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Chemical Characterisation of Carboxylic Acids in Aerosols. Comparation between Simulator Atmospheric Samples and Ambiental Samples.

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The volatile organic compounds (VOC's) are precursors of great amount of toxic compounds for human health. An important reaction in the atmosphere is the fotooxidation of aromatic hydrocarbons and biogenics compounds. They are precursors in the formation of secondary organic aerosols (SOA), in concrete the carboxylic acids that appears in particles. Another carboxylic acids source is the reaction of ozone (O_3) with acids of long chain that would act of precursors of shorter others.

Two types of complementary studies were made. On the one hand, reactions of ozonolysis of hydrocarbons like isoprene and octene were realised in the atmospheric photosmog simulators chambers EUPHORE (European PHOtoREactor) where aerosols were originated. On the other hand, a seasonal study between 2002 and 2003 of environmental filters were made. Aerosols in atmospheric samples were chemically characterised. A lot of monocarboxylic and dicarboxylic acids were identified and quantified.

An optimisation of functional hydroxyl (OH) derivatization reaction were made and a GC-MS methodology was applied. Some silyl reagents and some variants so that the reaction was completed, were studied. The conditions were adapted to employ 4-oxopentanic acid and benzoic acid as models. They are representative of the compounds that are product SOA of precursors like the toluene in the photochemical reactions.

Correlation between acids and concentrations of ozone and NOx were observed.

In conclusion, the method improves the characterisation of the carboxylic acids. The results obtained in the simulation chambers were compared with the environmental samplings. The origin of acids as the hydrocarbon reaction with the O_3 was observed. Also, shorter chain acids were tentative generated by reaction of $O_3$with long acids, although in these environmental conditions other precursors can exist that were not contemplated in the simulation chambers.