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Case Report

"Sukuday" A dangerous unknown drink: A fatal case at Cotonou

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Abstract

Energy drinks have been around for a long time, but they have only just become popular in the markets in the last few years. This is a case report on a fatal toxicity involving suicidal ingestion of a traditional energy drink called "Sukuday". An autopsy of the corpse was done and revealed multi-organ congestion and the presence of spume in the respiratory tract. The toxicological analyses of a sample of sukuday revealed essentially alcans (C_{14}-C_{31}). C_{24} H_{38} O_4 probably 1,2-Benzenedicarboxylic acid, diisooctyl ester also called (Diisooctyl phtalate, DIOP) was found at 22.8%, or the C_{16} H_{22} O_4(1,2 Benzenedicarboxylic acid, mono (2 ethylhexyl)) ester also called (Mono(2-ethylhexyl)phthalate, MEHP). Traces of oxycodone were detected and identified by UPLC DAD / UV and confirmed in GC-MS. A literature of the toxicity of such substances was discussed. This case report is a description of a problem which becomes a public health problem.

Keywords: Sukuday, Fatal toxicity, Autopsy, Oxycodone, Alcans.

Introduction

Energy drinks have been around for a long time, but they have only just become popular in the markets in the last few years.[1] Global energy-drink consumption increased by 14% (i.e. 1.5 billion liters higher) between 2007 and 2011 and had grown by a mean of 10% yearly from 2007 to 2011. More than half of young adults consume a minimum of one can of energy drink monthly and about 6% use energy drinks daily.[2,3]

Most energy drinks contain natural products such as guarana, ginseng and/or taurine, but also as much as caffeine and sugar. The millions persons consuming energy drinks seek more energy, alertness or without being aware of the composition of the drinks.[4,5] They are known to contain a mixture of ingredients that have the property of enhancing energy levels and vivacity. They are now consumed in the same way as conventional soft drinks.

"Sukuday" is a traditional energy drink appreciated in Nigeria, Benin, Niger and Cameroon as "energy booster". "Sukuday" originated from Nigeria, and gradually returned to the habits of many other countries. It's a nonpolar, colorless and transparent, pungent and volatile liquid. According to the sellers; "Sukuday" is manufactured using a mixture of petroleum derivates solvents, some other substances like tramadol, caffeine, and sweetened with different sugars. According to the sellers, the crude mixture, called "Mandara" must be in glass bottle because of its' lytic propriety on plastic. "Mandara" possessed high toxicity so that they use to dilute it with water by shaking before sale. According to them, the advised dose is at most 20 mL cup/person/day.

The users describe it as energy potentiator. It raises a feeling of a bowl and burn in throat while swallowing and shake most of the drinkers. Therefore in Benin, guardians, motorcycle taxi-men commonly called "Zemidjans", animal hunters and almost all the other hard workers use the product unaware its side-effects.

This reportis a case of suicidal "Sukuday" ingestion documented with autopsy observations and toxicological analyses. A toxicological screening was performed using LC-UV-DAD (Acquity, Waters) and GC-MS (7890 A, MSD 5970C, Agilent) for organic

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and volatile components. For LC-UV-DAD, after a liquid-liquid extraction, the sample was analysed. The column was UPLC BEH C18 1.7 µm*2.1*150mm (Acquity, Waters) and the pre-column BEH C18 1.7 µm*2.1*5 mm (Waters). The mobile phase was sodium acetate/acetonitrile/HCl and ammonium acetate. The volume of injection was 2 µL. The wavelengths used for detection were between 200 and 340 nm. The determination of oxycodone concentration was measured at 220 nm.

A screening for metals was performed using ICP-MS (Nexion 300X, Perkin Elmer) after mineralization using nitric. The sample was then diluted using desionized water (qsp 2 ml) and analysed.

Autopsy Results

A 22 year old patient was found dead in his house and presented by the legal police. He is an African thin male adult. He measured 179 cm height. The external examination reveals no lesions of violence anywhere on the body andno sign of cyanosis. No external evidence of trauma neither on the cephalic region.

At the cervical region, a major hemorrhagic infiltration was seen in the muscles of neck. The tongue does not present traumatic lesions. The oesophagus contains food fragments and the trachea was occupied by an airy and bloody spume. The internal carotid all does not show atheromatous plaques and no fracture of the cervical spine.

At the thoracic region, no abnormality on the sternocostal plastron and no hemothorax were observed. The right and left lungs weighed 645 g and 586 grespectively. They were very congestive and flow an airyandbloodyspume. The pulmonary arteries do not contain blood clots. No heart orifice abnormality was noted. There was no visible myocardial necrosis.

At the abdominal and small pelvis region, there was no hemoperitoneum or ascites. No specific particularities in the intestines and the stomach. The liver was congestive and did not present a traumatic lesion. There were no other particularity in gallbladder, spleen, pancreas, adrenals, kidneys and the lumbar spine was intact.

Slices of the lungs, kidneys, liver and spleen were taken for possible pathological examinations.

Peripheral blood, gastric contents were collected for toxicological analysis and section slices of the liver, spleen and kidneys were collected for the anatomical pathology examinations. Unfortunatly the court did not request for their exam.

Toxicological Results

A sample of "Mandara" was collected in a glass bottle and analysed for toxicological screening. The screening for metals had not shown the presence of heavy metals in abnormal concentrations (Table 1).

The results showed essentially alcans (C_{14} - C_{31}). C_{24} H_{38} O_4 probably 1,2-Benzenedicarboxylic acid, diisooctyl ester also called (Diisooctyl phtalate, DIOP) was found at 22.8%, or the C_{16} H_{22} O_4(1,2 Benzenedicarboxylic acid, mono (2 ethylhexyl)) ester also called (Mono(2-ethylhexyl)phthalate, MEHP). Traces of oxycodone were detected and identified using UPLC DAD / UV and confirmed in GC-MS by its' molecular mass 315.

Table 1: results of screening for metals

Element	Concentration (µg/L)
Al	650
As	1570
Be	<20
Ca	3840
Cd	<20
Ce	<20
Co	<20
Cr	530
Cu	170
Ga	<20
Gd	<20
Hg	<20
Li	< 20
Mg	3380
Mn	<20
Na	5030
Ni	<20
Pb	<20
Sb	<20
Sn	<20
Te	<20
Tl	<20

U	<20
V	1650

Discussion

Basing on the information provided by the legal police officer, the 22-year-old boy would have died after drinking around 60 ml of a drink called "Sukuday" or "Mandara", in the night of the day before. "Sukuday" is an unknown drink by the whole population, but very appreciated by customers who know it. There is no specific scientific study on the drink and no practically any information on it. It would have caused more than 20 deaths in Niger but not documented.

This drink would be a mixture of non-polar solvent and water. While lifting the body, the doctor would have observed the presence of a suspicious foam mushroom in the nostrils. The external examination of the body and the autopsy showed no sign of physical violence. The autopsy showed multi-organ congestion and the presence of spume in the respiratory tract. The notion of ingestion of the solvent, the presence of a foam mushroom in the nostrils at the body examination and the findings made during the autopsy evoke a death due to lungs acute edema solvent ingestion. However the samples collected from the corpse were not yet analysed, toxicological investigations of the supposed causal sample highlighted the presence of derivates of petroleum, alcans, and traces of oxycodone. Oxycodone is known to produce intensely positive feelings, rewarding sensations and therefore conduct to abuse.

Many toxicity effects are described for oxycodone such as drowziness, irregular heart rate (arrhythmia), hypotension, difficulty breathing and swallowing.

The phthalates derivates (DIOP and MEHP) are considered assevere dermal irritant, toxic orally. The $DIOPLD_{50}$'swas estimated at 2769 mg/kg.[6] for the mouse.

Monoethylhexyl phthalic acid (MEHP) is an active metabolite of Bis (2-ethylhexyl) phthalate (DEHP).[7]

Conclusion

The body has no physical lesion. The autopsy showed a multi-organs congestion and the presence of spume in the respiratory tract. The most probable cause of death is chemical asphyxia following an ingestion of solvents. Toxicological analysis of the sampleof supposed causal agent (Mandara) confirms toxic substances in it. Further analyses of the sample are required to identify the whole composition of toxic agents responsible for death.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this case report.

Ethical Considerations

This study has been approved by the medicalethical committee of Health Sciences Faculty of Abomey-Calavi.

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