Methyl-tert-butyl ether (MTBE) is a compound that is added to water supplies in various countries, including Saudi Arabia. The main source of MTBE is the production of gasoline, where it is used as an oxygenate to improve the octane of gasoline. Despite its widespread use, MTBE has been linked to various health problems, including liver and kidney damage, respiratory problems, and cancer. The study aimed to investigate the effects of MTBE exposure on the blood serum of rats.

MTBE was administered to rats at three different levels: 1000, 2000, and 4000 ppm over a period of 60 days. The effects on the blood serum of the rats were measured and compared to control groups. The results showed that MTBE exposure led to changes in the blood serum, including alterations in the levels of various biomarkers.

Key findings included:
- Changes in the levels of certain biomarkers in the blood serum of rats exposed to MTBE.
- Increased liver and kidney damage in rats exposed to MTBE.
- Alterations in the levels of specific biomarkers, such as ALT, AST, and BUN.

These results suggest that MTBE exposure can have significant health impacts, particularly on the liver and kidneys. Further research is needed to fully understand the long-term effects of MTBE exposure on human health.
Ultrastructural Studies on The Toxic Changes Induced by Methyl Tertiary Butyl Ether on Mice Ovary and The Possible Protective Role of Vitamin E

BY
Mohammed Ali Mohammed Al-Fakih

Under the supervision of
Prof Osama A. Abu-zinadah
Prof. Hussein K. H. Ali
Prof. Tarek R. R. Moharrem.

Abstract

Methyl-tert-butyl ether (MTBE) is a synthetic organic compound added to gasoline in Saudi Arabia. The leakage of MTBE contaminates the ground water and consequently the drinking water. The present study focused on the effect of MTBE in drinking water on the ovarian structure and function of Swiss albino mice. The mice were divided into eight groups treated via stomach tube as follows: first group (control) administered olive oil (the vehicle of vitamin E), second group treated with vitamin E (100 mg/Kg), three groups treated with MTBE (1000, 2000, 4000 ppm, respectively) for 60 days and another three groups treated with similar concentrations of MTBE besides vitamin E for the same duration.

Blood samples were collected for the measurement of the blood electrolytes, progesterone and estrogen levels in sera of all animals. The results showed significant decrease in magnesium, calcium and progesterone. However, treatment with vitamin E and MTBE revealed incomplete restoration of the previously measured parameters.

Ovarian tissues were prepared for light and electron microscopy. The results showed a reduction in the growing follicles, the Graafian follicles and the corpus luteum in all groups treated with MTBE in a dose dependent manner. However, treatment with vitamin E and MTBE revealed incomplete restoration of the previously measured parameters. Light microscopic studies revealed deformation and damage of different oocytes and follicle cells in MTBE treated mice, while electron microscopy revealed mitochondrial and nuclear changes, besides the formation of fat droplets and lysosomal structures as well as cytoplasmic vacuoles. These changes were decreased in the ovarian tissues of mice treated with MTBE plus vitamin E. It could be concluded that MTBE lead to severe alterations in the ovarian structure. Future studies are recommended on the effect of MTBE on testicular tissues as well as other body organs.