

Special **Toxicokinetic** Study of Sodium Dichromate Dihydrate Administered in Drinking Water to Male B6C3F1 Mice, F344 Rats, and Hartley Guinea Pigs

Objectives

Hexavalent Chromium (CrVI) has been used in corrosion inhibition, metal finishing, manufacture of safety matches and production of pigments. CrVI has been found to contaminate soil and air. This study was designed to evaluate the relationship between drinking water concentrations of Cr VI, as sodium dichromate dihydrate, and tissue accumulation of total chromium in three species (rats, mice, and guinea pigs).

Test Chemical

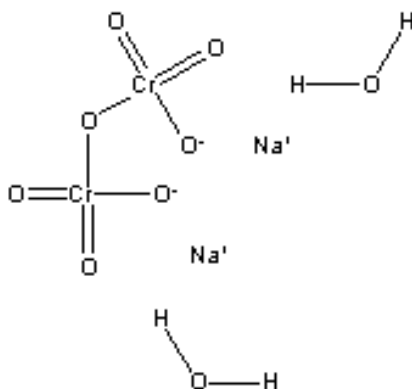
Preferred Name: sodium dichromate dihydrate

CAS Number: 7789-12-0

Molecular Formula: $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$

Molecular Weight: 298

Structure:



Animals

Twenty-eight male Fischer 344 (F344) rats, B6C3F1 mice, and Hartley guinea pigs between 8 ± 2 weeks of age were used in this study. Animals were approximately 6 - 7 weeks of age at the time of receipt and were quarantined for approximately 6 - 7 days prior to use. Body weights at the start of the study were approximately 150 g for rats, 15 g for mice, and 40 g for guinea pigs.

Experimental Design

Groups of four (4) F344 rats, 4 B6C3F1 mice, and 4 Hartley guinea pigs were provided *ad libitum* one of six concentrations of sodium dichromate dihydrate in their drinking water for 21 days. Control groups were given water without added chromium. Body weights were collected on the first day of each study week (study days 1, 8, 15, 22) and at necropsy. The dose concentrations were 0, 2.87, 8.62, 28.7, 86.2, 287, and 862 mg sodium dichromate dihydrate/L (to yield 0, 1, 30, 10, 30, 100, and 300 mg chromium/L; see Table 1.). On day 22, all animals were put on control (0 mg chromium/L) drinking water for 2 days. Animals were sacrificed on day 24 and total chromium concentration in blood, kidneys, and femurs were determined.

Table 1. Experimental Design: Sodium Dichromate Dihydrate in Drinking Water

Dose Group	Sex	Species ^a	sodium dichromate dihydrate concentration (mg/L) ^b	chromium concentration (mg/L)	No. Animals/Species	Samples Collected Per Animal	Total No. Animals
A	M	rat, mouse, guinea pig	0	0	4	blood, kidneys, femurs	12
B	M	rat, mouse, guinea pig	2.87	1	4	blood, kidneys, femurs	12
C	M	rat, mouse, guinea pig	8.62	3	4	blood, kidneys, femurs	12
D	M	rat, mouse, guinea pig	28.7	10	4	blood, kidneys, femurs	12
E	M	rat, mouse, guinea pig	86.2	30	4	blood, kidneys, femurs	12
F	M	rat, mouse, guinea pig	287	100	4	blood, kidneys, femurs	12
G	M	rat, mouse, guinea pig	862	300	4	blood, kidneys, femurs	12

^a F344 rats, B6C3F1 mice, Hartley guinea pigs

^b Sodium dichromate dihydrate will be mixed in drinking water at the listed dose concentrations to yield the desired levels of chromium in the drinking water listed in the next column.

Results:

Chromium levels in groups of rats, mice, and guinea pigs after exposure to concentrations of from 0 up to 350 mg Cr/L in the drinking water for 21 days followed by 2 days on control drinking water.

Blood Data:

Rat	html	Excel	Comparison Graph
Mouse	html	Excel	
Guinea Pig	html	Excel	

Kidney Data:

Rat	html	Excel	Comparison Graph
Mouse	html	Excel	
Guinea Pig	html	Excel	

Bone Data:

Rat	html	Excel	Comparison Graph¹
Mouse	html¹	Excel¹	
Guinea Pig	html¹	Excel¹	

Body Weight Data:

Rat	html	Excel
Mouse	html	Excel
Guinea Pig	html	Excel

Water Consumption Data:

Rat	html	Excel
Mouse	html	Excel
Guinea Pig	See Note	See Note

¹ Not available at this time

[Discussion of the Statistical Comparisons](#)