

Acute and sub-chronic effects of purified cathinone from khat (*Catha edulis*) on behavioural profiles in vervet monkeys (*Chlorocebus aethiops*)

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Received: 2 August 2013 / Accepted: 7 October 2013
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Abstract We investigated the cumulative effects of cathinone on behavioural alterations in single-caged vervet monkeys. Fourteen adult vervets were divided into tests (12 animals) and controls (2 animals), and exposed to escalating doses of cathinone at alternate days of each week for 4 months in presence and absence of cage enrichment. One month of pre-treatment phase served to establish baseline values. Composite behavioural scores of aggression, anxiety, abnormal responses, withdrawal and appetite loss were done. A series of repeated measures analysis of variances were conducted to examine the extent to which cathinone administration was associated with patterns of changes in behavioural data. Results indicate a dose-dependent effect of cathinone on increases of aggression, anxiety, abnormal responses, withdrawal, and appetite loss. The findings demonstrate that at high doses and long-term exposure, cathinone causes behavioural alterations probably via changes in presynaptic striatal dopamine system.

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Keywords Cathinone · Vervet monkeys · Behaviour

Introduction

Khat is customarily consumed by millions of inhabitants in the south-west part of Arabian Peninsula and East African countries between Sudan and Madagascar namely: Djibouti, Ethiopia, Somalia, Kenya, Tanzania and Uganda. Fresh leaves and shoots are chewed for their euphoriant and stimulatory effects (Al-Bekairi et al. 1991). Cathinone is the principal ingredient of khat, found naturally as (-)- enantiomer and this resembles (+)-amphetamine in chemical structure and biological activity (Zelger et al. 1980). The (+)- enantiomer is not found (Kalix and Braenden 1985).

Cathinone is a lipophilic alkaloid and readily crosses the blood-brain barrier to reach the primary sites of action in the central nervous system (Cox and Rampes 2003). Although behavioural consequences associated with khat and cathinone exposure in humans and experimental animals have been extensively documented, the corresponding magnitude of these psychological behavioural changes remain unclear due to the paucity of objective and, therefore, relevant data. The framework for postulating khat/cathinone associated behavioural changes in sleep patterns, mood, attention, aggression, anxiety, locomotor activity, and affiliative behaviour in humans has been extrapolated from results of khat studies predominantly in mice (Kimani and Nyongesa 2008), rats (Banjaw et al. 2005) and monkeys (Schuster and Johanson 1979).

In the present study, we administered cathinone to adult male and female vervet monkeys housed in single cages.