Evaluation of CMA as dust suppressant in Barcelona: Preliminary results from the AIRUSE LIFE+ Project

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Calcium-Magnesium Acetate (CMA) has been proposed as dust binder and its application on paved roads was recently tested in Sweden, Austria, Germany and UK in order to mitigate road dust emissions (Norman and Johansson, 2006; www.life-cma.at; www.tfl.gov.uk/corporate/projectsandschemes/17246.aspx). These previous studies showed that in most cases a reduction of kerbside PM10 concentrations was reached, even if short lived (few hours). The effectiveness of CMA in binding deposited particles seems to be closely related to the degree of road moisture (Gustafsson et al., 2010). This is a crucial aspect, mostly when evaluating the potential effectiveness in South European environments, where the higher solar radiation might further reduce the life-time of the air quality benefit.

In the framework of the LIFE+ AIRUSE project (www.airuse.eu), a measurement campaign will be carried out in April-May 2013 in the city of Barcelona (NE Spain), a typical Mediterranean city, spreading a 25% CMA aqueous solution (ICE & DUST-AWAY, Nordisk Aluminat) on a 1400 m stretch of a centric street (*Industria Av.*) counting typically 18000 vehicles/day. During the two months measurements the CMA solution will be spread 10 times during different mornings.

Given that the air quality benefit is expected to be short lived, CMA will be applied at 6 am local time, in order to exploit its effectiveness during the most-polluted hours due to traffic emissions (7-10 am).

Air pollutants will be monitored continuously at five monitoring sites:

- Two kerbside mobile laboratory vans installed at the kerbside of the road stretch treated with CMA;
- One control kerbside mobile laboratory van installed at the same road but on an untreated stretch, located 1 km away from the CMA stretch;
- One control kerbside mobile laboratory van installed at a parallel road (*Valencia Av.*) also untreated at a perpendicular distance of 650 m from *Industria Av.;*
- One control urban background monitoring station, located 5.5 km away from *Industria Av.*

Each monitoring site will be equipped with the following instrumentation:

- Optical counters (TSI Dust Track, TEOM and GRIMM);
- High volume samplers for PM10 (DIGITEL and MCV). PM10 samples will be chemical characterized for elemental composition (ICP-AES and ICP-MS), ECOC (thermo-optical analysis) and ions (HPLC and specific electrode for ammonium), following the procedure of Querol et al., (2001);
- Streaker low-volume samplers for hourly elemental composition of $PM_{2.5}$ and $PM_{2.5-10}$ by means of PIXE at two sites (Chiari et al., 2005);
- BC monitors (Mini-Aethalometers and Multi Angle Absorption Photometers);
- NOx, O_3 and SO_2 monitors;
- Meteo towers.

After the CMA treatment, conductivity tests will be carried out by means of the SOBO sensor (Boschung) to monitor the residual amount of CMA on the road surface. For traffic safety, friction tests will be also carried out following the UNE-EN 13036 protocol.

Results on air quality benefits will be shown.

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