

# Research Journal of Pharmaceutical, Biological and Chemical Sciences

## Kumta Butane Disaster: A Debriefing Report.

**Vinod Nayak<sup>1</sup>, Navin Patil<sup>2\*</sup>, Shankar Bakkannavar<sup>1</sup>, Nirmal Krishnan M<sup>1</sup>,  
A Avinash<sup>2</sup>, Karthik Rao<sup>3</sup>, Raghavendra Rao<sup>3</sup>, and Talha Ahmed<sup>4</sup>.**

<sup>1</sup>Department of Forensic Medicine, KMC Manipal, Manipal University, Manipal, Karnataka, India.

<sup>2</sup>Department of Pharmacology, KMC Manipal, Manipal University, Manipal, Karnataka, India.

<sup>3</sup>Department of Medicine, KMC Manipal, Manipal University, Manipal, Karnataka, India.

<sup>4</sup>Undergraduate, KMC Manipal, Manipal University, Manipal, Karnataka, India.

### ABSTRACT

Hydrocarbons are widely distributed in the environment in several compounds, most commonly in petroleum-related products. Butane is one such compound that is arguably one of the most common chemicals found in petroleum and related derivatives. Also, butane is said to be voluntarily inhaled by many for its euphoriant effect. Other than this voluntary exposure, the public may be exposed to the harmful effects of butane in cases of accidental contact. The authors report a case analysis report of a butane disaster (which killed many) that happened in Karnataka.

**Keywords:** LPG, Explosion, Burns, Petroleum, Accident

*\*Corresponding author*



## INTRODUCTION

Petroleum is the propeller of today's world. Liquefied Petroleum Gas (LPG) has a major role as a household cooking gas in India. This LPG mainly contains butane and propane gases, and can turn out to be a double-edged sword, if not handled in a careful manner. In India, it is transported via road, rail and by sea. It's a common sight in India to see bullet tankers carrying highly inflammable products and gases through busy roads and streets, negotiating hairpin curves and steep uphill roads. A mild accident can lead to leakage of the inflammable products, and can turn into a bomb, creating a fireball in a fraction of a second [1].

Butane is a volatile liquid that is a major constituent of several petroleum products. Since oblivion of the chlorofluorocarbons, butane has taken an upper hand in the usage, as evident from its widespread availability. Butane is mainly believed to be cardiotoxic, leading to arrhythmias and cardiac arrest, which is the most common cause of death with accidental or intentional inhalation. However, butane may also cause encephalitis, and also cerebral atrophy on chronic exposure [2]. Kumta, a silent coastal town in Karnataka, woke up on the morning of the 1<sup>st</sup> of September 2015, with the sound of such an explosion.

### Case Report

On the 1<sup>st</sup> of September 2015, at 5 AM in NH-66 near Bhargi village in Kumta, a gas tanker toppled and the gas that it was carrying got leaked. As the unwarned households in the vicinity opened fire in the kitchen in the morning, it resulted in an explosion, which killed and injured many. The fire spread to a nearby house wherein a 24 year-old lady, a 3-year-old male child and a 9-year-old female child were residing. They sustained burn injuries and were taken to the local Government Hospital and then to Kasturba Hospital, Manipal, where they died five days later, while under treatment. On autopsy, multiple burnt areas of varying depth (superficial to deep) were present over the body with areas of burns varying from 28% and 45% in each of them.

Here, we have discussed only about three cases, which were admitted to our hospital, but the total toll was 14, as the adjacent houses were also reduced to ashes in the explosion. Identification of the bodies was a major concern for the authorities and the forensic personnel. Most of the bodies were 100% burnt, and a few were charred beyond identification. Those who were found dead inside the houses were identified with a better accuracy. Many were identified with the help of built and other anthropometric measurements, and also based on gender.

## DISCUSSION

Are our roads safe for transportation of dangerous goods? Our National Highways, especially those of coastal Karnataka, have thickly populated towns throughout their course. The roads are narrower than the national standards, and are made over curvy and hilly terrains. The National Highways, which are ideally supposed to be 45 meters wide, have less than 30 meters wide over many stretches in this route<sup>3</sup>. Even though the Indian Oil Corporation has written guidelines to be followed in a trip undertaken by petroleum tankers, many private companies involved in oil trade seldom follow them, which lead to increasing occurrences of such disasters [4]. Faulty parking, carelessness and overworked drivers contribute further to the accidents.

Other factors that have contributed: LPG contains Butane gas, whose physical properties would have been a major contributory factor, as compared to those of Propane Gas. Butane has a higher density of 2.7093 kg/m<sup>3</sup> than air, which is only 1.225 kg/m<sup>3</sup>. This has contributed more for the disastrous incident because the early morning temperature and the mist would have contributed to the accumulation and settling down of the leaked gas in the very vicinity of the tanker rather than diffusing away and thereby getting diluted[5].

### Authors' suggestions for improvement

#### Alternatives methods of transport

Railways and waterways: Railways are a better method of transportation of such hazardous goods, as they generally avoid thickly populated areas. Statistics related to accidents quote that rail is a much safer

alternative when compared to roads. As India has a long coastline, sea route can be used as an alternative and a safer route of transport [1].

Smaller tankers can be used: When compared to the larger bullet tankers, the transport of LPG and other inflammable materials can be done through smaller tankers which can easily negotiate through curvy roads than the larger ones. It will be easier for the authorities to control fire and the other hazardous materials in case of a fire outbreak.

### **Emergency preparedness**

The fire and emergency response teams of the region need to be at high alert when a tanker passes by its jurisdiction. Every fire station throughout the way needs to be intimated before hand, in relation to transport of such materials. Moreover, the drivers need to be alerted about dangerous curves and accident-prone areas in the route.

### **SOS button in each tanker**

An SOS facility, which is GPS-enabled, should be set up in each tanker, through which the nearest fire station can be alerted in case of an accident. A characteristic alarm has to go off from the tanker to alert the nearby public regarding the accident and the emergency situation to be followed.

### **Public awareness**

Public needs to be alerted using mass media, handouts and other possible ways of communication in relation to preparedness of an emergency situation related to leakage of a inflammable material.

## **CONCLUSION**

An LPG tanker blast in a populous town can be considered as a mass disaster and will need the medical and administrative support to meet the emergency. The Government should wake up, with the situation becoming worse day by day. Government should change the policies and guidelines in the transport of such hazardous substances.

## **REFERENCES**

- [1] <http://www.aidic.it/icheap10/webpapers/471Busini.pdf> (Last accessed on November 20, 2015 at 23:45 hours)
- [2] Harris D, Mirza H. Butane encephalopathy. *Emerg Med J* 2005;22:676-7.
- [3] <http://www.newindianexpress.com/states/kerala/'NHs-to-have-Width-of-45-Metres'/2014/06/27/article2302429.ece> (Last accessed on November 20, 2015 at 23:45 hours)
- [4] [http://www.ndma.gov.in/images/reports/pol\\_pdf.pdf](http://www.ndma.gov.in/images/reports/pol_pdf.pdf) (Last accessed on November 20, 2015 at 23:45 hours)
- [5] National Center for Biotechnology Information. PubChem Compound Database; CID=7843, <https://pubchem.ncbi.nlm.nih.gov/compound/7843> (Last accessed on November 20, 2015 at 23:45 hours)