

International Congress and Expo on **Biofuels & Bioenergy**

August 25-27, 2015 Valencia, Spain

Workers' exposure to biological and chemical agents in biomass processing at CHP plants

Juha Laitinen¹, S Laitinen¹, M L Aatamila¹, M Jumpponen¹, K Ojanen¹, K Korpijärvi², L Fagernäs², H Koponen³, J Jokiniemi³ and L Korpinen⁴

¹Finnish Institute of Occupational Health, Finland

²VTT Technical Research Centre of Finland Ltd., Finland

³University of Eastern Finland, Finland

⁴Tampere University of Technology, Finland

Combined heat and power plants (CHP) use different biomasses to produce energy for their customers, and during the processing of biomass, many particles and chemical agents may spread to the air. The aim of the study was to measure workers' exposure to biological and chemical agents at the CHP plants. Occupational hygienic measurements were taken during normal duties. Material samples were collected from processed biomass and air samples from workers' breathing zones and stationary sites in the different phases of the production chain. The study was part of the BEST research program, and was funded by the Finnish Funding Agency for Innovation. The results showed that workers' exposure to bacterial endotoxins, actinobacteria, fungi, and dust was high. They were also exposed to volatile organic compounds and diesel exhausts. The highest emission levels were measured in the workers' breathing zones when they had to take biomass samples and have to do maintenance work. Workers' exposure to biological and chemical agents was at such a high level in biomass handling areas that it may cause health effects. This risk could be minimized if workers supervised the processes from ventilated control rooms or worked inside cabins during unloading. Local hoods are highly recommended in indoor spaces in which workers have to handle biomass in open sites. In places in which the fermentation of biomass is possible, workers should use a personal gas detector which warns them when carbon dioxide and hydrogen sulfide concentrations are too high.

Biography

Juha Laitinen is educated as an environmental hygienist, and holds a PhD in occupational hygiene and the biomonitoring of chemical agents and their health effects. He works as a Senior Research Scientist at the Finnish Institute of Occupational Health and has over 20 years of experience in chemical risk characterization, evaluation and management. He also holds the title of Docent in Occupational Toxicology at the University of Eastern Finland. With his research group, he has published about 30 international peer-review articles on chemical exposure at different work sites. His research group is currently working on exposure studies among fire fighters and workers in the bioenergy supply chain, and actors who are exposed to theatrical smoke.

juha.laitinen@ttl.fi

Notes: