STUDY OF AIR QUALITY IN TERMS OF BIOLOGICAL AND RESPIRABLE DUST IN MILITARY UNIFORM PRODUCTION FACTORY OF ROYAL THAI ARMY QUARTERMASTER GENERAL DEPARTMENT

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Progress Report

Human gets harmful effects from inside building atmosphere 2-5 times or even 100 times over than from outside. Generally, people spend 90% of time inside buildings. Harmful atmosphere can affect health and well-being and, thereby, decrease product and quality of work. One of major causes of this problem is inadequate ventilation leading to air contamination. Royal Thai Army (RTA) AFRIMS recognized the importance of this problem in Military Uniform Production Factory of RTA Quartermaster General Department and conducted a study to examine biological air qualities and respirable dust, as well as factors affecting mold, bacteria and respirable dust. The study also measured the prevalence of respiratory symptoms resulted from air quality problems in the factory. This factory has been equipped with EVAPORATIVE COOLING SYSTEM. During the 2-week study, data collection was done by collecting mold and bacteria using BioStage single impactors from 12 sites in the factory and got a total of 480 samples, 240 each for molds and bacteria. For outside the factory, 40 samples were collected with 20 each for molds and bacteria. Two hundred and forty samples were collected by dust meter. Temperatures and relative humidity were also monitored. Daily respiratory symptoms record forms were used for 227 subjects working in the factory.

The study showed that mold quantity was between 1.9×10^2-2.0×10^3 CFU/m^3. Bacteria quantity was between 1.7×10^2-1.9×10^3 CFU/m^3. Respirable dusts were between 23.4-176.6 µg/m^3. Quantity of mold and bacteria inside building was significantly higher ($p<0.001$) those outside. Factors including relative humidity, temperature, density of workers and ventilation system cleaning significantly affected mold and bacteria quantities ($p<0.001$). Quantity of mold and bacteria were correlated significantly to each other with $r = 0.873$ ($p<0.001$). Numbers of bacteria and respirable dust were conversely correlated r = -0161 ($p=0.018$). Prevalence of cough was 38.33%; cough with phlegm was 37.89%; nasal congestion was 36.12%; dyspnea was 18.06%; chest pain was 8.37% and wheezing lung was 3.52%. The correlations were found between bacteria quantity and cough and between presence of phlegm and nasal congestion ($p=0.046$, 0.035 and 0.041, respectively).

These findings are useful for air quality control planning and improving indoor ventilation system in the factory. They reflect the need to reduce mold and bacteria quantity and respirable dusts. Data from the surveillance of health conditions related to air quality problem will help identifying people at risk or people with illness and providing appropriate support to them.