Asian Journal of Biochemical and Pharmaceutical Research *Issue 1 (Vol. 2) 2012* ISSN: 2231-2560
CODEN (USA): AJBPAD

Research Article

Asian Journal of Biochemical and Pharmaceutical Research

Analyses On Potential Hazard For Vegetation

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Received: 24 November 2011; Revised: 24 December 2011; Accepted: 01 January 2011

Abstract: Fog and dew are not in list of pollutants. The chemistry of fog and dew is discussed in relation to the potential hazard for vegetation, depending on the local chemical regime, the water layer formed on plant surfaces by the deposition of cloud, fog or dew water can contain high concentrations up to loo µmol/L of oxidizing or reducing species Relatively high concentrations up to several tens of µmol/L of Mn are found in dew water sampled from plants. This Mn, that is Leached from the plant itself, results in significant catalytic oxidation of S (IV).

Keywords: Fog and dew, vegetation, potential hazard.

INTRODUCTION:

The main pathways for deposition of pollutants generally are wet and dry deposition. As a result, the research into the effects that pollutants have on vegetation is focused on the same pathways, that is, acidification of the soil and uptake of gases via the stomata. However, in addition to these gross deposition processes, effects on vegetation can also be caused by uptake of pollutants in dew water or by deposition of highly polluted fog droplets. Depending on various parameters such as distance to sources, type of sources as well as meteorology, the chemistry involved differs from that of the gross deposition. The forests that are located on mountain slopes are frequently enveloped in clouds. These clouds are formed at the interface of the boundary layer and the oxidant-rich free troposphere. As a result, cloud water often contains large amounts of hydrogen peroxide. The effect of H_2O_2 on vegetation was investigated [1]. In the study, young spruces and beeches were exposed to H_2O_2-containing fog. At concentrations that are frequently found in clouds, H_2O_2 was proven to cause severe damage to the tissue of the exposed plants.

In valleys or in flat countries like Iran thin water layers may form on vegetation due to the process of dew formation, or by deposition of fog droplets. Formation of (radiation-) fog occurs during calm nights in which the dispersion of pollutants is at a minimum. Therefore, the pollutant levels in meteorological situations that favor fog formation are quite high. Even if H_2O_2 would be formed under these conditions, the fog water is not likely to contain H_2O_2 as a result of the rapid reaction with SO_2 that takes place, in the droplets. Fog water often is in a reducing state due to the presence of sulfite. This sulfite predominantly is present as hydroxymethane sulfonicacid (HMSA), that is formed when formaldehyde is present. In the form of HMSA, large amounts of sulfite can be present even if the very high acidity of fog water inhibits the presence