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THE TOXICOLOGY OF POTASSIUM AND SODIUM IODATES: ACUTE TOXICITY IN MICE

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Interest in the toxicology of iodates apparently stemmed from the work of Melsens (1865) and of Rabuteau (1869), both of whom recognized the danger of administering iodide contaminated with iodate. Binz (1878) and Ruhemann (1894), and subsequently, others, proposed to use iodates therapeutically after a series of investigations concerning their pharmacologic and toxic actions. However, the suggested uses were not widely adopted.

A renewed interest in potassium iodate, KIO_3, resulted from the proposal by Johnson and Herrington (1927) to substitute the more stable iodate for potassium iodide, KI, in so-called iodized salt and in dairy-feed mixtures. Iodide used for this purpose requires the addition of one or more substances to increase its stability. More recently, the use of KIO_3 has again received serious consideration (Mendez *et al.*, 1953). However, the earlier toxicity studies cited above, as well as more recent ones by Crespolani (1908) and by Macciotta (1916), are inadequate to evaluate the possible dangers involved in using iodates in salt for the seasoning of food.

The purpose of this investigation was to study the action of KIO_3 on experimental animals and to measure its toxicity when given orally as well as by other routes. Due to the toxicity of the potassium ion, some work was carried out with the corresponding sodium salt. Finally, since a substitute for iodide was being tested, measurements were made of the relative toxicities of the corresponding iodate and iodides. This paper is limited to a study of acute single-dose toxicity in mice.

METHODS. Female white Swiss mice of the NIH strain were housed in groups of 5 to 7 in glass jars with sawdust bedding. Purina Laboratory Chow Checkers and water were available at all times.

The mice given intraperitoneal and intravenous injections were fasted for 17 to 20 hours previous to the administration of drugs. Three groups were used for the intraesophageal or intragastric injections; one group was fasted on sawdust, a second on wire screens, and a third, following determination of fasted weights, was fed for 24 hours before receiving the drug.

Iodate and iodide dosages, based on fasted body weights, were varied ordinarily by equal logarithmic steps; this facilitated determination of the LD_{50} values by the probit method (Finney, 1952). Usually ten mice were used for a trial of each dosage. Comparable groups, given iodides, water, or normal saline, served as controls.

After the administration of the drug, observations were made for evidence of toxic effects, such as hemoglobinuria, prostration, or convulsions. Tests for hemoglobinuria were made routinely with benzidin, and red blood cell (RBC) counts, hematocrit, and non-protein nitrogen (NPN) determinations were carried out on certain groups.