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الجمعية العربية للعلوم الجنائية والطب الشرعي
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Commentary on: Attafi IM, Albeishy MY, Oraiby ME, Khardali IA, Shaikhain GA, Fageeh MM. Postmortem Distribution of Cathinone and Cathine in Human Biological Specimens in a Case of Death Associated with Khat Chewing. Arab J Forensic Sci Forensic Med. 2018 Jun 7;1(7).



تعليق على دراسة عطا في وآخرون: توزع ما بعد الوفاة لمادتي الكاثينون والكاثين في عينات بيولوجية بشرية في حالة وفاة مرتبطة بمضغ القات، المجلة العربية لعلوم الأدلة الجنائية والطب الشرعي العدد السابع المجلد الأول.

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Abstract

The interpretation of post-mortem human tissue toxicology levels may be affected by the sampling site chosen. It is important to bear this in mind when looking at the psychoactive constituents of khat (*Catha edulis* Forsk) that have been consumed and have contributed to or caused death.

The post-mortem levels of cathine, cathinone and norephedrine/ norpseudoephedrine are very rarely reported, thereby making it impossible for toxicologists, pathologists and others investigating khat-related fatalities to decide if a level is toxic or fatal.

This paper presents all the published data that exists to help start documenting this neglected area. Such information should be collected and reported on a systematic basis to facilitate correct interpretations in the future.

المستخلص

من الممكن أن تتأثر مستويات السموم الدوائية في الأنسجة البشرية بعد الوفاة من خلال الموقع الجسدي المختار لأخذ العينة. من المهم أخذ ذلك في الاعتبار عند تحليل المكونات ذات التأثير النفسي في القات (*Catha edulis* Forsk) التي تم تعاطيها وساهمت في أو تسببت في الوفاة.

نادراً ما يتم الإبلاغ عن مستويات الكاثين والكاثينون والنورفيدرين / نوربسودوإيفيدرين بعد الوفاة، ما يجعل من المستحيل على أخصائيي السموم والأطباء وغيرهم من الأشخاص الذين يحققون في الوفيات المرتبطة بالقات أن يقرروا إذا كان المستوى ساماً أو قاتلاً.

تعرض هذه المقالة جميع الأبحاث المنشورة المتاحة حالياً للمساعدة في البدء في توثيق هذا النطاق المهم. وينبغي جمع هذه المعلومات والإبلاغ عنها على أساس منهجي لتسهيل التفسيرات الصحيحة في المستقبل.

Keywords: Forensic Science, Khat, Deaths, Fatalities, Toxicology, Interpretation.

الكلمات المفتاحية: علوم الأدلة الجنائية، القات، الوفيات، علم السموم، تفسير النتائج



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1. Introduction

The recent case report by Attafi et al. [1] raises the important issue of the need to take into account the post-mortem (re)-distribution of the key psychoactive constituents of khat (*Catha edulis* Forsk), i.e. cathine and cathinone and their precursors, when interpreting their levels in various human body tissues.

The sampling site may be affected by metabolism, especially if there is any hepatic or renal impairment. The levels of cathine, cathinone and related metabolites may also be affected by deterioration during the period between death and post-mortem sample collection, as well as storage methods, etc. Another important consideration in determining the toxic/lethal levels of these molecules is whether the decedent(s) had co-ingested any other drugs which may have given rise to drug-drug interactions and/or synergistic effects.

It is important that portmortem toxicology levels in 'deaths associated with khat consumption' are not only quantified, but also recorded and published. This will greatly assist in establishing what levels of these two molecules are toxic

and which are fatal. It is likely that there are many deaths which come under this heading, but they are not properly identified, recorded, analysed and published [2]. At present, the only information collated on such fatalities is presented in a book chapter [3] and two papers by the correspondent [2, 4], and the aforementioned paper [1]. This is summarised in Table-1.

This shows that the cathinone levels reported in the most recent case for both blood and vitreous humour are towards the low end of those previously reported by the correspondent. Perhaps, more importantly, the results presented show just how scant the published information is on this issue and, therefore, how difficult – if not impossible – it is to state with any confidence what constitutes a toxic or fatal level. One can only do that if there are sufficient cases reported with toxicological levels and where no other substances were found and/or implicated.

It would have been of interest if Attafi et al. [1] had provided the autopsy findings (including any information on hepatic or renal impairment and co-ingestion of other drugs), and the findings reached by the investigating officials in

Table 1- Summary of measured toxicological findings for the psychoactive constituents of khat (*Catha edulis* Forsk) in deceased humans.

Reference	Case number	Tissue levels ($\mu\text{g/L}$)		
		Norephedrine/ norpseudophedrine	Cathine	Cathinone
[1]			Kidney - 310 Stomach - 3280	Brain - 30 Liver - 30 Stomach - 1850 Blood - 60 Vitreous humour - 70
[3]	2	Blood - 154		Blood - 104
[3]	5	Blood - 1000 Urine - detected		Blood - <50
[3]	9		Vitreous humour - 310	Vitreous humour - 110
[3]	10	Blood - <50 Urine - detected		Blood - <25 Urine - detected
[3]	13			Blood 19
[3]	15		Peripheral blood - 1447	Peripheral blood - 122



respect of the cause and manner of death, for example, accidental asphyxiation caused by the khat content in the decedent's mouth.

It is recommended that toxicologists and pathologists should bear in mind the need to build up the very limited published evidence-base we have on post-mortem cathine, cathinone and norephedrine/norpseudoephedrine tissue levels for deaths involving khat consumption.

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