

The Khat and the mouse game: Is there a shift towards more dangerous substances in the cathinone illicit market?

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Introduction

New psychoactive substances (NPS) are becoming a major issue as their consumption rises and their number increases yearly. Synthetic cathinones are among the most relevant NPS due to their recent increase on the market and established toxicity profile. They are abused not only for their hedonic and euphoric effects but as a replacement for other stimulants that are tightly regulated (e.g., cocaine, MDMA, and other amphetamines) and which are more expensive, more difficult to obtain, and considered less pure [1]. Mephedrone (4-methylmethcathinone, 4-MMC) was one of the first legal highs in Europe and is considered a typical cathinone derivative. After Mephedrone's ban in March 2010 new cathinones proliferated widely, even a new branch of atypical derivatives was launched into the market, represented by MDPV (3,4-methylenedioxypyrovalerone, also known as bath salts and cannibal drug) [2]. The cardiovascular and central nervous system toxicity draws attention to this new family of cathinones, also known as pyrovalerones [3]. MDPV was scheduled in 2011, leading to the apparition of Alpha-PVP (α-pyrrolidinopentiophenone, also known as flakka) from which there is little information, and it is supposed to act also as norepinephrine-dopamine reuptake inhibitor [4].

Objectives

The aim of the present study is to describe the evolution of different cathinones in the samples delivered for analysis to the harm reduction NGO Energy Control from March 2009 to March 2016 in Spain.

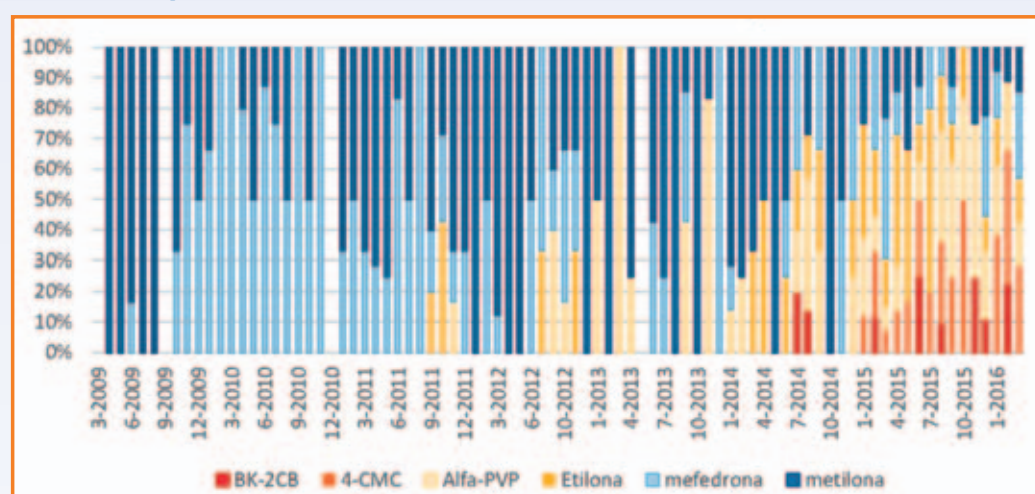
Methods

Energy Control is a Spanish harm reduction NGO that offers to drug users the possibility of analyzing the substances they intend to consume. From March 2009 to March 2016 a total of 24.528 samples were analyzed by the NGO from which 760 contained cathinones. Substance analysis was done by Gas Chromatography–Mass Spectrometry.

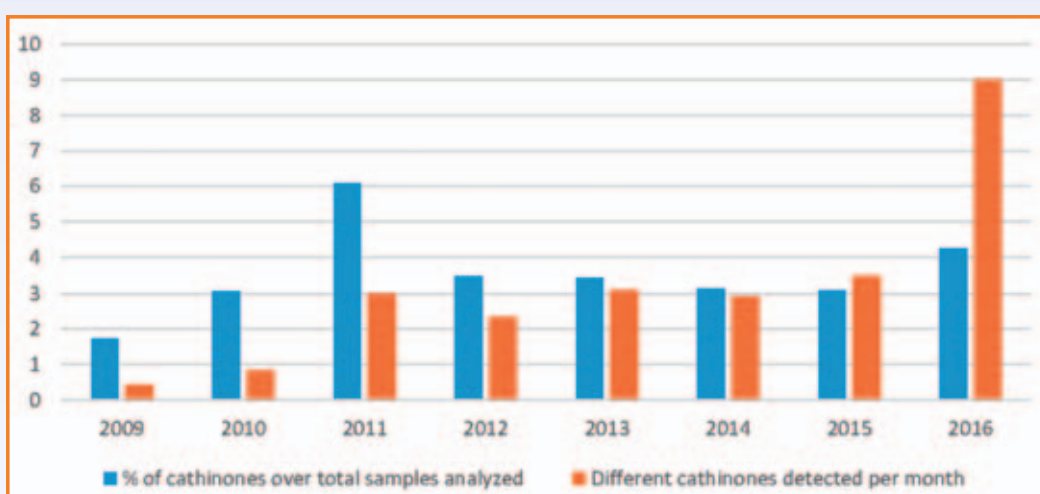
Results

From 2009 to 2016, cathinones represented a 2,82% from all analyzed samples. From March 2009 to March 2010 only 5 different cathinones were detected, in this same period Methylone (n=16; 37,20%) and Mephedrone (n=17;39,53%) represented 76% of analyzed cathinones (n=43). MDPV represented a 4,65% of analyzed cathinones in 2009 peaking to 13,95% in 2011 and returning to 1,51% in 2015. From March 2015 to March 2016, the drug analysis revealed the presence of 132 cathinones: Methylone and Mephedrone represented only 19,69% of analyzed cathinones, giving prominence to Clephedrone (n=25; 18,93%), Alpha-PVP (n=24; 18,18%), Ethylone (n=21; 15,9%) and BK-2CB (n=8; 6,06%).

Main cathinones detected from March 2009 to March 2016 in harm reduction service in Spain



Evolution of analyzed cathinones in a Harm reduction facility in Spain



Conclusions

The evolution of synthetic cathinones detected by Energy Control is consistent with the evolution described in the literature. From 2009 to 2016 the cathinones detected diversify. From cathinone market dominated by Mephedrone and Methylone with its well established toxicity profile, new substances with higher toxicity potential such as Alpha-PVP, 4-CMC and Ethylone could be establishing its market share. This could represent a shift towards more addictive, toxic and unknown substances in the cathinone market.

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