MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

APRIL 26, 1994

TO: File for Potassium Iodate (CAS # 7758-05-6)

FROM: Marco Bianchi

SUBJECT: Initial Threshold Screening Level

The initial threshold screening level (ITSL) for potassium iodate is 1 $\mu g/m^3$ based on an annual averaging time.

The following references or databases were searched to identify data to determine the ITSL: IRIS, HEAST, NTP Management Status Report, RTECS, EPB-CCD, EPB library, CAS-online, NLM-online, IARC, NIOSH Pocket Guide, and ACGIH Guide.

A complete reference check was conducted for potassium iodate, but only limited information was available. Potassium iodate is a GRAS (generally-regarded-as-safe) food additive that is used in small amounts (0.0075% / wt. flour) as a bread-dough stiffener. Related iodine salts such as sodium or potassium iodide are also used as food nutrients in common table salt and dairy-feed mixtures. However, in higher concentrations, iodates have pronounced toxic effects on the eyes. Experimental retinal degeneration was induced in rabbits by daily injections of 30 mg/kg. The effects of iodate were not due to the accumulation of iodate in the eye tissue, but damage to biochemical mechanisms involved in the reduction to iodide.

An oral acute mouse study provided an LD_{50} with which to derive an ITSL. Groups of 10, white female Swiss mice were orally dosed by gavage in a fasted and non-fasted state. Iodate dosages were based on body weights, and varied by equal logarithmic steps to facilitate determination of LD_{50} values by the probit method. Mice were observed for clinical signs over a 14 day period. Symptoms of toxicity include diarrhea, weakness, prostration, dyspnea, excitability, convulsions, and hemoglobinuria in fasted mice. Additionally, a microscopic examination was conducted to analyze heart, lungs, stomach, spleen, pancreas, adrenals, kidneys, brain, gonads, and thyroid. Histopathologic findings revealed degeneration of many parietal cells of the stomach, ranging from slight pyknosis to frank necrosis and exfoliation at the base of the gland. Severe visceral fatty changes were noted along with hemosiderin deposits in the kidneys, particularly in non-fasted animals. The LD_{50} was determined to be 815 mg/kg.

The ITSL was derived as follows:

LD_{50} = 815 mg/kg

$$ITSL = \frac{1}{500}\ x\frac{1}{40}x\frac{1}{100}x\frac{815}{0.167\ x1.677} = 0.001\frac{mg}{m^3}$$

0.001 mg/m^3 x 1000 µg/mg = 1 µg/m^3 based on annual averaging

The ITSL for potassium iodate = 1 µg/m^3 based on annual averaging.

References:

Webster, SH, et al., 1957. The Toxicity of Potassium and Sodium Iodates: Acute toxicity in Mice. J. Pharmacol. Exptl. Therap. 120, 171-178.

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