
EXPERIMENT 4 EXTRACTION OF SHARK LIVER OIL

Structure

- 4.1 Introduction
 - Objectives
- 4.2 Experiment
 - 4.2.1 Principle
 - 4.2.2 Requirements
 - 4.2.3 Procedure
 - 4.2.4 Observations
 - 4.2.5 Results
- 4.3 Precautions

4.1 INTRODUCTION

Livers with high content of oil only are used for extraction, such as those of shark and cod. During extraction, care must be taken to retain the important components of the oil. This is because some components like Vitamin A are vulnerable to heat and oxygen. One suitable method is called the alkali digestion process.

Objectives

After performing this experiment, you will be able to:

- extract oil from shark liver; and
- familiarize with some of its characteristics.

4.2 EXPERIMENT

4.2.1 Principle

Oil with all its dissolved components is held within the liver tissue. On treating liver with alkali and heat, the tissues are digested thus releasing the oil. For better contact of alkali with tissues, the liver is cut to small pieces, which aids in the extraction process. However, the treatment conditions must not be harsh as it can affect the quality, especially the vitamin content of oil.

4.2.2 Requirements

- Shark liver
- Sodium hydroxide, anhydrous sodium sulphate
- pH paper
- Thermometer
- Utensils, bottle
- Mincer

- Stove
- Centrifuge
- Filtering unit

4.2.3 Procedure

- 1) The raw material must be fresh or well-frozen. If frozen, thaw the material at low temperature.
- 2) Weigh the liver.
- 3) Remove gall bladder, veins, etc., and wash.
- 4) Mince using a meat mincer.
- 5) Transfer the minced material to a stainless steel vessel. Add a limited quantity of water (liver : water = 2 :3) and mix.
- 6) Add sufficient quantity of sodium hydroxide solution to raise the pH to 8 – 9. Mix and check pH using a pH paper.
- 7) Heat the slurry at a temperature not exceeding 90°C, with frequent stirring for a period of 60 minutes.
- 8) Centrifuge the hot digested liquor. Collect the oil fraction.
- 9) Add hot water to the oil. Mix rigorously.
- 10) Centrifuge again and collect the oil (Repeat washing if necessary).
- 11) Mix oil with anhydrous sodium sulphate (approximately 5%). Keep overnight.
- 12) Filter the mixture.
- 13) Collect the oil in clean, dry bottles and close air-tight.
- 14) Take weight. Examine the colour and odour of the oil.

4.2.4 Observations

Name of fish :
 Weight of liver (x) =
 Weight of oil (y) =
 Yield of oil = $(y/x \times 100)$ =%

Characteristics of oil

Colour :
 Odour :

4.2.5 Results

The yield of oil from shark liver is %

The overall quality of oil appears to be

4.3 PRECAUTIONS

- Take care not to excessively heat the liver as it can affect the quality of oil particularly the vitamin A potency.
- The amount of water added must only be just sufficient to form slurry. Excess water can result in emulsion formation.
- The amount of alkali used must be sufficient to make the slurry slightly alkaline only. If excess alkali is used, soap formation can occur.