Identification of polymorphism in ethylone hydrochloride: synthesis and characterization

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Abstract: Ethylone, a synthetic cathinonewith psychoactive properties, is a designer drugwhich has appeared on the recreational drugmarket in recent years. Since 2012, illicit shipments of ethylone hydrochloride have been intercepted with increasing frequency at the Canadian border. Analysis has revealed that ethylone hydrochloride exists as two distinct polymorphs. In addition, severalmminor impurities were detected in some seized exhibits. In this study, the two conformational polymorphs of ethylone hydrochloride have been synthesized and fully characterized by FTIR, FT-Raman, powder XRD, GC-MS, ESI-MS/MS and NMR (13C CPMAS, 1H, 13C). The two polymorphs can be distinguished by vibrational spectroscopy, solid-state nuclearmagnetic resonance spectroscopy and X-ray diffraction. The FTIR data are applied to the identification of both polymorphs of ethylone hydrochloride (mixed with methylone hydrochloride) in a laboratory submission labelled as ‘Ocean Snow Ultra’. The data presented in this study will assist forensic scientists in the differentiation of the two ethylone hydrochloride polymorphs. This report, alongside our recent article on the single crystal X-ray structure of a second polymorph of this synthetic cathinone, is the first to confirm polymorphism in ethylone hydrochloride.

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