazards during routine operations, mainly through inhalation. Although basic controls were in place, additional improvements are required to further reduce chemical exposure. Therefore, the implementation of enhanced control measures is important to improve workplace safety and protect workers' health in the flour manufacturing industry.

**Keywords**: Flour, Cleaning agents, Chemical, Routes of Exposure

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