

A microXRF study of silicon and its behaviour in lung tissues with evidence of silicosis

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The study of the health issues (silicosis, lung cancer and also self-immune diseases) raised by occupational exposure to respirable crystalline silica (RCS) attracted the interest of a multidisciplinary scientific community for at least three decades. Still, many external variables limited the clarification of the relationship between the pathogenic factors and the occurrence of the illness in cases of low exposure doses. In this study we aimed at verifying the spatial distribution of Silicon (as a tracer of RCS) in relation to other potentially modulating agents as e.g. transition metal ions, in tissue where the occurrence and localisation of silicotic nodules has been diagnosed. Namely, selected samples of lymph nodes were considered. The investigation was carried out by means of synchrotron-radiation micro-X-ray Fluorescence (experiments were performed at the beamline ID21 of ESRF, Grenoble, France), a technique that can provide significant information especially on biologic samples, where the matrix effect is considerably low. X-ray element distribution maps were obtained for all the considered samples, and a preliminary study of the obtained chemical composition results has been undertaken by means of a properly designed robust statistical approach, which will allow to sort out internal laws of interaction between different elements in the obtained database.