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Confirmation by LC-MS of drugs in oral fluid obtained from Roadside testing

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AIMS: Assessing the effectiveness of current onsite oral fluid drug detection devices (Oralab and Dräeger), and developement of confirmation methods in oral fluid by LC-MS.

METHODS: The study was done in colaboration with the Spanish Traffic Police, in areas near discos nad sites of leisure during 2004 and 2005 in the Northwest of Spain (Galicia), by teams composed of scientists and traffic police members. Approximately 500 drivers selected at the police controls agreed to participate through informed consent. In addition, oral fluid samples were collected by spitting and sent to the Laboratory to confirm the device results. For this purpose two different analytical LC-MS methods were used to detect 11 drugs or metabolites in a total of 300 µL of sample. Simultaneous analysis of morphine, 6-monoacetylmorphine, amphetamine, methamphetamine, MDA, MDMA, MDEA, MBDB, benzoylecgonine and cocaine was carried out using 100 µL of oral fluid. After an automated solid phase extraction with OASIS HLB cartridges in the presence of their deuterated analogs, reverse phase chromatographic separation in an Atalntis dC18 (2.1x100mm, 3µm), was achieved in less than 10 minutes, under gradient conditions. The mobile phase consisted in formiate buffer pH 3 and acetonitrile. A different LC-MS method was performed to detect Δ^9-THC after liquid-liquid extraction with hexane at pH = 6, in the presence of its deuterated analog, using 200 µL of oral fluid. A reverse phase chromatographic separation in a XTerraMS C18 (2.1x100mm, 3.5µm) was used. The mobile phase was a mixture of 0.1% formic acid and acetonitrile (15:85) in isocratic mode.

RESULTS: Both methods were full validated, including linearity (1-250ng/mL, 2-250ng/mL) recovery (>55%), within-day and between-day precision (C.V.<15%) and accuracy (MRE<15%), limit of detection (0.5 and 1ng/mL) and quantitation (1 and 2ng/mL), relative ion intensities and matrix effect. The selected m/z were 315.4 and 193.1 for THC, 286 and 201 for morphine, 328.1 and 211 for 6-monoacetylmorphine, 136.1 and 119 for amphetamine, 150.1 and 119 for methamphetamine, 180.2 and 163.2 for MDA, 194.2 and 163.2 for MDMA, 208.3 and 163.2 for MDEA, 208.3 and 177.1 for MBDB, 290 and 168.2 for benzoylecgonine, and 304.2 and 182.1 for cocaine. All of the positives cases were analyzed and 30% of negatives ones. The comparative results Oralab/Dräeger were the followed: in the case of cocaine the especificity was 44.1/100, the sensibility 100/98.5 and the precision 56.2/98.7; for THC the especificity was 78.9/52.3, the sensibility 100/92.5 and the precision 85.2/81.3; for amphetamines the especificity was 93.7/52.2, the sensibility 0/85 and the precision 93.7/67.4; and finally for opiates the especificity, sensibility and precision was 100% with the two devices.

KEYWORDS: *LC-MS, Oral fluid, Drugs of abuse*

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