	<b>Washington State University</b> <b>Institutional Animal Care and Use Committee</b>	<b>Standard Operating Procedure #6</b>
	Title: Euthanasia Using Saturated Potassium Chloride (KCl) Solution	
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## Standard Operating Procedures for Euthanasia Using Saturated Potassium Chloride (KCl) Solution

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### **1.0 Background on Compound:**

1.1 A non-USP saturated or supersaturated solution of KCl may be administered parenterally to produce euthanasia in anesthetized animals. Although KCl is quite safe when administered orally, it is lethal at 75-150 mg/kg IV. Injection of a lethal dose of KCl produces death by cardiac arrest. KCl eliminates the potassium concentration gradient in cardiac muscle, and the depolarized muscle cannot repolarize. Because cardiac arrest by itself does not meet the criteria for euthanasia, the use of KCl for euthanasia is restricted to animals under general anesthesia.

KCl is available as a USP drug for IV administration to correct electrolyte imbalance. However, the solutions used for therapeutic administration contain around 80 mg/ml (2mEq/ml) KCl. The saturated or supersaturated solutions of KCl used for euthanasia contain in excess of 130 mg/ml. The high levels of KCl contained in the non-USP solution are needed to ensure rapid and irreversible death.

### **2.0 Requirements for Use of Compound:**


- 2.1 KCl use must be described in an ASAF and **reviewed and approved** before its use.
- 2.2 KCl use is allowed only in **anesthetized animals** (surgical or deeper plane of anesthesia).
- 2.3 Personnel who administer KCl for euthanasia must be **trained and knowledgeable** in anesthesia for the species to be euthanized to ensure an adequate level of animal unconsciousness prior to KCl administration.
- 2.4 KCl is to be administered **intravenously (IV) or intra-cardiac (IC)** in an anesthetized animal.
- 2.5 KCl must be **prepared, used, stored, and disposed of** as described in DCM Guidelines that follow;

### **3.0 Preparation of Compound:**

3.1 Ingredients:

- Potassium chloride (CAS # [7447-40-7](#)); white crystalline solid;
- Tap, sterile or deionized water.

3.2 KCl is quite soluble in water. To make a supersaturated solution of KCl, add 130 g to 1L of solution (tap water, deionized water or sterile water) at room temperature. A precipitate should be present after thoroughly mixing this solution. If a precipitate is not present after mixing, add an additional 50 g KCl to formulate a supersaturated solution.

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#### **4.0 Storage of Compound:**

4.1 Saturated and supersaturated KCl solutions may be stored at room temperature in a closed container. Due to the extremely high osmotic pressure of the solution, microbial growth is not a concern. The presence of some KCl crystals at the bottom of the storage container is normal.

#### **5.0 Use of Compound:**

5.1 KCl should be administered only by an intravenous or intracardiac route in anesthetized animals. A dose of 75-150 mg/kg should be used and the full dose should be administered. Cardiac arrest may occur prior to full administration of the dose. If the full dose is not administered, a secondary physical method must be used to assure death.

#### **6.0 Disposal of Compound:**

6.1 Dispose of unwanted KCl as standard waste.

#### **7.0 References:**

- 7.1 Bhatkhande, C.Y. and V.D. Joglekar. Fatal poisoning by potassium in human and rabbit. *Forensic Science* Vol. 9, 1977, pp. 33–36.
- 7.2 K. Watanabe, K. Hasegawa and O. Suzuki. A double-suicide autopsy case of potassium poisoning by intravenous administration of potassium aspartate after intake of some psychopharmaceuticals. *Hum Exp Toxicol* 2011 30: 777
- 7.3 IACUC [Policy #29](https://iacuc.wsu.edu/policies/) “Use of Non-Pharmaceutical Grade Substances”  
<https://iacuc.wsu.edu/policies/>