Sirpa Laitinen et al., J Fundam Renewable Energy Appl, 5:5
http://dx.doi.org/10.4172/2090-4541.S1.003

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International Congress and Expo on
Biofuels & Bioenergy
August 25-27, 2015 Valencia, Spain

Risks to workers' safety and health in biomass processing

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Most biomasses include a multitude of different microorganisms such as bacteria, fungi, viruses, and parasites. During the biodegradation of organic matter, many microorganisms are capable of converting a wide range of carbon, nitrogen and sulfur sources of biomass into chemical compounds such as gases via fermentation and anaerobic decomposition. These biological and chemical agents may spread to the air during biomass processing in open sites. Our occupational measurements at different biomass processing plants have revealed very high levels of worker exposure to dangerous substances; levels which are over the health-based recommended limits. Multiple biological and chemical exposure may increase worker health effects such as acute toxic effects, respiratory symptoms and diseases, infections, and allergies. In order to prevent health hazards among workers, all valuable preventive working techniques and tools should be taken into use to keep occupational exposure as low as possible. These factors should be taken into account before work is begun. Workers may be exposed to hazardous substances through inhalation, direct contact with skin or eyes, or via the mouth. Some microorganisms can survive on surfaces for extended periods of time. Therefore, regular cleaning is also important to inhibit the spreading of microorganisms. Surfaces must be designed to be easily cleaned and workers must have opportunities to wash and take care of personal hygiene. Workers' exposure should primarily be diminished through technical solutions: protective clothing and respiratory equipment should be secondary alternatives.

Biography

Sirpa Laitinen, has 20 years of experience in investigating exposure to biological and chemical agents that cause adverse health effects in different occupational and indoor air environments. Exposure evaluations have been tailored to the company's needs, and have given her a clear picture of the companies' work environments, workplaces and problems. She has been a senior researcher in many large studies and has published over 40 international peer-reviewed publications. The last biomass studies are supported by the Finnish Work Environment Fund and the Finnish Funding Agency for Innovation in the Sustainable Bioenergy Solutions for Tomorrow research program.

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