

ABSTRACT OF THESIS

SILICON DIOXIDE EXPOSURE AND THE RELATIONSHIP TO LEUKOTRIENE E-4 IN CONSTRUCTION WORKERS

The purpose of this study was to investigate the effects of respirable crystalline silica on a pulmonary immune response and the urinary excretion of leukotriene E-4 in workers exposed to respirable crystalline silica. Respirable crystalline silica has been shown to promote a pulmonary inflammation response. Studies have shown leukotriene E-4 levels increase during an inflammation response. There is also evidence a pulmonary threshold may exist due to volume and surface area of respirable crystalline silica in alveolar macrophages. Clearance of respirable crystalline silica has also been linked to pulmonary and cellular mediated inflammation.

A total of 33 participants were monitored for respirable crystalline silica exposure. Participants were construction workers from a variety of job descriptions. Personal sampling results were compared to the Permissible Exposure Limit and Threshold Limit Value. In this study it was found that respirable crystalline silica LTE-4 levels from Post-Shift urine samples were compared to LTE-4 levels from Overnight-Void urine samples. LTE-4 levels were then compared to respirable crystalline silica exposures.

This study found a significant relationship to the biomarker between exposure to respirable crystalline silica and the immune system's inflammatory response biomarker LTE-4. It was found as respirable crystalline silica concentrations increased, the LTE-4 ratio decreased. We concluded that respirable crystalline silica is significantly related to LTE-4 ratios.

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