



Removing Iodine from Iodized Salt

Objective:

To remove potassium iodide from iodized salt. Iodine is a halogen. At room temperature it is a bluish-black solid with a metallic luster and is classified as a semiconductor of electricity. Iodine is needed by the thyroid gland during the production of thyroxin, a growth hormone. The thyroid gland obtains the iodine by collecting iodide from the blood plasma and converting it into iodine. A deficiency in iodine will cause the thyroid gland to enlarge (goiter). In order to prevent this table salt has iodine added in the form of potassium iodide (KI) or sodium iodide (NaI). Iodized salt contains 0.01% KI or NaI. The iodine is easily separated from the salt because iodine is soluble in alcohol whereas salt is not.

Materials:

- filter paper/coffee filter
- steam bath or hot plate
- iodized salt
- 3% hydrogen peroxide
- ethanol
- NaI or KI solution
- shallow bowl or plate
- 3 small jars with lids (test tubes can be use)
- petroleum ether (alternatives: hexanes, pentane, or diethyl ether)

Procedure:

1. Add 20 g iodized salt and 25 mL ethanol to a jar, tighten lid and shake vigorously. Let the jar sit for 5-10 min and shake occasionally.
2. Filter the solution into a shallow bowl or plate and evaporate until dry. A steam bath or hot plate may be needed to quicken the evaporation. (Caution: ethanol is flammable)
3. Add 5 mL of 3% hydrogen peroxide to the bowl and warm it slightly until the residue is dissolved.
4. Carefully transfer the solution to a small jar, add 1-2 mL of petroleum ether or alternative, tighten the lid and shake. The petroleum ether, hexanes, and pentane should turn slightly pink due to the presence of iodine. If diethyl ether is used the solution will turn a faint yellow colour. Try to use a jar that will allow the diethyl ether to form a thin layer a couple of millimetres thick.
5. A standard can be made to compare the colour change. Add 5 mL of diethyl ether to 10 mL of hydrogen peroxide in a small jar. Add a few drops of a KI or NaI solution and observe the colour change in the ether layer.