

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

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For the degree of Ph.D. In Pathology

(general, special and post-mortem)

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بسِمِ اللهِ الرَّحْمَنِ الرَّحِيمِ (يَرْفَعِ اللهُ الذَّينَ أَمَنُوا مِنْكُمْ وَالذَّينَ أُوتُوا العُلْمَ دَرَجَاتٍ وَاللهُ بِمِا تَعَمَلُونَ خَبِيرٌ)

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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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