



Short communication

Mercury in air and plant specimens in herbaria: A pilot study at the MAF Herbarium in Madrid (Spain)

R. Oyarzun ^{a,*}, P. Higuera ^b, J.M. Esbrí ^b, J. Pizarro ^c^a *Departamento de Cristalografía y Mineralogía, Facultad de Ciencias Geológicas, Universidad Complutense, 28040 Madrid, Spain*^b *Departamento de Ingeniería Geológica y Minera, Escuela Universitaria Politécnica de Almadén, Universidad de Castilla-La Mancha, Plaza M. Meca 1, 13400 Almadén, Spain*^c *Departamento de Biología Vegetal II, Facultad de Farmacia, Universidad Complutense, 28040 Madrid, Spain*

Received 6 March 2007; received in revised form 23 May 2007; accepted 23 May 2007

Available online 27 June 2007

Abstract

We present data from a study of mercury concentrations in air and plant specimens from the MAF Herbarium in Madrid (Spain). Hg (gas) emissions from old plant collections treated with mercuric chloride (HgCl₂) in herbaria may pose a health risk for staff working in installations of this type. This is an issue not yet properly addressed. Plants that underwent insecticide treatment with HgCl₂ at the MAF Herbarium until the mid 1970s have persistent high concentrations of Hg in the range 1093–11,967 μg g⁻¹, whereas untreated specimens are in the range of 1.2–4.3 μg g⁻¹. The first group induces high concentrations of Hg (gas) in the main herbarium room, with seasonal variations of 404–727 ng m⁻³ (late winter) and 748–7797 ng m⁻³ (early summer) (baseline for Hg: 8 ng m⁻³). A test survey at another herbarium in Madrid showed even higher concentrations of Hg (gas) above 40,000 ng m⁻³. The World Health Organization guidelines for chronic exposure to Hg (gas) are estimated at a maximum of 1000 ng m⁻³. While staff was aware of the existence of HgCl₂ treated plants (the plant specimen sheets are labelled as ‘poisoned’), they had no knowledge of the presence of high Hg (gas) concentrations in the buildings, a situation that may be relatively common in herbaria. © 2007 Elsevier B.V. All rights reserved.

Keywords: Mercury gas; Mercuric chloride; Herbaria; Plants; Health risk**1. Introduction**

A classic threat to preservation of herbarium specimens are insects and fungi, for which a series of chemical deterrents were used in the past, among them mercuric chloride (HgCl₂). Mercuric chloride was widely used until the 1970s, and even the early 1980s in some herbaria (Clark, 1986), when health risks made it unsuitable for specimen preservation. However, given that many herbaria are much older than this, an important

number of plant specimens in herbaria worldwide are contaminated with mercury. To our knowledge few scientific studies (e.g., Purewal, 2001) have been conducted in herbaria to determine the extent of Hg (gas) contamination, and only one of them (Hawks et al., 2004) includes measurements of gaseous mercury with continuous Hg (gas) measurements, real-time monitoring. A pioneer work on Hg (gas) in herbaria was conducted by Briggs et al. (1983), who stated that: “In the light of our experience, it seems likely that other institutions will wish to study the concentration of mercury vapour in their rooms and collections especially if collections are housed in tightly closed unventilated

* Corresponding author.

E-mail address: oyarzun@geo.ucm.es (R. Oyarzun).