

Wood Dust: Overview & Areas of Uncertainty

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Wood dust is made up of cellulose (β -D-glucose, 40-50%), polyoses (mannose, galactose, xylose, 15-35%), lignin (guaiacyl, syringyl, 20-35%), and “extractives” (low-relative-molecular-mass organic and inorganic compounds, <1-15%). The “extractives” are highly variable between species and include many biologically active agents such as alkaloids (toxins, intoxicants), catechols (strong sensitizers, irritants), flavonoids (cardiac effects), lignans (sensitizers), phenols (irritants, sensitizers), quinones (irritants, sensitizers), stilbenes (sensitizers, irritants, carcinogens?), tannins (carcinogens?), and terpenes (sensitizers, irritants). The variability in health effects observed between species is likely due to these naturally occurring chemicals.

The health effects of wood dust include upper respiratory and eye irritation, asthma, dermatitis, chronic lung disease, and cancer. Wood dust has been most strongly associated with sino-nasal cancer, although other cancer sites such as the naso-pharynx are suspected. The highest risks have been observed among furniture workers which may be due to either high levels of exposure or the tree species used (i.e. oak, beech, teak, mahogany, walnut, mahogany, and birch) or both. Many cross-sectional surveys have observed an elevated prevalence of respiratory symptoms and decreased lung function associated with both conifers (softwood) and deciduous (hardwood) tree species. Occupational asthma and exposure to certain tree species, such as Western red cedar and many exotic tree species (e.g. iroko and obeche), has been well established. However, there is evidence that asthma may also be caused by other more, common tree species such as pine, although the prevalence among exposed workers may be lower. A number of tree species have been associated with allergic and/or irritant dermatitis. Upper respiratory and eye irritation is perhaps the most common health effect of wood dust exposure. Many of the health effects of wood dust are observed in the upper respiratory system and it is most appropriate to measure levels of exposure to the inhalable fraction of wood dust when assessing exposure.

There are several areas of uncertainty remaining. An over-riding issue is that the health effects of wood dust vary by tree species, but it is not always clear which are the most toxic or how to group similar species for risk assessment purposes. It is clear that dose-response relationships exists between exposure to wood dust and the risk of both chronic respiratory disease and sino-nasal cancer, but not yet clear what a safe level of exposure is. Further research regarding the mechanisms by which wood dust causes health effects and more studies using quantitative exposure assessment will help address these issues.