

Respirable crystalline silica (RCS) and feldspars: an unconventional harmful exposure scenario

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Exposure to respirable crystalline silica (RCS) can cause silicosis, a recognized occupational disease. The presence of RCS in equine riding arenas may be a risk factor for the development of silicosis in these animals (Schwartz et al., 1981), but also in human beings working in the equine industry. Currently, a case of lung cancer caused by RCS has been reported in a horse trainer (Yoon et al., 2013).

This study describes for the first time the qualitative and quantitative features of inorganic particles found in equine alveoli and small airways, distinguishing among RCS and non-RCS species. In parallel, the composition of equine working surfaces (soil) is assessed. This approach will help in evaluating possible health consequences due to exposure to equine working surfaces in recreative and professional context.

A total of 10 horses were studied. Based on their clinical presentation and respiratory cytopathology, they were classified as: healthy (control group) or affected by chronic inflammatory (asthma-like) airway diseases (mild and severe asthma groups).

Samples of bronchoalveolar lavage fluid (BALF) and of working surfaces/soils have been collected and investigated respectively by electron microscopy (SEM/EDS, TEM/EDS) and XRPD techniques.

The quality and quantity of Inhaled inorganic particles found in BALF samples from control horses were compared with those found in asthmatic horses. The results highlight an association between the quantity and composition of inhaled inorganic particles (particularly those referable to silicon dioxide) and the presence and severity of bronchoalveolar inflammation in the horses studied.

All the soils investigated contained quartz; feldspars were also often recognized, both sometimes as more abundant species. Together, these data suggest that the silicon dioxide species in BALF can be identified as quartz.

Based on our data, it is plausible to hypothesize that horse riding represents an unconventional exposure to quartz during occupational or recreational-sporting activity. Although limited information is available on the toxic potential of feldspars, they could also represent an additional risk factor for respiratory health and deserves attention in future studies.

The research will subsequently be completed with the evaluation of the presence and quantity of particles dispersed in the air due to trampling by horses. The possible harmfulness of feldspar particles in this context will also be investigated.

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Yoon J.H., Kim B., Choi B.S., Park S.Y., Kwag H.S., Kim I.A. & Jeong J.Y. (2013) - A case report of lung cancer in a horse trainer caused by exposure to respirable crystalline silica: an exposure assessment. *Saf Health Work.*, 4(1), 71-4.