

# Psychoactive Faunas: New Unconventional Substances of Abuse

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## Abstract:-

**Background and Objectives:-** Prevalence of substance abuse remains very high globally and particularly in third world countries.-where people turn to cheap, equally potent and dangerous principles from animals and are collectively called *Psychoactive Faunas* - the group of animals whose body parts, secretions or excretions/wastes contain one or more substances; which taken in a sufficiently high dose via any route of administration, possess the potential to alter an individual's cognitive state and behavior. Except for wild life related laws in most countries, there are no specific laws regulating the increasing abuse of these substances in most countries of the globe.

**Methods:-** Preliminary search was performed via Google® to obtain potential keywords that would be representatives of "Abuse of Psychoactive fauna" Animal's name and possible street names on PubMed/Medline, Scopus, and Google Scholar. Secondary searches were also carried out.

**Results:-** The database search yielded 39,187 records. Twenty one (21) Journal Articles, Five (5) Newspaper reports, One (1) Policy document, total Twenty seven (27) studies included in the present review.

**Discussion and Conclusion:-** The findings demonstrated evidences of the abuse of psychoactive fauna different parts of the globe of whole lizard, its tail or dung; snake venom or skin; toad venom; whole scorpion, its tail or venom; cattle dung; human excreta or urine; whole hallucinogenic fish; cow dung; hen dung; spider web and more recently goat or sheep dung. Lizard is the currently the most cited of psychoactive faunas of abuse apart from snakes, toads, and scorpions that have been extensively studied.

**Scientific Significance:-** Majority of previous reviews on substance abuse have not acknowledged psychoactive

faunas as potential sources of drug of abuse. Our findings has provided documented evidences of their use.

## I. INTRODUCTION

In trying to feed from natural abundance, the primitive man incidentally discovered other substances with psychoactive properties. Although majority of these mind-altering components are found in plants<sup>1</sup>. Notwithstanding, there are equally potent and dangerous principles originating from animal parts or largely unwanted products of metabolism. These new, unconventional and strange components from the animal kingdom that have become drugs of abuse from are collectively called *Psychoactive Faunas* – a phrase credited to Blom<sup>2</sup>. To understand the origin of the phrase, the term 'Psychoactive' comes from Greek words *psyche* (Meaning spirit, life breath, soul, mind), the Latin word *activus* which means 'active', and *Faunus*, the 'goddess of fertility in Roman history'<sup>3</sup>. Generally, Psychoactive Faunas are the group of animals whose body parts, secretions or excretions/wastes contain one or more substances; which taken in a sufficiently high dose via any route of administration, possess the potential to alter an individual's cognitive state and behavior<sup>4</sup>. Interestingly, this definition would later on, include utilization of Human excreta (street name *Jenkem*, *Butthash*) as drug of abuse previously reported by the WHO<sup>5</sup>, and very recently documented in *Dumbiliet al*<sup>6</sup>.

Abuse of psychotropic substances, as old as it has existed, remains a top troubling global social, economic, and legal problems cutting across individuals of diverse cultures and socio-economic strata. About 9 in 10 individuals aged 12 years and above could be dependent on at least one psychoactive substance<sup>7</sup>. This is even more evident in the developing countries, and third world communities<sup>8</sup>. For instance in Nigeria, the overall prevalence of drug abuse is still high despite the availability of various policies, drug laws and schemes for prevention<sup>9</sup>.

Studies from different parts of the globe have accounted for the unconventional use of various forms of psychoactive faunas as substances of abuse. Documented are hallucinogenic fishes and ants<sup>3</sup>, lizard dung<sup>4,10,11</sup>, lizard tail<sup>12,13</sup>, cow dung<sup>14</sup>, snake venom<sup>3,15-21</sup>, human wastes<sup>10,11,22,23</sup>, toad skin excretions<sup>3,24,25</sup>, scorpion stings<sup>26,27</sup>, Cow or hen dung<sup>23</sup>, and more recently reported Goat or sheep faeces<sup>28</sup>. The overall effects reported from abuse of these faunas include intoxication, hallucinations, palpitation, numbness, anesthesia, paresthesia, abdominal pain, nausea and vomiting, muscle paralysis and respiratory insufficiency<sup>29</sup>. It is the innate compulsion in man, just like hunger, thirst or sex<sup>30</sup>, and the persuasion to experience a novel euphoria, that led to substance abusers resorting to the use (as a single or in combination) of several other dangerous and mundane substances like the psychoactive faunas. Financial implications of sustaining the usage of certain substances is also a valid factor for trying out these rather unconventional alternative<sup>4</sup>, with patterns and prevalence likely to be seen in localities, where a major population are financially constrained. Elsewhere, studies have outlined other reasons driving the abuse of drugs/substances identifying improved performance, peer influence and unemployment, but easy availability is leading motive driving the abuse of psychoactive substances<sup>31</sup>, especially the unconventional substances like the psychoactive faunas. By implication, the abuse of these substances became inevitable as they are readily available at almost no financial cost, and no legal hurdles or monitoring<sup>32</sup>. Apart from the states of New York<sup>33</sup> and California<sup>34</sup> where the bufo toad have been outlawed as a source of drug of abuse, the only legal framework militating against psychoactive fauna abuse in most nations are often more of laws protecting wild life exploitation than specified drug laws<sup>18</sup>. Sadly, previous studies that ascertained the patterns of drug use and remarkably misused substances have not acknowledged Psychoactive faunas<sup>9,35,36</sup>.

Now that the menace of drug abuse continues ravaging the sanctity of the society, there exists a vacuum in medical literature about the abuse of these unconventional substances- especially the psychoactive faunas, that presents myriads of physical, social, mental, psychological and medical challenges.

It is in view of the above that we commissioned this present review to describe and characterize Psychoactive faunas and it's application, providing evidences of their use as drugs of abuse/dependence and to explore possible areas of research ranging from chemical constituent and compositions, possible psychoactive compound, plausible mechanism of action and molecular pathways, effects and untoward effects of the use/abuse of the psychoactive fauna, and to also sensitize law enforcement agents to bridge the legal lacunae.

## II. METHODOLOGY

### A. Search Strategy

Preliminary search was performed via Google® to obtain potential representatives of “Abuse of Psychoactive fauna” Animal’s name and possible street names. The following keywords was then applied to make up search terms on Pubmed/Medline, Scopus, and Google Scholar, - “psychoactive fauna” “psychedelic animals” “psychoactive animals”, “unconventional substance abuse” “New Psychoactive Substances” “Novel Psychoactive substances” “legal high” “lizard smoking” “toad licking” “scorpion addiction” “addiction to snake” “cow dung smoking” “Toilet smoking” “Toilet inhalation”.

In combination of the free text terms searched on Google®, possible MESH headings for the topics of Psychoactive Fauna, Psychedelic Fauna, New Psychoactive substances and Novel Psychoactive Substances were searched as (((*Psychoactive* OR *Psychedelic* OR *Hallucinogenic*) substances [Title/Abstract]) AND ((various names of *animals*) [Title/Abstract])) on Pubmed/Medline Secondary searches (like a snowball technique) were also carried out from the references contained in the chosen articles and relevant systematic reviews.

### B. Study Selection and Inclusion/Exclusion criteria

The first 10 pages of Google® searches were screened and relevant results selected based on supposed pertinence to the study and potential key words for creating search terms.

Without setting a time limit, all articles and relevant reviews published in any language until August 9<sup>th</sup>, 2021 were selected. Articles that described the use (by man, via any route of administration) of these animals/animal parts, secretions and waste products as a drug of abuse/dependence, for recreational purposes, for purported psychoactive/psychedelic/hallucinogenic experiences were included. Original Articles, Casereports, Reviews, policy documents, letters to editors and Newspaper reports were all considered for retrieving data.

Studies that highlighted medicinal uses were also selected but those recording only the traditional or religious/spiritual uses only were excluded from the review, as they do not serve the goal of the current study.

## III. RESULTS AND DISCUSSION

The database search yielded 39,187 records. After removing duplicates, 498 remained, of which 363 were excluded based on title and abstract. 135 full texts were assessed, and 109 were excluded, for not meeting the criteria of the review. Twenty one (21) Journal Articles, Five (5) Newspaper reports, One (1) Policy document, making a total Twenty seven (27) studies were included in the present review.

The review shows that Lizard is the currently the most cited of psychoactive faunas of abuse apart from snakes, toads, and scorpions that have been extensively studied and previously existed as entheogens.

Diverse range of substances earlier intended as lawful alternatives to the already constituted illicit drugs (consciously grouped and tagged *new psychoactive substances*; [NPS]) has emerged at astronomical rates since the mid-2000s and has posed serious challenges to the traditional public health responses, monitoring and control approaches to drug use<sup>37,38</sup>. The United Nations defined these NPS as “substances of abuse, either in a pure form or a preparation, that may pose a public health threat but are not controlled neither by the Conventions on Narcotic Drugs of 1961 nor the Convention on Psychotropic Substances of 1971<sup>39</sup>.”

In this context, the term ‘new’ only means ‘emergent’, ‘unconventional’ Psychoactive faunas fits perfectly to a potential source of these new, unconventional and ‘legal’ alternative drugs of abuse although the current operational definition of New Psychoactive Substance (NPS) by the UNODC did not identify them as such.

The abuse of psychoactive fauna has been reported in many unpublished newspapers, magazines and blogs<sup>40-43</sup>, now attracting attention, being reported and discussed in detail in medical literature.

Whereas the words ‘use’ ‘misuse’ and ‘abuse’ have been taken interchangeably throughout this study, it is important to establish that what entails ‘use’ in one geographical area of study might imply ‘misuse’ and/or ‘abuse’ in another. Bufotenin (from Bufo toads) have been previously known to be used for ritual purposes since the precolumbian age<sup>1,24</sup> and also as an investigational drug for CNS studies<sup>44</sup>. Results from this study posit that ritual use of bufo toads may be totally strange among the population of interest as it is neither used for cultural nor religious purposes hence, cases cited would entail abuse/misuse.

The pathology of addiction is not entirely based on free will or an individual’s conscious choice to use but may have some deeper influences. Although humans may be biologically and psychologically predisposed to illicit drug use and addiction, they may often be driven toward that state by several social and cultural influences<sup>45</sup>. Personality profiles, temperament, socio-cultural environment, availability and accessibility of the substance, and comorbid psychopathology are factors known to influence the disposition to involve in a particular kind of substance of abuse<sup>32</sup> but the findings of this review asserts that availability and accessibility is the leading contributing factor. Even though it has been previously established that novelty seeking is a general predisposing factor for substance addiction<sup>46</sup>, this study has also supported the initial position of Le Bon *et al.*<sup>47</sup> that opioid and cocaine users have shown more compulsion at seeking new alternatives to their addictions. Abuse of lizard and snake has been documented to be common in individuals with earlier addiction/dependence to opioids and cocaine. Thus, with the previously discussed cases of using lizard tail and experiencing a high similar or comparable to cannabis<sup>4,13,48</sup> and particularly a combination with cannabis<sup>12,49</sup> it becomes reasonable to hypothesize that cannabis would be a plausible positive control in experimental studies for understanding the actual psychoactive component of lizard tail. It could as well be a mere coincidence, open to experimental confirmation.

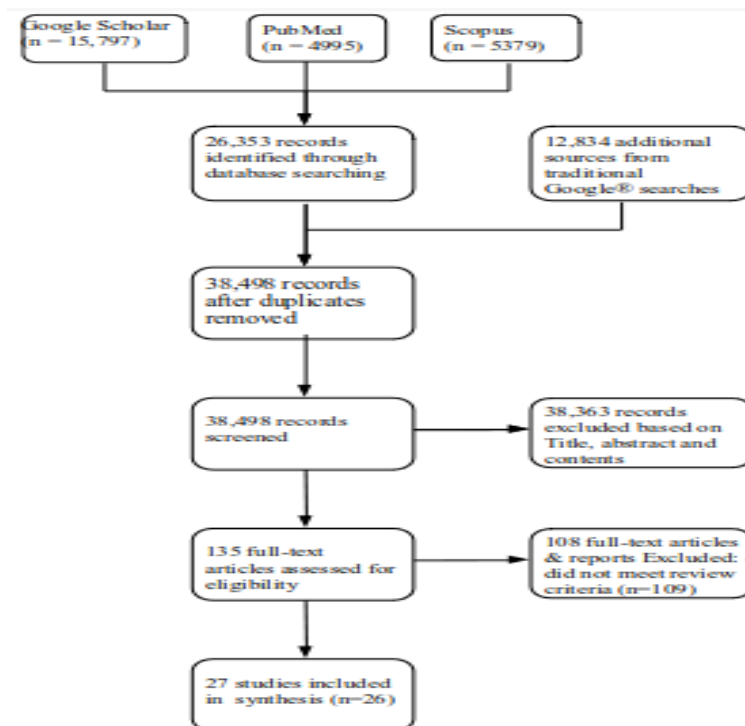


Fig. 1: Study Flow Diagram Lizard

In available reports the basis for the purported use of Lizard tail as a drug of abuse is inclined towards psychological than physiological dependence even though the possibility of a physiological dependence cannot be ruled out entirely. Abusers would heat freshly collected lizard tails and inhale the flame as deeply as possible, to experience mind-altering effects enduring only for about 4-10 minutes<sup>13</sup>. Similarly, a rare case of combination of cannabis with powder made from whole lizard was reported<sup>49</sup>, where the abuser burned the Indian spiny tailed lizard (*Uromastyxhardwickii*) in whole and combined with or substituted cannabis for the charred remains. Additionally reported and awaiting experimental confirmations; is a similar case of combination of lizard powder with cannabis, raised the suspicion of a possible intensified addiction when cannabis is combined with powdered lizard tail<sup>12</sup>.

Related to other reported modes of administration, an exceptional case of opioid-dependent syndrome, also using powdered tail of Indian wall lizard to get high was reported<sup>48</sup>. In this instance, abusers sun dry the lizard tail before burning and then smoke the charred remnants experiencing instant euphoria akin to abusers previously addicted to cannabis<sup>4</sup> and heroin<sup>26</sup>. In India, the white part of the Lizard droppings have been reportedly combined with chewable tobacco brands to potentiate the action of tobacco<sup>4</sup>. As nauseating as it sounds, abusers chew the lizard excreta as they purportedly believe it gives an extra “kick”. In a similar report, substance users in Bida LGA of Niger state, Nigeria, has attested to using the white portion of lizard dung to achieve a high<sup>11</sup>.

The white part of the lizard excreta is a composition of crystallized uric acids as a means of excretion of nitrogenous wastes analogous to urine<sup>50</sup>. It is therefore credible to consider the urate content as the psychoactive substance. This is subject to experimental verification even though literature reviews of the central nervous system activity of uric acid has previously confirmed the enhancement of cognitive functions and motivations in different human population samples. In biochemical basis, uric acid (and its analogues) penetrates the blood brain barrier, and relative to metabolism of catecholamines/dopamine, urates can be synthesized and metabolized in the CNS, therefore exhibiting potent neuroprotective and antioxidative properties<sup>51</sup>.

### C. Snake

Ancient cultural practices envisaged that repeated snake bites and exposure to snake venoms provides a form of immunization from a more dangerous snake envenomation<sup>52</sup>. A contrast to this opinion asserts that no form of immunity was produced and in fact, death from anaphylaxis was possible<sup>53</sup>. This makes snake venom the most evidently deadly of all reported forms of psychoactive substance of abuse from animal origin<sup>18</sup> although they have been initially employed as invaluable pharmacological tools in study of nerve activity<sup>54</sup>. The *Bungaruscaeruleus* (common krait), *Najana* (cobra), and *Opheodrysvernalis* (green snake) are the most commonly abused snake species by psychonauts<sup>20</sup>.

To achieve some levels of high spirits, reports has attested to the deliberate exposures to snake bites<sup>16,19</sup> and bites from snakes previously fed with some other unidentified substance<sup>30</sup>. These cases may just be an evidence of the bigger picture as numerous indirect reports have acknowledged arrests of drug peddlers selling snake venom at different places<sup>17</sup>. Smoking of dried snake skins (combined with cannabis) was also reported for similar effects<sup>29</sup>. Cases of injection of extracted snake venom for recreational activities to experience euphoria and relief from stress has also been cited, all of which have been documented and suggesting a comparable opioid-like analgesic effects<sup>15,21</sup>. A separate investigation reasserts that the central cholinergic system but not necessarily the opioid system seem to be effective in eliciting the antinociceptive action of snake venom<sup>55</sup>. In support, additional studies maintained that distinct neurotoxins, slow reacting substances, active metabolites including bradykinin, peptides, prostaglandins and serotonin released during snake envenomation, are responsible for a demonstrated significant analgesia of the venom when tested in animal models<sup>19</sup>.

Although currently abused, evidences from a more recent review of literature maintained that employing snake venoms for pain management (similar to opioids use) is a common and promising hypothesis, particularly for its potential curative effects on pain from rheumatoid arthritis<sup>56</sup>.

### D. Toad/Frog

The first documented information regarding a psychoactive drug from the animal kingdom, provided a clear evidence Precolumbian peoples of the New World have been using the psychoactive toad<sup>57</sup>. Ethnographic reports and anthropological folklore initially hypothesized psychoactivity of the Mesoamerican toad, *Bufo marinus*, where it used as an entheogen. However, *B. marinus* was discredited by Weil & Davis<sup>24</sup> for use in ritual or recreational purposes because of the illustrated toxicities of the venom.

Subsequently, the skin and glands of the Sonoran desert toad, (*Bufoalvarius*), has sufficed for this purpose because it secretes ample quantities of a potent hallucinogenic tryptamine analogue- Bufotenin- 5-methoxy-*N,N*-dimethyltryptamine (5-MeO-DMT) and Bufotoxin<sup>3</sup>. Initially discovered in 1893, bufotenin has enjoyed several citations in scientific literature and essentially, the *Bufo* toad became famous as a therapeutic, a powerful poison and an investigational tool in CNS studies<sup>58</sup>. Since 1960s the *Bufo* toad has paradoxically become a non-conventional source of drug of abuse, with people reportedly licking or smoking the skins/secretions to get high even though the venom of *B. alvarius*, is known to be toxic when consumed orally<sup>57</sup>. An important psychedelic component of ancient South American snuff powders, bufotenin (street name *hashish*) is a drug of abuse on the streets to the point it is now a controlled hallucinogenic substance (schedule I) under the state and federal laws in New York<sup>33</sup>. Experimental models has demonstrated a comparable mechanism of action of Bufotenin with other renowned hallucinogenic drugs like



LSD, psilocin and 5-MeO-DMT at the acknowledged hallucinogenic 5-HT<sub>2A</sub> and 5-HT<sub>2C</sub> serotogenic receptors. It is the inability of Bufotenin (and similar compounds) to penetrate the BBB that is responsible for the reported lack of a classic hallucinogenic activity in Human studies, and not necessarily the absence of 5-HT receptor activity<sup>25</sup>.

#### E. Scorpion

As a substitute for heroin, abusers claimed to experience distinct pleasurable effect of the scorpion sting that was more potent than heroin, without any report of hallucinations or loss of consciousness, the abuser experiences instantaneous anxiolytic effects that could last for about six hours<sup>26</sup>. Reports shows abusers in the interiors of Khyber Pakhtunkhwa (KP), India, also smoke the fume from dead scorpion for same purpose of 'getting high' where dead scorpion is dried in the sunlight and then burnt on coal to release smokes that is inhaled by the abuser<sup>59</sup>.

Previous studies has established that the scorpion venom contains basic polypeptides of low molecular weightmucus, inorganic salts, lipids, amines, nucleotides, enzymes, kallikrein inhibitor, natriuretic peptide, proteins with high molecular mass, free amino acids and neurotoxins, As the important venomous agents, these toxins act on voltage-gated sodium (Nav) and potassium (Kv) channelspromoting a disturbance that likely to elicit an atypical neurotransmission; such as release of serotoninin mammals. Accompanied are a resultant production of varying psychoactivity such as convulsions, electrographic neuronal damage in specific hippocampal areasbehavioural and histopathological effects<sup>27,60-62</sup>. With evidences of potential lethal effects on almost all anatomic systems, scorpion venom is lethal at experimental conditions providing the basis for a potential health hazard to psychonauts<sup>27</sup>.

#### F. Cow/Cattle Dung

A case vignette of dependence on freshly collected cow dung was used by the abuser achieved higher degrees of elation by ingestion as compared to smoking the fumes of the burnt dry dung. The abuser reported easy irritability, restlessness, uneasiness, insomnia and anxiety and also noticed the periods of palpitation, dizziness, nausea and loss of concentration in her routine work if she missed inhaling the fumes even for a day<sup>14</sup>. One of the non-pathogenic bacterium first isolated from cow dung *Mycobacterium vaccae*, possesses antidepressant properties. When inhaled, it enhanced the growth of neuron which stimulates the production of serotonin and norepinephrine in the brain<sup>63</sup>. Although contrary to the reported case of abuse, this is perhaps, a headway to the psychoactive mechanism resulting to the abuse of cow dung.

Findings in Lalet *al*<sup>64</sup> proposes that (active or passive) smoking of cow dung increased pulmonary tissue damage that may result in diverse respiratory infections, having established that the principal constituent of the smoke from cow dung is Polycyclic aromatic hydrocarbons (PAHs).

#### G. Human Waste/Excreta

Unarguably, the most bizarre psychoactive substance of abuse from the animal kingdom is the use of human excreta (Street name *Jenkem*) to get high. Reports from the Program on substance Abuse by WHO's Division of Mental Health and Prevention of Substance described Jenkem to be composed of fermented human wastes (feces and urine). The name Jenkem evolved from a popular glue brand known as 'Genkem'. Sniffing of this glue was peculiar South Africa but later became a trend amongst several substance abusers on the streets of Lusaka, Zambia<sup>5</sup>. Using this dirty hard drug essentially involves the user inhaling methane emissions from human feces and urine<sup>10,11,23</sup>. This is purportedly more potent and effective to induce euphoria when inhaled as opposed to glue and several other similar options, with effects lasting up to an hour. Typically, the users gather human waste from sewers and then bottle it for several weeks to allow fermentation. A balloon is used to collect the emissions from a small opening on the bottle. Experiences of intense hallucinations were reported when the fermented gas is inhaled from the collecting balloon. These studies declares that youths (aged between 18 and 30 years) were into non-conventional substance use/abuse particularly inhalation of hydrogen sulfide gas from pit latrine.

Other numerous cases of people getting high from human waste has been seen in unpublished newspapers and magazine articles, even in the western media<sup>22</sup>.

### IV. CONCLUSION

- Most reported cases of abuse of psychoactive faunas is from India.
- There exists a vacuum in medical literature about a clear mechanism of action and toxicities of the psychoactive fauna .
- The actual form of dependence or addiction of these absurd substances of abuse remains blurry.
- There are no records of actual prevalence or burden of psychoactive fauna as drugs of abuse.
- Lizard is the currently the most cited of psychoactive faunas of abuse apart from snakes, toads, and scorpions that have been extensively studied and previously existed as entheogens.
- The findings of this review is just a tip of the iceberg as there may be many more psychoactive substances from the animal kingdom being abused in various undocumented and unimaginable methods of abuse/use and modes of administration, especially in under developed and developing parts of the Globe, where documentation of these instances of abuse may be almost impracticable, but easy availability and financial implication will be driving the adoption of these inconceivable substances of abuse.

## V. RECOMMENDATIONS

From the findings, this review recommends:

- Inclusion of psychoactive faunas as 'Not otherwise specified' group under the substance use section of revised International statistical Classification of Diseases and related problems (ICD-11) which will come into effect on 1 January 2022.
- The government and drug Regulatory agencies/departments of different countries to be proactive by putting in place a legal framework for control of this novel addition to the burden of drug abuse.
- Studies to at least verify a null hypothesis for the actual psychoactive potentials of most of these faunas under experimental conditions. Otherwise, these faunas are potential sources of drugs as medicines or investigational tool just like Bufotenin that has long been documented even on Drug Bank database (CADD) as experimental drug in CNS studies.
- Further studies to clarify the specific psychoactive entity in Lizard dung/Tail and establish the pattern of dependence to this substance in experimental animals. Techniques to isolate and purify the active components of these psychoactive faunas for possible use as medicines or investigational tools in CNS studies.

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**Appendix 1 : Summary of Findings.**

PSYCHOACTIVE FAUNA	PART/METABOLIC PRODUCTS USED	LOCATION CITED	DEMOGRAPHIC VARIABLES OF USERS	ROUTES OF ADMINISTRATION/METHOD OF ABUSE	PROBABLE OR DOCUMENTED ACTIVE COMPOUND(S) RESPONSIBLE FOR ACTION	SUMMARY OF PSYCHOACTIVE/PSYCHOPHARMACOLOGICAL EFFECTS	PROBABLE OR DOCUMENTED TOXIC EFFECTS	DOCUMENTED MEDICINAL EFFECT(S)	SOURCE( NUMBER OF CITATIONS)
Lizard	a) Tail	India, Jamaica	Adolescent males, Prison inmate, Previous cannabis and/or alcohol dependence	i) Inhalation of fumes from flames of fresh tails, 4-5 times daily ii) Smoking of charred remains from dry tail powder (sometimes in combination with cannabis)		i) Euphoria lasting 4-10 mins. (Dass et al., 2020) ii) Tingling sensation over lower limb, imbalance while walking (Anil et al., 2019) iii) Mild sedation lasting 10-12hr (Bhad et al., 2016)	i) Raised liver enzymes and hepatomegaly ii) cerebral and cerebellar atrophy, iii) bilateral axonal demyelinating neuropathy, iv) hypotonic bladder. v) Primary open angle glaucoma with optic neuropathy (Anil et al., 2019)	NIL	Journal Articles(3)
	b) Dung/excreta	India, Nigeria	Adolescent males in slums, Prison inmates	i) Ingestion of dried whitish part of dung in combination with tobacco ii) Liquid Drink in combination of blue dye and zakami	Crystallized uric acid (Avery and Perkins, 1989; Tovchiga and Shtrygol', 2014)	i) Potentiate CNS stimulation (Isaacs, 2002; Legit.ng, 2013; Chahal et al., 2016; Danjuma et al., 2016; Igonikan, 2018)	Hyperuricemia, gout(Tovchiga and Shtrygol', 2014)	NIL	Journal articles (2) Newspaper Articles (3)
	c) Whole lizard	India	Prison inmates, Previous addiction to lizard tails	i) Smoking of Powder made from whole animal substituted or combined with cannabis		i) Potentiated euphoria (Basu et al., 2014) ii) Acute psychotic episodes with disorganized behavior (Sarkhel et al., 2011; Garg et al., 2014)			Journal articles(3)
Snake	a) Venoms	India, China, Vietnam,U	Adolescents (male and	i) Deliberate snake bites and	neurotoxins, bradykinin, peptides,	i) Lethargy, profound muscular	Coagulopathy, haemorrhagic and indirect	i) Anxiolytic ,	Journal articles (9) Newspaper

		SA	female) especially in rave parties. Young adults previously addicted to heroin	combination of extracted venoms with alcohol. ii) IV injection of extracted venoms	prostaglandins and serotonin (Senthil Kumar et al., 2013)	weakness, sleepiness and Euphoria (Pradhan, 1990; Kautilya and Bhodka, 2012; Senthil Kumar et al., 2013) ii) enhanced sensation, energy boost, tachycardia, dizziness, and narcosis (Das et al., 2017)	haemolytic activities, (Meier and Stocker, 1991; Maduwage et al., 2016)	antinociceptive and analgesic (Pradhan, 1990; Katshu et al., 2011; Kautilya and Bhodka, 2012, 2013; Braganza and Krishnamurthy, 2013; Senthil Kumar et al., 2013; Das et al., 2017; Mehra et al., 2018; Metzger, 2021) Potent against replication of Covid 19 virus (Chaturvedi, 2021)	Articles (1)
	b) Skin	India, USA	42 y/o male,	i) Smoking of powder in combination with cannabis		i) Euphoria, Light headedness, tremor ((Kautilya and Bhodka, 2012; Anil et al., 2019)			Journal articles(1)
Toads	Venoms	USA, China, India,	Young population	i) ingestion/Licking of skin surface ii) deep inhalations of vaporized venom	Bufotenin- and Bufotoxin action on hallucinogenic 5-HT <sub>2A</sub> and 5-HT <sub>2C</sub> serotogenic receptors (Lyttle et al., 1996, 2012; McBride, 2011; Orsolini et al., 2018)	i) intense and transient psychoactive effects mainly auditory and visual hallucination (Weil and Davis, 1994; Orsolini et al., 2018)	anorexia, nausea, vomiting and neurological symptoms similar to digoxin (Gowda et al., 2003)	antiinflammatory, analgesic and anti-infectious actions (Zhang et al., 2019)	Journal articles(2)
Scorpion	Venoms	India, Pakistan	Male age 60	Deliberate envenomation/sting	Neurotoxins act on the ion channels and cause	i) Euphoria and anxiolytic effects lasting up to 6 hours	Elevated hematological and histological		Journal articles(1)

					abnormal release of neurotransmitters like serotonin (Varghese et al., 2006)	(Varghese et al., 2006)	parameters (Dehghani et al., 2012) Neurotoxicity, (Nencioni et al., 2000)		
	Whole scorpion or tail	India	Male age 74,	Dried and smoked	May be similar as in above for venoms	i) Hallucinations, euphoria, memory loss, lasting up to 10 hrs with first 6 hrs being more intense (Ullah, 2016)			Newspaper article (1)
Cow/Cattle	Dung	India	Housewife	i) Ingestion of dry cake ii) Inhalation of fumes from burnt cake	i) Sulphuric mists (Khairkar et al., 2009) ii) Non-pathogenic bacterium <i>Mycobacterium vaccae</i> , possesses antidepressant properties. When inhaled, it enhanced the growth of neuron which stimulates the production of serotonin and norepinephrine in the brain (Lowry et al., 2007)	i) Euphoria, irritability, restlessness, uneasiness, insomnia (Khairkar et al., 2009)	Normal limits of : i) Baseline routine investigations ii) Gastroenterology evaluation, iii) Computed tomography scan of brain and electroencephalography (Khairkar et al., 2009)	Possible medicinal effects with low toxicity	Journal articles (1)
Human	Excreta and Urine	Zambia, Nigeria	Children, Young adults, cannabis addicts	i) Inhalation of fumes from pit latrine ii) Inhalation of fumes from fermented excreta and urine enclosed	Unknown	Sustained euphoria and anxiolytic effects (WHO, 1996; Guest, 2003; Danjuma et al., 2015, 2016; Motyka and Marcinkowski, 2015; Dumbili et al., 2021)	Gout, Hyperammonemia, elevated kidney and liver enzymes	N/A	Journal Articles (6) Reports (1)

Fish (Hallucinogenic fish)	Whole	South Africa and Hawaiian and Norfolk Islands in the Pacific Ocean.	Young and older adults from riverine areas	Ingestion of raw fish		i) Stimulant and psychedelic effect, hallucinations , aphrodisiac. (Orsolini et al., 2018)			Journal articles(1)
Camel or Hen	Dung	Afghanistan, Pakistan, Iraq, Iran, England,	Tobacco users	Adolescents Orally in combination with tobacco, slaked lime, vegetable oil, ash from burnt plants and various spices (Nasway).( Motyka and Marcinkowski, 2015)	Potentiates effects of tobacco. Actual mechanism unclear	Subjective sense of spinning or imbalance, moving tingling in arms and legs, blurred perception and a sense of relaxation lasting about 5-7 minutes. intestinal infections and parasite-induced diseases, chronic conditions (Motyka and Marcinkowski , 2015)	Gout, Hyperammonemia, elevated kidney and liver enzymes		Journal articles(1)
Spider	Web	India	Young adults and children			(Anil et al., 2019)			