Title	**Sulfur in plants as part of a metabolic network**
Author	Rainer Hoefgen and Holger Hesse
Journal	Plant Ecophysiology
Abstract	The aims of this paper were to determine the phytoavailability and phytotoxicity of hydrogen fluoride (HF) and fluoroborate (BF 4 -) in solution when exposed to the root of the plant. As fluoroborate undergoes a slow hydrolysis to F and borate ions, the stability of BF 4 - under solution culture conditions was determined. Fluoroborate was found to have a zero order rate constant of 0.0136 and took approximately 72 days to hydrolyse completely. Tomato (Lycopersicon esculentum) and oat (Avena sativa) plants were grown in dilute nutrient solutions which contained a range of activities of HF and BF 4 - . Dry matter production of both tomato and oat plants grown in nutrient solutions were found to be restricted by increased activity of HF and BF 4 - in solution. Tomatoes were more sensitive to HF and BF 4 - than oats. Limitations to dry matter production coincided with increased uptake of F for F concentrations in tissue of both tomatoes and oats. Fluoride uptake of both HF and BF by tomatoes and oats was orders of magnitude higher compared to similar activities of other ionic species of F reported in previous studies. Possible mechanisms of uptake are discussed.
Year	2007
Pages	107- 142
keywords	

Title	**Comparative assessment of ambient air quality in two typical Mediterranean coastal cities in Greece**
Author	Antonia-Nelly Riga-Karandinos and Constantine Saitanis
Journal	Chemosphere
Abstract	Air quality data (O3, NO2, NO, CO and SO2) of two Greek coastal cities, Patras and Volos, were analyzed and compared to evaluate: (a) the exceedances of air quality EU threshold values, (b) the diurnal patterns of air pollutants and (c) the “weekend effect” on ozone levels. High ozone levels, close to the thresholds for human health and clearly above the threshold for the protection of plants and ecosystems, were observed in Volos. O3 levels in Volos were higher than those in Patras. NOx levels in Patras were significantly higher than the limits for human health and plants’ protection. Both, NOx and SO2 levels were higher in Patras than in Volos. The Patras’ harbor high traffic seems to drive the diurnal pattern of SO2 in that city. The examination of the rate of ozone accumulation, during the high O3 period (Apr.–Sep.), revealed the occurrence of two phases, a fast and a slow one, with different durations in each city. We suggest that the occurrence of such two phases’ patterns should be considered in relevant ozone studies. In both towns, the O3 levels were higher during weekends in comparison to midweek days, although NO levels were lower. Our results support the hypothesis that the weekend O3 effect is due to a combination of VOC sensitivity of the studied areas and the reduced NOx emissions during weekends. Based on the comparison of the weekend effect in the two cities, we suggest the occurrence of a feedback mechanism between peri-urban natural ecosystems (forests) and the polluting

	anthropogenic ones (cities).
Year	2005
Pages	1125- 1136
keywords	

Title	**Amelioration of Indian urban air pollution phytotoxicity in Beta vulgaris L. by modifying NPK nutrients**
Author	Anoop Singh, S.B. Agrawal and Dheeraj Rathore
Journal	Environmental Pollution
Abstract	Air pollution levels are increasing at an alarming rate in many developing countries, including India and causing a potential threat to crop production. Field experiments were conducted to examine the impact of urban air pollutants on biomass (yield) and some physiological and biochemical parameters of palak (Beta vulgaris L. var. All Green) that grew from germination to maturity at seven periurban sites of Allahabad city having different concentrations of air pollutants under different levels of nutrients. The 6 h daily mean NO2, SO2 and O3 concentrations varied from 2.5 to 42.5, 10.6 to 65 and 3.5 to 30.8 μg m−3, respectively at different locations. Levels of air pollution showed significant negative correlations with photosynthetic pigments, protein, ascorbic acid and starch contents and catalase activity of palak leaves. A significant negative correlation was found for total biomass with SO2 (r = −0.92), NO2 (r = −0.85) and O3 (r = −0.91) concentrations. The increased fertilizer application (N, P and K) over the recommended dose resulted in a positive response by reducing losses in photosynthetic pigments and total biomass. This study proved that ambient air pollution of Allahabad city is influencing negatively to the growth and yield of palak plants.
Year	2005
Pages	385- 395
keywords	

Title	**Sulfur metabolism in higher plants: potential for phytoremediation**
Author	Wilfried H.O. Ernst
Journal	Biodegradation
Abstract	Sulfur is a major nutrient for all organisms. Plant species have a high biodiversity in uptake, metabolization and accumulation of sulfur so that there are potentials to use plants for phytoremediation of sulfur-enriched sites. A survey of soils enriched with sulfur either naturally or by human activities shows that a surplus of sulfur is mostly accompanied with a surplus of other chemical elements which may limit phytoremediation because these co-occurring elements are more toxic to plants than sulfur. In addition, the accumulation of the other elements makes the plant material (phyto-extraction) less suitable for the use as fodder and for human consumption.
Year	2004

Pages	311- 318
keywords	

Title	**Phytotoxicity of hydrogen fluoride and fluoroborate and their uptake from solution culture by Lycopersicon esculentum and Avena sativa**
Author	D.P. Stevens, M.J. McLaughlin and A.M. Alston
Journal	Plant and Soil
Abstract	The aims of this paper were to determine the phytoavailability and phytotoxicity of hydrogen fluoride (HF) and fluoroborate (BF 4 -) in solution when exposed to the root of the plant. As fluoroborate undergoes a slow hydrolysis to F and borate ions, the stability of BF 4 - under solution culture conditions was determined. Fluoroborate was found to have a zero order rate constant of 0.0136 and took approximately 72 days to hydrolyse completely. Tomato (Lycopersicon esculentum) and oat (Avena sativa) plants were grown in dilute nutrient solutions which contained a range of activities of HF and BF 4 - . Dry matter production of both tomato and oat plants grown in nutrient solutions were found to be restricted by increased activity of HF and BF 4 - in solution. Tomatoes were more sensitive to HF and BF 4 - than oats. Limitations to dry matter production coincided with increased uptake of F for F concentrations in tissue of both tomatoes and oats. Fluoride uptake of both HF and BF by tomatoes and oats was orders of magnitude higher compared to similar activities of other ionic species of F reported in previous studies. Possible mechanisms of uptake are discussed.
Year	2004
Pages	175- 184
keywords	