THERMOANALYTICAL INVESTIGATIONS OF MORPHINE AND ITS DERIVATIVES IN BIOLOGICAL SAMPLES

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This work presents some experimental data collected within a more general promotional research project, which aims to the psychological support for drug dependants. Nowadays, the fight against the illegal marketing of drugs as well as the drugs of abuse is a permanent social problem. However, besides the prevention of abuse of drugs, the follow-up treatment of drug addicts plays also an important role which is carried on mainly in the psychiatry departments of hospitals. Besides the psychological aspects, such a promotional/rehabilitation activity requires reliable analytical techniques, able to monitoring the levels in biological tissues of the drugs of abuse and their metabolites.

In the first part of the project the most common drugs of abuse have been characterised by thermoanalytical methods. In addition to a general description of their thermal properties, a coupled TG-MS technique has been specifically developed to differentiate between morphine and its chemically modified derivatives. Scanning electron microscopy and x-ray powder diffractometry have also been performed on the same samples for completing the morphological and structural characterization.

Furthermore, samples obtained from biological sources have been analysed. By comparing TG-MS results on native, artificially doped hairs and those of drug addicts the drugs of abuse can be identified. Finally, multisectional analysis of hair can provide a very accurate history of drug use due to the relative constancy of growth, thus allowing the distinction between single exposure and chronic use. The results have been compared with those obtained by other analytical methods (GC, GC-MS, HPLC, HPLC-MS) which are routinely used in forensic science.

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