

The Concrete Industry as a Source of Contribution and Origin of PM2.5 (Toluca México)

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The city of Toluca has been considered one of the most polluted by PM2.5 in recent years worldwide.

The concrete industry, in its processes, generates a large number of particles, which is why it is important for the population to know the profile of PM2.5 generated and how they behave in the air, in order to control them.

A PM2.5 sample was collected at a plant in the north of the city of Toluca using low-volume minivol particle analyzer equipment, with a constant flow of 5lpm, in 24-hour periods, with 47-inch quartz fiber filters. mm, during the warm dry season, two points were located on the north and west sides, under temperature conditions of 17 °, atmospheric pressure of 768 mmHg, and with prevailing winds from the northwest. The samples were analyzed to determine the morphology, sizes, and elemental chemical composition by means of SEM and EDS, at distance conditions of 12 mm, and a voltage of 20 kilovolts.

The measured average PM2.5 concentrations ($43.14 \pm 6.5 \mu\text{g}/\text{m}^3$) exceed the 24-hour guideline value ($15 \mu\text{g}/\text{m}^3$) established by the WHO.

Particle microstructures with irregular shapes and globular, spherical agglomerates associated with emissions from diesel engines and industrial processes were found, also linked to natural sources of mineral and rock substrates according to the nature of the activities. The most abundant elements detected were O, C, Si, Ca, Al, Na, and K, present in 85% of the total particles, with O, C, and Si being the most abundant. Other elements such as S and Cl were found in lower percentages, observing particle sizes between 0.02 and 2.49 microns and size distribution of 80% in the range of 0 to 0.5 microns.

These results are part of a more complete investigation of the concrete industry.

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