

ENDOTOXIN IN COTTON DUST: A RESPIRATORY HAZARD WITH IMPLICATIONS FOR WORKER HEALTH IN BOTH AGRICULTURE AND MANUFACTURING



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The Public Health Service's *Year 2000 Objectives for the Nation* call for the elimination of exposures that cause byssinosis ("brown lung disease"), an occupational lung disorder which affects cotton workers. Recent research on the etiology of byssinosis has contributed substantially to the body of knowledge necessary to achieve this goal. Although byssinosis is usually considered in the context of the textile manufacturing industry, results of this recent research have implications for both agricultural worker health and agricultural practices which may prevent downstream risk in manufacturing. Recent experimental evidence has clearly demonstrated that the acute airway response of humans exposed to cotton dust is associated with airborne endotoxin concentration. Cotton is contaminated by endotoxin-containing gram-negative bacteria while in the field before harvest. Local cotton growing conditions appear to substantially affect the level of colonization by gram-negative bacteria, resulting in wide variation in the potency of cotton dust with respect to endotoxin. A survey of commercial cotton gins has revealed substantial regional differences in endotoxin contamination of airborne cotton dust. In addition to regional effects, year-to-year variability within the same growing location has been observed in the level of endotoxin contamination of experimentally-generated cardroom dust. Subsequent environmental sampling of cardroom work areas in selected commercial cotton textile mills has shown that area of growth differences are also reflected in yarn manufacturing processes. Airborne endotoxin concentrations in work areas of both agriculture and manufacturing range widely, from relatively low levels to levels which may represent a substantial respiratory hazard. Byssinosis prevention may be enhanced by appropriately applying knowledge of how to limit the natural tendency for gram-negative bacteria to colonize cotton. Therefore, defining the factors which influence the level of gram-negative bacterial contamination of cotton is a prime objective of ongoing research. Furthermore, because of the relationship between endotoxin exposure and byssinosis, a pilot surveillance system to monitor endotoxin in cotton is currently under development.

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