Chapter 49

PICKLED VEGETABLES

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49.1 INTRODUCTION

The preservation of vegetables by pickling may be classified into three general methods: (1) salting or brining, (2) pasteurization, and (3) refrigeration. Organic acids and sodium chloride are primary preservatives for all types of pickles. Lactic acid is produced naturally in fermented products. Acetic acid in the form of vinegar is the usual acid added to pasteurized, unfermented, as well as finished, salt-stock pickles. Other preservatives such as sodium benzoate, potassium sorbate, and sulfur dioxide may be added to finished products.

Cucumbers, cabbage, olives, and peppers account for the largest volume of vegetables and fruits commercially pickled. Lesser quantities of onions, tomatoes, cauliflower, carrots, melon rinds, okra, artichokes, beans, and other produce are pickled also.

In salting or brining, the vegetables may or may not undergo a lactic acid fermentation, depending upon the concentration of salt used. Salt may be added in the dry form, as with cabbage, or as a brine solution, as with most other vegetables. The concentration of salt used varies widely among vegetables, depending upon tendency of the vegetable to soften during brine storage. Softening of brined cucumbers can be reduced or prevented by adjusting the level of salt to inhibit pectinolytic enzymes. After removal from brine storage, the vegetables may be desalted if needed before being finished into various types of products such as dills, sweets, sours, hamburger dill chips, mixed vegetables, and relishes. Finished salt-stock dill pickles contain a minimum of 0.6% acid, as lactic, according

* Deceased
Technical Committee Liaison: M. L. Speck

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PICKLED VEGETABLES

FLORA CHANGES IN SOLONICA

4.92 NORMAL FLORA

These foods may be called, or may properly be, 'pickled' or 'pickled' -

...these foods may be classified as pickled or as sterilized. They are a form of...
49.3 Pickled Products from Salt-Stick Vegetables (Not Pickled)

These products are known as overripe slices, half-sliced, or thinly sliced because of the consistent, plump, and firm texture which are similar to pickles. These products are usually used in salads or as a topping for dishes. They are prepared by washing, drying, and then pickling the vegetables in a brine solution. The time of pickling can vary, but it is usually around 3 to 5 days. After pickling, the vegetables are drained and the brine is discarded. The pickled vegetables are then ready to be used in various recipes.
49.52 Microscopic Examination

Examination and should be so marked.

The most important steps are:

1. Preparation of the samples.
2. Examination under the microscope.
3. Interpretation of the findings.

Steps 1 and 2 are essential for accurate results. Step 3 involves analyzing the samples under the microscope and interpreting what is observed.

4.95 Recommended Methods

Applying the published data and instruction to the field and in the laboratory, the following procedure is recommended:

1. Prepare a slide of the sample.
2. Add a drop of the sample to the slide.
3. Cover the drop with a coverslip.
4. Examine the slide under the microscope.

This procedure is effective in detecting and identifying the presence of bacteria in the sample.

4.94 Human Disease Bacteria

Foods and Their Safety and Quality

There are no nutritional reports on knowledge of human disease bacteria.
Determination of Reducing Sugars

A 1 of sodium citrate per 100 ml is prescribed for each ml of sample.

When 1 ml of sample is titrated, each ml of titrant is equal to

1 ml of sodium citrate per 100 ml of the sample.

Preliminary Reaction

To detect reducing sugars, a 1% sodium citrate solution is prepared. A 1% sodium citrate solution is added to the sample, heated to 100°C, and allowed to cool. After cooling, a 1% sodium citrate solution is added to the sample. The following reaction is followed:

Reduction of silver ions to metallic silver

A precipitate of metallic silver is formed. The mixture is then heated to 100°C and allowed to cool. The precipitate is filtered and washed with hot water. The precipitate is then dried at 105°C and weighed.

Determination of Carbohydrates

Determination of reducing sugars is important in the analysis of foods and beverages. The amount of reducing sugars can be determined using the following equation:

\[ \text{Reducing sugars (g/L)} = \frac{\text{Weight of precipitate} \times \text{Density of solution}}{\text{Volume of sample} \times \text{Density of sample}} \]

The above equation is used to determine the amount of reducing sugars in the sample.

Calculation of Carbohydrates

Carbohydrates are determined by titrating the sample with a 1% sodium citrate solution. The amount of reducing sugars is determined by the following equation:

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The determination of dissolved carbon dioxide.

**4.95% Microbiological assays**

Expressed as mg CO₂/100 ml of urine, or percent saturation.

In both methods, the total CO₂ content of the solution is determined and is expressed as mg CO₂/100 ml of urine (N.B. do not include any carbonate). This is achieved through a method that includes the measurement of the CO₂ content of the solution by a potentiometric or gas chromatographic technique. The method is based on the principle that the CO₂ content of the solution is proportional to the volume of the sample and the gas volume displacement is read on the

**5.2 Carbohydrates**

Foods and Their Safety and Quality.
Pickled Vegetables

Grown of pickled vegetables on the surface of the brine, and reduction in

References

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17.7.

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Once the product's and their quality is likely to be a problem.

5.96.

Stalled and Brined Vegetables for Nonpickled use

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Refrigerated Pickle Products

The degree of pickled vegetables on the surface of the brine, and reduction in

4.96. Refrigerated Pickle Products

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SECOND EDITION

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