Cairo University
Faculty of Veterinary Medicine
Department of Pathology

Pathological and Carcinogenic Studies on the Effect of Potassium Bromate as a Food Additive in Albino Rats

A Thesis Presented
by

Abdullatif Abdullah Ibrahim AlWazzan
(B.V.Sc. 2006, Fac. Vet. Med., Qassim University-KSA)
(M.V.Sc. 2010, Fac. Vet. Med., Cairo University)

For the degree of Ph.D. In Pathology
(general, special and post-mortem)

Under the Supervision of

Prof. Dr. Magdy M. El-mahdy
Professor. of Pathology
Faculty of Vet. Medicine
Cairo University

Prof. Dr. Adel M. Bakeer
Professor. of Pathology
Faculty of Vet. Medicine
Cairo University

Prof. Dr.Mokhtar H. Moussa
Professor. of Histology
Faculty of Vet. Medicine
Cairo University

Prof. Dr.Sherien S. Abd-Elgaied
Professor of Pathology
Faculty of Vet. Medicine
Cairo University

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بسِمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

(يَرْفَعِ اللَّهُ الذَّينَ آَمَنُوا مِنْكُمْ وَالذَّينَ أُوتوُا العِلْمَ
دَرَجَاتٍ وَاللَّهُ بمِا تعَمَلُونَ خَبِيرٌ)

سورة المجادلة ، أية ١١

Cairo University y

Faculty of veterinary medicine

Department of pathology

Supervison sheet

Prof. Dr. Magdy Mohamed El - mahdy

Professor of, pathology

Faculty of Veterinary Medicine, Cairo University .

Prof . Dr. Adel Mohamed Bakeer

Professor of, pathology

Faculty of Veterinary Medicine, Cairo University .

Prof. Dr. Sherien Saied Abdelgaied

Professor of, pathology

Faculty of Veterinary Medicine, Cairo University .

Professor Dr.Mokhtar H. Moussa

Professor. of Histology

Faculty of Veterinary Medicine, Cairo University .

Cairo University
Faculty of Vet. Medicine
Department of Pathology
Name: Abdullatif Abdullah Ibrahim AlWazzan
Date of bith: 15/3/1983
Degree: Ph.D.
Nationality: KSA
Specialization: Pathology
Title of Thesis: **Pathological and Carcinogenic Studies on the Effect of Potasium Bromate as a Food Additive in Albino Rats**

Supervision:

Prof. Dr. Magdy M. El-mahdy	Prof. of Pathology- Faculty of Vet. Med.Cairo University
Prof. Dr. Adel M. Bakeer	Prof. of Pathology- Faculty of Vet. Med.Cairo University
Prof. Dr.Mokhtar H. Moussa	Prof. of Histology- Faculty of Vet. Med.Cairo University
Prof.Dr. Sherien S. Abd-elgaied	Prof. of Pathology- Faculty of Vet. Med.Cairo University

Abstract

Key words: Potassium bromate, food additives, rat, dietary potassium bromate, histopathology, carcinogenicity.

Potassium bromate is one of the food additives which often used in bakeries as flour improver and dough conditioner. KBrO3 is a complete carcinogen having both initiating and promoting activities for the development of renal cell tumors. It is highly probable that active oxygen radicals are involved in the demonstrated carcinogenic and toxic effects.The objective of this study was to investigate the toxic and carcinogenic effects of various levels of dietary potassium bromate in the different organs of male and female rats. The criteria for assessment include its effects on hematological, pathological, biochemical and immunohistochemical, alterations. In this experiment a total number of 105 albino rats of both sexes, weighing 120 g were used, they were kept and housed in a metabolic cages under standard conditions and had free access to water and standard diet. The animals were left for a week, as an adaptation period. The rats used were 45 male, 45 female and 15 rats of both sexes used as control. Both male and female rats were divided into three groups. KBrO3 dissolved in water at concentrations of 200, 400 and 600 ppm respectively was daily administered to male and female rats till the end of the experiment. After 6, 9 and 14 months, ten animals from each group (5 male and 5 female) and five from the control were sacrificed.

Blood samples and tissue specimens were collected for haematological and histological examination. Haematological results revealed significant variations of most of the different estimated parameters except monocytes and eosinophil as compared with the control group. Liver function markers showed significant increase in the level of Alanine Aminotransferase (ALT) and Aspartate aminotransferase (AST). Histological examination revealed congestion, degenerative and necrotic alterations. Carcinogenic and dysplastic alterations were recorded in the kidney and liver of some cases especially after 9 and 14 months of treatment which gave positive results by using Proliferating cell nuclear antigen (PCNA) and CD10 as an immunohistochemical stains.

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