Isolation of Extraneous Matter in Hard Cheeses

I. ROSENTHAL and S. GORDIN
Division of Food Technology
Agricultural Research Organization
The Volcani Center
Bet Dagan, Israel

ABSTRACT
Extraneous matter in cheese was isolated easily by dissolving the cheese samples in concentrated solutions of urea and filtering through a standard filter pad.

INTRODUCTION
Examination of extraneous matter in cheese allows estimation of hygienic conditions during cheese production. This test is based on filtering a cheese solution through a standard filter pad, followed by evaluation of the materials retained on the filter.

Several solvents, such as sodium citrate and phosphoric acid, have been suggested for dissolving hard cheeses (2). A more complex method which involves enzymatic digestion is recommended by AOAC (1). We found testing cheese for sediment by these methods was a difficult process primarily because of slow filtration.

A method for examination of extraneous matter in processed and hard cheeses based on dissolving cheese samples in a concentrated solution of urea was developed and tested in our laboratory.

MATERIALS AND METHODS
Filter pads (Sediment Testing Supply Co., Chicago, IL) were used in a Gerber sediment milk tester. Initially, analytical grade urea was employed. Since appreciable amounts of urea are required for the test and cost of the reagent could become prohibitive, local fertilizer-feed grade urea was suitable. In a typical experiment, 1,500 g urea and 2.5 liters water were heated to 50°C with continuous magnetic stirring until the cheese was dissolved (usually 3 h). The magnetic teflon bar was removed and examined for iron filings attached to it. The solution was left for about 2 h to allow deposition of insoluble particles. Alternatively the solution was centrifuged at 3000 rpm for 10 min. At this stage the fat separated, was removed easily and analyzed separately if required. The solution was filtered without vacuum with care to avoid transfer of insoluble material on the pad to prevent clogging. With this precaution, one filter pad could accommodate the entire sample. The insoluble residue was washed several times with water subsequent to separation by decantation, and filtered through the same pad. The filter pad and the insoluble material were examined visually and microscopically for extraneous matter.

RESULTS AND DISCUSSION
Concentrated solutions of urea denature proteins and increase their solubility in aqueous media. In a similar fashion a concentrated solution of urea can solubilize cheese almost entirely. A small amount of insoluble material up to 1% of the initial weight of the cheese sample, depending on the kind of cheese, cannot be dissolved under the mild conditions recommended. Preliminary tests to determine chemical composition indicated a large amount of inorganic ions (over 55% ash). Attempts to dissolve this material in sodium citrate (.5M) and filter it, as recommended for cheese (2), led to clogging of the filter. However, after vigorous stirring in boiling phosphoric acid, this material was filtered relatively easily. Since this solvent also may dissolve foreign particles (2), we recommend examination of the insoluble residue before this step.

We tested this method with locally produced, processed cheese of Edam, Gouda, Emmental,
and Kashkaval types as well as with curd of a high total-solids content (over 50%). Parallel tests were with sodium citrate, phosphoric acid, and the AOAC method for comparison. Since the sediment test for cheese was based on visual and microscopic inspection of the sediment disks, it was difficult to compare methods in quantitative terms. However, several observations can be made: 1) All cheeses tested with the urea-method afforded mixtures which filtered easily (no vacuum or pressure required). All other mixtures frequently clogged the filter pad so that more than one pad was required to accommodate the whole amount. b) Sediment tests with sodium citrate, phosphoric acid, and the AOAC method seemed darker than tests with urea. c) Materials such as hair, dust, tobacco ashes, soil particles, vegetable matter, cloth fibers, brush bristles, wood splinters and metal filings were subjected to the conditions and solvents of each test. These materials, in general, were recovered after treatments in identifiable amounts with the exception of iron particles which were dissolved by the phosphoric acid.

The obvious advantages of the urea-method are simplicity and ease of filtration under conditions which are probably the least severe among similar tests described in the literature.

REFERENCES
