COLLECTION OF PAPERS ON CO₂ AND CONTROL OF BLOATERS DURING CUCUMBER FERMENTATION*

The U.S. Food Fermentation Laboratory (USDA and NCAES, Raleigh, North Carolina) has studied the problem of bloater damage of fermented cucumbers for many years. Attached is a selected collection of papers which relate to reduction of bloater damage by controlling the fermentation and CO₂ of the brine.

Bloater damage has been related to many factors as demonstrated by the attached publications, and others from this Laboratory which may be consulted for a more thorough background of information. The problem areas responsible for blobaters may be categorized into:

I. Properties relating to the cucumber:
   1. Size, 2. Variety, 3. Mechanical injury,
   4. Growing conditions

II. Brining conditions:
   1. Temperature, 2. Salt concentration,
   3. Container geometry

III. Microbes active during the fermentation:
   1. Lactic acid bacteria, 2. Coliform bacteria,
   3. Yeasts

The suggested procedure for the controlled fermentation process incorporates features designed to eliminate the defects of brine-stock pickles such as bloater damage. This procedure includes washing of the cucumbers, sanitizing, acidification, buffering, purging to reduce CO₂ with N₂ gas, and starter cultures of lactic acid bacteria (see no. 2). It is valuable to monitor the dissolved CO₂ in the brine. Nitrogen gas is recommended for purging CO₂ from the brine. The use of air and continuous pumping of the brine, particularly of "natural" fermentations may produce inferior, soft stock and should not be carried out. The evaluation of the brine stock for blobaters (see no. 1, bloater chart), firmness, color, and overall commercial acceptability should be recorded for each tank.

1. BLOATER CHART. Etchells, J. L.; Bell, T. A.; Fleming, H. P.; Kelling, R. E.; and Thompson, R. L. Published and distributed by PPI, Inc., P. O. Box 31, St. Charles, IL, 1974.


8. ADVISORY STATEMENT: QUICK METHOD FOR ESTIMATING CO₂ IN CUCUMBER BRINES. Fleming, H. P.; Thompson, R. L. and Bell, T. A. Published and distributed by PPI, Inc., P. O. Box 31, St. Charles, IL, 1974.
