

PRELIMINARY INVESTIGATIONS OF SOME FIBROUS ZEOLITES WHICH MAY CAUSE ADVERSE HEALTH EFFECTS: A CASE STUDY FROM VOLCANIC ROCKS OF NORTHERN ITALY

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Zeolites are secondary minerals occurring in volcanic rocks, whose genesis require high alkalinity, low temperature and low pressure conditions, due to diagenetic, deuteric or hydrothermal processes. Among zeolites, fibrous erionite represents a well-known health hazard. Exposures to erionite fibers can cause adverse health effects identical to those of asbestos, including mesothelioma. For this reason, erionite is the only zeolite which was classified as a human carcinogen, although there may be other fibrous zeolites should not be considered intrinsically safe. Despite of the lack of epidemiological information on populations exposed to natural asbestiform minerals other than asbestos and erionite, experimental results suggest that, if breathed, all mineral fibers of similar size, habit, and biopersistence may carry the same risks for humans. In Italy, very few occurrences of fibrous zeolites was reported, but the widespread zeolitization processes of most italian volcanic deposits could suggest the local presence of such hazardous mineral, often associated with other non-hazardous and commercially exploited zeolites. In the Northern Italy a huge amount of volcanic rocks are often deeply weathered and show veins and vesicles frequently filled by secondary minerals such as hydrous silicates, silica and nonsilicates. Preliminary investigations indicate that the most common silicates are zeolites, including some fibrous species (erionite, offretite, and natrolite). Considering that the exposure to fibrous zeolites can be assumed as dangerous where anthropic activities such as quarrying or building/restructuring activities are in progress, the identification and quantification of the possible presence of these health-threatening minerals should be the first step of a risk assessment process.

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