



Le indagini forensi ed il contributo della spettrometria di massa

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ABSTRACT

oral/poster presentations and case reports (5 minutes presentation)

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Title Mass spectrometry application on the detection of Sildenafil in aqueous phases		
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Mass spectrometry application on the detection of sildenafil in aqueous phases

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Sildenafil, the active ingredient of Viagra (Figure n.1), is a drug helpful in solving erectile dysfunction problems and recently entered the list of emerging contaminants. The use of these pharmaceuticals is increasingly widespread among perfectly healthy young people (20 or 30 years old) who make them a dangerous abuse for "recreational" purposes together with ecstasy: the result is a synergistic amplification of their final effects, such as the feeling of euphoria, confusion, disorientation, hallucinations, tremors or, in severe cases, irregular heartbeat and even coma. According to the 2018 annual report prepared by the Italian Medicines Agency (AIFA), this compounds' consumption had increased over time from 2.9 DDD (Defined Daily Dose assumed per 1000 inhabitants in the referred year) in 2014 to 3.6 DDD in 2018. Unfortunately, it is impossible to detect the actual quantity used from the population (young and patients) because the internet network is becoming a way of purchasing to avoid medical prescriptions. Indeed, some researchers [1] report that illicit trading with pharmaceuticals products from the Internet is not wholly conscious of the risks for health concerning the quality of these products, such as the possible presence of toxic impurities [2]. The increase in demand is powering the illegal trade via the web, and, consequently, the risk of using an ineffective/harmful to health drug is very high [3,4]. The human body does not fully utilize these drugs. An unknown quantity, probably transformed, is excreted with urine and faeces. The high consumption of this substance, globally accomplished by legal and illegal ways, and the fact that Wastewater treatment plants (WWTP) cannot remove all types of contaminants that enter the sewer legitimates thinking that they can pose a severe threat to ecosystems and human health [5]. The unambiguous analytical determination of the active parent drug and the identification of its transformation products are therefore indispensable to try understanding if the quantity found of this drug in wastewater and surface water is linked to actual medical use and to verify whether tertiary purification treatments of wastewater are effective in the removal.

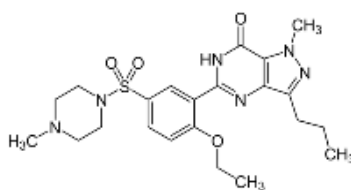


Figure 1. Sildenafil, the active ingredient of Viagra.

In this work, the identification and quantification of this pharmaceutical product in water and synthetic wastewater were performed by LC-ESI-LTQ/MS and confirmed by CID-MSⁿ. Thanks to high mass precision and MS/MS capability, determination and structural interpretation of sildenafil and its transformation products were achieved.

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