Radioisotope Fact Sheet
Chromium 51

Half life 27.7 days

Radiations emitted

<table>
<thead>
<tr>
<th>Radiation</th>
<th>Energy (keV)</th>
<th>Yield (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-ray</td>
<td>5</td>
<td>22</td>
</tr>
<tr>
<td>Gamma ray</td>
<td>320</td>
<td>9.8</td>
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</tbody>
</table>

Safety precautions
51Cr is a medium energy gamma emitter that presents both an internal and external hazard.

Handling tools and standard laboratory PPE (gloves, lab coat, safety glasses) should be used to minimise exposure.

Workstation shielding will not normally be required as the external radiation levels are very low and the duration of most work procedures is relatively short. However, wastes stored in the laboratory containing 51Cr may require shielding. Wastes should be monitored with a survey meter to ensure radiation levels are acceptable.

NB radiation levels in controlled areas must not exceed 40 µSv per week, and in areas accessible to non-radiation workers, 10 µSv per week.

Radiotoxicity data
51Cr is classed as being of moderate hazard (Group 3) according to AS/NZS 2243.4.

The Annual Limit on Intake by ingestion (ALI_{ing}) is 530 MBq and the most restrictive inhalation limit (ALI_{inhal}) is 560 MBq.

Dose rates
The gamma ray dose rate constant for 51Cr is 6.3 µSv/h/ GBq at 1 m

Dose rate to the basal skin cells from contamination of 1 kBq cm^{-2}: 14.9 µSv h^{-1}

Dose rate from a 1 kBq (0.05 ml) droplet on skin: 0.6 µSv h^{-1}

Shielding
Half value layer (HVL) for the 320 keV gamma ray = 2 mm lead.

Tenth value layer (TVL) for the 320 keV gamma ray = 7 mm lead.

Licensing requirements
Under the Radiation Safety Regulation 2021, a licence is required to possess 51Cr sources with concentrations equal to or greater than 1 kBq per gram and with activities of 10 MBq or greater. Individual use licences are required for persons who use licensable sources for research purposes.

Disposal data
The maximum concentration of 51Cr in aqueous wastes released to a sewerage system is given in the Regulation as 36 MBq per m^3 i.e. 36 kBq per litre.

The concentration of 51Cr in solid wastes disposed of to either the general or pathology waste streams must be less than 5 kBq per gram (5 MBq per kg) – i.e. half the concentration limit for licensing.

Radiation detection and monitoring
A large diameter end window or pancake type GM tube contamination monitor is the most suitable type of meter for contamination control. TLD/OSL dosemeters are recommended for whole body personal monitoring.

Laboratory requirements
Indicative maximum activities:

<table>
<thead>
<tr>
<th>Low level</th>
<th>Bench</th>
<th>37 MBq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fume cupboard</td>
<td>370 MBq</td>
<td></td>
</tr>
<tr>
<td>Medium level</td>
<td>Bench</td>
<td>100 MBq</td>
</tr>
<tr>
<td>Fume cupboard</td>
<td>1 GBq</td>
<td></td>
</tr>
</tbody>
</table>

Low level lab maximum activities
Bench: 37 MBq
Fume cupboard: 370 MBq

Medium level lab maximum activities
Bench: 100 MBq
Fume cupboard: 1 GBq