

# Research Journal of Pharmaceutical, Biological and Chemical Sciences

## A Rare Case of Neem Oil Ingestion as a Suicidal Modality.

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### ABSTRACT

Neem oil is a naturally occurring pesticide, found in seeds of the neem tree. It has been used for hundreds of years to control pests and diseases. Components of neem oil can be found in many modern products of today like toothpaste, cosmetics, soaps, and pet shampoos. People can be exposed to chemicals by eating them, breathing them in, through skin contact or eye contact. Since neem oil is used on a variety of crops, people are mainly exposed to neem oil in their diet. People who apply neem oil may also be exposed if they inhale the mist or dust, let the product touch their skin, or fail to wash their hands before eating or smoking. The authors report a case of an adult female who committed suicide by consuming neem oil.

**Keywords:** Insect repellent, Mitochondrial damage, Toxicity

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## INTRODUCTION

Neem (Margosa) tree is traditionally known as a medicinal tree, whose parts are beneficial in several conditions. The seeds are obtained from the neem plant (*Azadiracta indica* Juss). Oil extracted from the neem seed kernels (Neem oil/Margosa oil) is claimed to be beneficial in a myriad spectrum of illnesses from running nose, skin allergy to rheumatic diseases. It is also widely used as an insect repellent [1]. The oil is a mixture of many steroids, triglycerides, palmitic acid, stearic acids and terpenoids along with minimal amount of aflatoxins [2]. The active ingredients are terpenoids such as azadirachtin, nimbin, picrin and sialin. Azadirachtin is attributed to be associated with the pesticidal action of neem oil. Neem oil is used as a base for many herbal medicines and is also used in cosmetic products. It is also said to be effective as a contraceptive in males.

### Case Report

#### History

A 65-year-old female who apparently felt depressed in life due to her illness and husband's disability, committed suicide by ingesting neem oil. She was hospitalized in two tertiary care hospitals and had survived for 4 days before her death.

#### Investigations

In the hospital, she was diagnosed to have multi-organ failure, secondary to neem oil poisoning. CT Brain (contrast) showed features suggestive of toxic encephalopathy. ESR was 48 mm at the end of one hour. Total WBC count was 1,900 cells/mm<sup>3</sup> (Normal being 4000 - 11,000 cells/mm<sup>3</sup>). Hepatic and renal parameters were raised. Prothrombin time was increased. Histopathological examination revealed early consolidation of lung and thrombotic microangiopathy of kidney.

#### Postmortem findings

Conjunctivae were pale bilaterally (Figure 1). Ecchymosis was present in the left arm (Figure 2) and in the inguinal region. Right lung and left lung weighed 645g and 525g respectively. All the organs were congested and the brain was oedematous.



Figure 1: The forensic expert showing the presence of pale conjunctiva in the victim



**Figure 2: Presence of ecchymosis over the left arm**

Neem oil bottle in her hand, stomach wash, viscera and blood were sent to the Regional forensic Science laboratory (RFSL). RFSL reported that colour test and thin layer chromatographic methods responded for the presence of azadirachtin in stomach wash sent. Hence the cause of death was reported to be due to complications secondary to neem oil poisoning.

#### **DISCUSSION**

Ingestion of margosa oil has been found to be associated with toxic encephalopathy, Reye's syndrome and metabolic acidosis. Sinniah et al noted extensive mitochondrial damage in liver, proximal tubule of kidneys and brain of mice that were experimentally given margosa oil [3]. Lai et al reported reversible toxic encephalopathy in infants with margosa oil ingestion and noted that even a few drops can have such effects [4]. In our case, toxic encephalopathy and multi-organ failure were the complications noted.

In RFSL, either the active principles like azadirachtin, nimbin etc are detected or animal studies are performed. These animal studies are performed on mice, which show symptoms such as salivation, diarrhea, tremors, convulsions and even death to detect neem oil. The severity of symptoms is dose-dependent. The exact toxicity levels for humans are unknown. In our case, azadirachtin was detected in the viscera sent. No specific antidote is available and gastric lavage is not recommended. The management is primarily symptomatic. Cases presenting only with mild vomiting and gastrointestinal features fare better than those with CNS manifestations. The prognosis is usually good, and death is rare.

#### **CONCLUSION**

Neem oil poisoning is very rare. Accidental poisoning in children with herbal preparations of neem are usually reported. It can be mistook for methanol poisoning due to the presence of metabolic acidosis. Detection at RFSL is done either by detection of its active principles or animal studies. Awareness about it would help in its detection. Clinical features help in diagnosis and increase survival rate.

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