

KHAT (*CATHA EDULIS*): THE HERB WITH OFFICIO-LEGAL, SOCIO-CULTURAL AND ECONOMIC UNCERTAINTY

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ABSTRACT

Khat (*Catha edulis*) is a plant of uncertain and highly controversial status grown in the countries around the Red Sea and on the eastern coast of Africa. The chewing of khat leaves has a deep-rooted religious and socio-cultural tradition. Khat is considered a cash crop and its cultivation is a source of economic value to the societies and nations involved. There have, however, been reports of negative economic effects on the individuals engaging in the habit of khat chewing.

The increasing use of khat worldwide, along with the negative international attention that this has garnered, has led to the present status of uncertainty of the once indigenous practice of khat chewing. Scientists, mostly western Europeans, have tended to focus on problems related to khat with little attention to the positive role of khat chewing in society and the world at large. In addition, no report has directly associated khat with any organised crime, violence or antisocial activity, particularly in countries where khat is legalised.

This paper reviewed the various areas of uncertainty and controversy relating to khat. Based on the findings of the review, further qualitative and quantitative research is required and a positive international approach to khat use at economic, religious and socio-cultural levels is advocated.

INTRODUCTION

Khat is the name generally used for *Catha edulis*, a dicotyledonous evergreen shrub of the family Celastraceae.¹ It is widely cultivated in certain areas of east Africa and the Arabian Peninsula. Khat is known by a variety of names, including: Abyssinian tea, African salad, bushman's tea, *catha*, *chat*, flower of paradise, *gat*, *herari*, *jaad*, *kaad*, leaf of Allah, *mirra*, *qaat*, *qat*, tea of the Arabs, *tohai* and *tschat*.^{2,3,4,5} The earliest scientific report on khat was written in the 18th century by the botanist Peter Forskal.^{2,3} Many believe that khat originated in Ethiopia, from where it spread to the hillsides of east Africa and Yemen;^{6,7} others argue that it originated in Yemen before spreading to Ethiopia and nearby countries.^{8,9,10} Whatever the case, the plant spread from Ethiopia and Yemen to Kenya, Somalia, Malawi, Uganda, Tanzania, Arabia, Congo, Madagascar, Zimbabwe, Zambia and South Africa; it is also found in Afghanistan and Turkistan.¹¹

Khat belongs to the kingdom Plantae, class Magnoliopsida, order Celastrales, family Celastraceae, genus *Catha* and species *edulis*. The shrub khat (*Catha edulis* Forsk.) has a slender trunk with smooth, thin bark. The lancet-shaped leaves are between 0.5 cm and 10 cm long and between 0.5 cm and 5 cm wide. Young leaves are reddish green, later turning to yellow-green (Figure 1). The leaves are faintly aromatic, with an astringent, slightly sweet taste. The tap root grows to a depth of 3 m

or more. In areas with frost, the shrub can grow higher than 1.5 m but in places with more rainfall, such as the highlands of Ethiopia and areas near the equator, khat trees can reach up to 20 m.⁹ Khat can also survive droughts, when other crops fail. It grows at altitudes of 1 500 m – 2 000 m. Khat is a perennial, propagated by grafting. Trees are grown for 3–4 years before leaves are harvested. A healthy tree yields for about 50 years. Khat is not affected by any known disease.^{9,10}

Environmental and climatic conditions determine the chemical profile of khat leaves. In the Yemen Arab republic, about 44 different types of khat exist, originating from different geographical areas of the country.^{9,12}

THE CHEMICAL SUBSTANCES IN KHAT

Many different compounds are found in khat, including alkaloids, terpenoids, flavonoids, sterols, glycosides, tannins, amino acids, vitamins and minerals.^{5,13} The phenylalkylamines and the cathedulins are the major alkaloids. The cathedulins are based on a polyhydroxylated sesquiterpene skeleton and are basically polyesters of euonyminol; 62 different cathedulins have recently been characterised from fresh khat leaves.¹⁴ The khat phenylalkylamines comprise cathinone (S-[-] cathinone), which is the primary constituent of khat, as well as two diastereoisomers: cathine (1S, 2S -[+]- norpseudo-

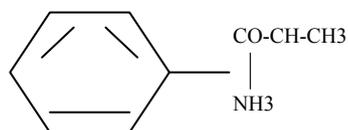


FIGURE 1
A young khat shrub

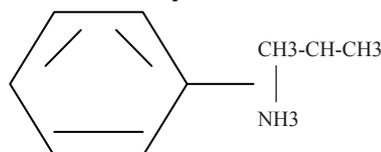
ephedrine or [+] norephedrine) and norephedrine (1R, 2S -[-]-norephedrine), which are the secondary constituents. These compounds are structurally related to amphetamine and noradrenaline. Cathinone is found mainly in the young leaves and shoots.

Chemical structures

Cathinone



Cathine and norephedrine



Chemical formulae

Cathinone: $C_9H_{11}NO$

Cathine and norephedrine: $C_9H_{13}NO$

Relative molecular mass (M_r)

Cathinone: 149.2

Cathine and norephedrine: 151.2

Stereoisomers

Cathinone refers to the naturally occurring S(-)-cathinone, cathine refers to the naturally occurring 1S, 2S-(+)-norpseudoephedrine, and norephedrine refers to the naturally occurring 1R, 2S(-) norephedrine.¹⁴

During maturation, cathinone is metabolised into cathine ([+]- norpseudoephedrine in a ratio of approximately 4:1).^{15,16} Other phenylalkylamine alkaloids in khat leaves are the phenylpentanilamines meru-cathinone, pseudomerucathine and merucathine. These, however, seem to contribute less to the stimulatory effect of khat.^{17,18} Cathinone is unstable and undergoes decomposition reactions after the harvesting and during the drying and extraction of the plant,^{17,18} leading to a 'dimer' (3, 6-dimethyl-2, 5-diphenylpyrazine) and possibly to small fragments. Both the dimer and phenyl-propanedione have been isolated from khat extracts.¹⁹ That cathinone is presumably



FIGURE 2
A bundle of khat wrapped up in banana leaves

the main psychoactive component of khat explains why fresh leaves are preferred and why khat is wrapped in banana leaves (Figure 2) to preserve freshness.¹⁵ Khat taste varies depending on tannic-acid content; khat leaves have an astringent taste and aromatic odour, with the young leaves being slightly sweet.¹⁵

The euphoric effect of khat starts after about one hour of chewing, when plasma concentrations of cathinone start to rise; peak plasma levels are obtained within 1.5 h to 3.5 h after the onset of chewing.²⁰ Chewing the material effectively liberates the alkaloids from the leaves and allows rapid absorption into the systemic circulation. On average, peak plasma levels have been obtained after 2.3 h for cathinone, 2.6 h for cathine and 2.8 h for norephedrine.²¹

OFFICIAL AND LEGAL UNCERTAINTY

Emigrants from east Africa and the Arabian Peninsula try to maintain their habit of khat chewing^{22,23} and large quantities of fresh khat are therefore imported into other areas of the world.^{24,25,26} Khat is reported to be used by between five and ten million people every day. Despite this, however, khat is not currently under international control, even though two substances usually present in khat, cathine and cathinone, have been under international control since the early 1980s, when all amphetamine-like substances were placed under such control¹⁵: cathinone was included in Schedule I and cathine in Schedule III of the UN Convention on Psychotropic Substances in 1988.²⁷ Cathinone remains a Schedule I substance and cathine is now a Schedule IV substance.^{28,29} The legality of khat usage by the general populace, however, still varies from country to country.^{30,31,32,33,34}

The situation is complicated by uncertainty regarding the official status of khat as a commodity. Authorities in the West are not familiar with khat and are uncertain as to how to react to it: should khat be categorised as a drug, such as cannabis, heroin and cocaine, or should it be placed in the same category as coffee, tobacco and alcohol? Should it be banned as a drug or should it be tolerated as a custom of cultural importance to those involved?^{35,36,37}

Khat trade and use are not illegal in the UK and efforts to cultivate it for personal use have been reported.³⁴ The position of European countries with regard to khat, however, is not uniform.³⁸ While it is tolerated in the UK and the Netherlands, it is prohibited in France, Sweden and Switzerland. Outside Europe, it is illegal in the USA and Canada.^{30,31,32} Indeed, the case of this plant is an equivocal one and international law on this issue is ambiguous.³⁴

Khat users appear to have very low levels of other drug or alcohol use. There is no evidence that the use of khat is a gateway to the use of other stimulant drugs, although there is a strong association with tobacco use. Khat does not lead to acquisitive crime in the way that is evident with cocaine or heroin use, which may be due to its low cost and its lower re-enforcing properties. The khat industry is, in fact, a legitimate business. There is no indication of organised criminals or terrorists involved in the UK trade, possibly because of its legality; with khat being illegal in the USA, however, there is some evidence of organised criminals becoming involved in its shipment to the USA.⁸

Researchers have avoided taking a clear stand either for or against khat. Thus, when reporting on khat use in Rome, Nencini and others³⁹ cautiously concluded that 'the Khat party has thus remained a social event and is one way for the participants to keep their ethnic identity'. Studies in Melbourne and the Netherlands have also reported that khat use is highly regarded as a social event. Like going to a pub and having a drink, using khat for recreation and relaxation makes people feel good. For the participants in khat sessions, it is a way of redefining their identity and reinforcing their self-esteem as migrants in an alien society. At the same time, khat sessions are an important source of news from home and an opportunity to exchange information pertaining to society.^{37,40}

RELIGIOUS AND SOCIO-CULTURAL UNCERTAINTY

Khat chewing has a deep-rooted socio-cultural tradition, its pleasure-inducing and stimulating effects seemingly having a strong influence on the social and cultural life of the communities who indulge in it.^{13,33}

The most important aspect of khat sessions is their function as a medium for the exchange of information; participants meet friends, exchange news, take part in discussions and debates and make plans and decisions. The exchange of information is often highly personal and may be relevant to one's place within the community.^{41,42}

Khat sessions often have a cultural function as well.^{43,44} At festivities, feasts and rituals, including birth, circumcision and marriage, adult guests often chew khat, which heightens their enjoyment of the occasion.

People also use khat to help them to perform daily activities involving hard physical labour or intense concentration. There are many farmers, labourers and long-distance lorry drivers who chew khat every day, as do students when preparing for exams. Clan elders use khat when settling difficult disputes, while judges use it during lengthy court sessions. Local elite, notably in Yemen, can afford to chew khat every day solely for the enjoyment of the stimulating effects.^{1,43,46} Previous attempts to legally prohibit khat usage in some countries have failed.^{42,45,46}

Islam, smoking, low income and a high educational level all show a strong association with daily khat consumption.^{47,48} To some Muslims, khat is, in fact, known as 'the flower of paradise'. Some countries in the Middle East, such as Saudi Arabia, however, impose heavy penalties equivalent to those for opium or cannabis on people either who have khat in their possession or who use khat. The Islamic faith of the Yemenites forbids intoxicants other than those prescribed for medical reasons, even though the Koran mentions only alcohol as being prohibited. Even religious leaders practise the habit, which may be because, in contrast to opium and cannabis, khat does not produce severe antisocial behaviour, being more akin to amphetamine or caffeine-type substances. A study conducted in Butajira, Ethiopia, where khat usage is legal, showed that 80% of chewers used khat to gain a good level of concentration for prayer, to facilitate contact with God and to discourage them from criminal activities.⁴⁷ Many Christians and Yemenite Jews in Israel also chew khat.⁴⁹

ECONOMIC UNCERTAINTY

Khat trade is not illegal in the UK; a known market and a distribution network for the drug do, in fact, exist and the use of the plant in certain locations is substantial.³⁴ Khat is native to the eastern and southern regions of Africa but is grown extensively as a cash crop in Ethiopia (where it is freely available and is a highly valued export commodity⁵), in Yemen and in the northern provinces of Kenya. It is also socially and economically important in the neighbouring areas of Somalia and Djibouti.

Khat is profitable to the huge number of people involved in its production and marketing, including farmers, distributors and merchants. The taxes imposed on khat are also an important source of revenue to governments.¹ In Yemen, for example, estimates in the early 1980s – before the production of oil – attributed 30% of the gross domestic product to khat.⁵⁰ Yemeni khat is not exported, however, and its macroeconomic significance is therefore not pronounced, as is the case in Ethiopia.

However, studies have reported that the regular consumption of khat may be associated with various social and economic problems affecting both consumers and their families.³³ In Yemen, for example, much time is spent buying and chewing khat, affecting working hours and time with family.¹³ For some, the daily cost of the khat habit exceeds their expenditure on

food for their families. At the family level, khat may therefore be damaging to budgets, especially among the poor. In the late 1980s, Kennedy¹ estimated that 10% of the Yemeni population suffered economic hardship due to khat use; this figure would have increased by now due to the economic deterioration since the early 1990s.

Khat chewing may therefore lead to a loss in working hours, to decreased economic production and to malnutrition. Kalix and Khan⁵⁰ estimated that, in Djibouti, about one-third of all wages were spent on khat. Many people do, in fact, secure their daily portion of khat at the expense of vital needs, indicating dependence. Family life is therefore harmed because of neglect, the dissipation of family income and inappropriate behaviour; khat is quoted as a factor in one in two divorces in Djibouti. The acquisition of funds to pay for khat may also lead to criminal behaviour and even to prostitution.⁵¹ Khat chewing and its associated behaviours may be indirectly linked to absenteeism and unemployment, which may, in turn, result in a fall in overall national economic productivity. It is, in fact, reported that habitual khat chewing has led to decreased productivity in Ethiopia, Kenya, Somalia and Uganda.⁵²

Others again argue that moderate use improves performance and increases work output, owing to the stimulating and fatigue-postponing effects. Working hours and possibly productivity may therefore decrease when khat is not used because of anergia and reduced motivation.

CONCLUSION

Khat chewing has a deep-rooted religious and socio-cultural tradition. It is especially highly regarded as a social event, where it is used for recreation and relaxation. For the participants in khat sessions, it is also a way of redefining their identity and reinforcing self-esteem both at home and as migrants in an alien society. At the same time, khat sessions are an important source of news from home and an opportunity to exchange information on the society in which those involved in khat chewing find themselves. The legality of khat, however, varies from country to country. The economic effect of khat on individuals and societies that engage in khat chewing furthermore seems uncertain; these uncertainties make the habit of khat chewing controversial and ambiguous.

The increasing use of khat worldwide and the negative international attention have led to the present uncertain status of this once indigenous practice. Scientists, mostly western Europeans, tend to focus on the problems related to khat, with little attention being given to the positive role of khat chewing on indigenous societies and on the world at large. Moreover, from the review of relevant literature, there seems to be no report directly associating khat chewing with criminal activities, violence or antisocial activities, particularly in countries where khat is legalised.

Based on the findings of this review, and before a conclusive statement can be made on the status of khat at local, national and international level, there is a need for an international conference of stakeholders, including traditional and indigenous people of khat-using origin. The need also clearly exists for consensus, for scientific and joint qualitative and quantitative studies on khat. Lastly and, most importantly, a positive approach to khat use at religious, cultural, economic and social levels is advocated.

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