

FIRST REPORT ON THE CONCENTRATIONS OF PGE (Pt, Pd) BIOMONITORED IN ATHENS

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EXTENDED ABSTRACT

Legislation in the western world has led to the fitting of catalytic converters containing platinum-group elements to many cars, in order to reduce the toxic gases emitted from exhausts. Platinum (Pt) was the dominating precious metal used in automobile exhaust converters but in recent years a partial substitution of it by palladium (Pd) occurs in the US and, with some delay, in Western Europe. Platinum and Palladium emissions have led to an increase of their concentrations in different environmental matrices.

Even though the data available today indicate no obvious health effects, continual further biomonitoring or monitoring of changes in Platinum Group Elements (PGE) levels in streets is recommended, to ensure that there is no dramatic increase from today's levels.

The present investigation is the first report of the Pt and Pd concentrations in plants grown along the avenues of the city of Athens. As far as we know, similar study has not been conducted previously in any area of Greece. We further explore: a) the seasonal variation of the concentration of Pt and Pd in the leaves of the evergreen laurel shrub (*Laurus nobilis* L.) and b) the correlations between metal concentrations and traffic load, to evaluate the reliability of plant leaves to reflect traffic load.

To this purpose, samples, of 40 leaves of Laurel shrubs each, were collected at the end of May- two months old leaves- and at the end of September- six months old leaves, from fifteen stations (S) along six main avenues and streets of Athens

The concentrations of both Pt and Pd in the *washed* leaves were below the detection limits of our method. In the *unwashed* leaves, the mean concentration (along with the standard error) of the 15 replications, for samples collected at the end of May were 1.06 ± 0.23 and 1.20 ± 0.23 (ppb) for Pt and Pd respectively, while for the samples collected at the end of September the concentrations were much more higher; 5.20 ± 0.65 and 4.48 ± 0.96 respectively.

The higher levels of both elements measured in September were attributed to the accumulation of these elements during the summer season when the lack of rain restricted any leaching. This observation also suggests that the best season for biomonitoring the urban pollution in towns with Mediterranean climate, using evergreen plants, is the end of the dry season. Although positive, the correlation between elements concentrations and traffic load was not statistically significant; perhaps the turbulent effects of air movement in streets and stop-start nature of traffic in Athens confounded the relation.

The obtained data can serve as a starting point for further biomonitoring of these metals in Athens and in other Greek towns

Key words: Platinum, Palladium, Urban Pollution, Traffic Pollution, Biomonitoring.