MEASUREMENT OF pH

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INTRODUCTION

Pre-rigor fish flesh is semi-translucent, glossy and dry in appearance and no moisture can be expressed from it. The flesh is nearly neutral, that is its pH, the degree of acidity or alkalinity is near 7.0. After rigor has resolved, the flesh is wetter in appearance, moisture can be expressed much more easily from it and pH is more acid. The lowering of pH is due to the breakdown of glycogen to lactic acid. Depending upon species, the pH immediately after rigor has resolved is usually 6.4 to 6.8. The pH increases again with increased growth of spoilage bacteria.

The pH of the environment affects bacterial growth. Most bacteria, especially spoilage bacteria grow well between pH 6 and pH 8 with progressively less growth at extremes of pH. On the other hand, the pH of other animal meats is between 5.3-6.0, thus the bacteria grow less readily. This is one reason why fish spoil more quickly than meat. However, the measurement of pH is an indicator of fish freshness.

I SAMPLING AND SAMPLE PREPARATION

Take a representative sample from the experimental material or product lot, avoiding the red meat portion, and store in polyethylene bag prior to preparation for analysis. The sample should be kept in refrigerator or in ice to maintain its integrity.

Homogenise the sample with a mechanical/electrical mincer or chop the sample with a knife until homogeneous.

Transfer the homogenised sample into a polyethylene bag and store in refrigerator until required. Ensure that the prepared sample is still homogeneous prior to weighing.

In the case of fresh fish meat, the pH of fish homogenate should be determined at once.

II APPARATUS

Round bottom flask
Heating mantle
Mortar & pestle
Tissue homogeniser or grinder with speed control
Beakers, 100 ml
pH meter

III REAGENTS

a) **CO_2-free distilled water**

Boil the distilled water in a round bottomed flask. Cool the distilled water prior to use. Cap the flask to avoid contact with atmospheric air.

b) **Treated sand**

Sieve the sea sand and wash the resulting fine sand 3 times with distilled water.

Boil the washed sand for 15 mins. in a 1N NaOH solution. Allow to cool.

Decant away the NaOH solution and wash the sand 3 times with distilled water or until it is free of the alkali.

Boil the sand for 15 mins. in a 1N HCl solution. Allow to cool.

Decant away the HCl solution, and wash the sand 3 times with distilled water or until it is free of the acid.

Place the treated sand in an oven set at 105°C overnight to dry.

IV PROCEDURE

1. Sample prepared with mortar and pestle

   Weigh accurately 2.0 g of sample and place into a mortar.

   Add approximately 2.0 g of treated sand to the mortar and grind until the sample is homogenised.

   Add 10 ml of CO_2-free distilled water to the homogenate and grind again.

   Remove the well-ground homogenised sample into beaker and read the pH.

2. Sample prepared with tissue homogeniser/grinder

   Weight accurately 5.0g of sample and place into the beaker.

   Add 45 ml of CO_2-free distilled water to the sample and homogenise for 30 seconds. Read pH of sample.