Suggestions Regarding Pickle Plant Sanitation[1]

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INTRODUCTION

IN early 1942, the National Pickle Packers Association through its Research and Sanitation Committee prepared. "Rules and Regulations for Sanitation of Salting Stations." Presumably these were prepared in light of the modern trend in thinking with respect to sanitation, for the betterment of the industry as a whole, and ultimate benefit to the consumer. The job at present concerns sanitary practices in factories, and the material prepared on this subject is presented by the writer at the request of the Association, through the Sanitation Committee Chairman. It is presented to serve merely as a guide, and as suggestions for the Association's consideration and subsequent action. To what extent the industry's sanitation program will succeed will depend upon the amount of aggressive and progressive leadership given by the Association, and the amount of cooperation and support given by the individual packers.

In setting the stage for suggestions for improved sanitary practices, it is well to know just what points might be of concern to a trained inspector when visiting a plant. An indication of this in regard to canneries was presented by N. H. Sanborn (1)[3] at the National Canners Association Technical Sessions, held in Atlantic City, February, 1946. In answer to an inquiry made by the N.C.A., Dr. Paul B. Dunbar, Commissioner of the Food and Drug Administration had, in part, the following comments to make, many of which, if not all, could be considered for pickle plants as well as canneries:

> "1. Is the plant in an area where a rodent problem is to be expected?
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> "2. Is cannery waste or other waste dumped close to the plant, so as to constitute an insanitary nuisance and become a breeding place for flies or other vermin?
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> "3. The building itself is a matter of concern. Is it properly screened?
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> "4. Is the equipment kept clean? Is it so constructed that all parts are accessible for cleaning?
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> "5. Is the drainage such as to permit the accumulation of spillage, offering additional breeding places for insect life?
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> "6. Is the plant rodent—or cockroach—infested?
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> "7. Are raw materials and manufactured products properly protected?
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> "8. Is the brining eqipment properly handled to be sure that the brine is clean from start to finish?
>
> "9. Are toilets properly constructed and well-screened from the remainder of the plant? Are they kept clean?
>
> "10. Are soap and hot water provided so that hands may be washed after absences of employees from work? Are these facilities used?
>
> "11. Are the employees themselves clean? Do they indulge in insanity practices?
>
> "Those are the things I think of insofar as a cannery is concerned. With the answer to all of these questions, however, the inspector then has a decision to make as to whether the conditions found unsatisfactory may cause the food product being prepared in the plant to be contaminated with filth. If the answer is in the affirmative, it is our view that the output of the firm is adultered immediately upon its delivery or offered delivery for shipment in interstate commerce."

The above points certainly give the plant operator, by implication at least, definite conditions and requirements to be met and maintained. In addition to the federal regulations, there are also various state and local regulations to be observed in connection with handling and processing of food. The progressive pickle packer can readily meet the reasonable and just sanitary obligations required by law irrespective of his locality. To those that are less progressive, it hardly seems a matter of what they want to do, but rather what is expected of them in the best interests of their bread and butter—the customer. However, in the interest of raising the sanitation level of the pickling industry on a National scale, an effective, workable, well coordinated, and properly administered sanitary program is essential. This is where the National Association can function to advantage.

The material to follow has been organized on the basis of suggestions concerning PREMISES MANUFACTURING PRACTICES, PERSONNEL, and METHODS OF ANALYSIS and will be presented in that order.[4]

A. PREMISES

1. Buildings: It is recognized that the type of plant construction will, in all likelihood, have a direct bearing on how efficiently and effectively plant sanitation can be carried out and maintained during factory operation. The same applies to surrounding premises, since they too will influence the sanitation of the factory. Plant design should give prime consideration to provisions for equipment layout for proper cleaning, adequate screening, and rat proofing. However, as has been pointed out (2), "Clean products can be produced with clean methods in an old, at first impression, unfit building, whereas beautiful buildings are totally without effect when insanitary methods are followed."

2. Lighting and Ventilation: Adequate amounts of light and fresh air should be provided to do the job efficiently and provide comfort for the employees. Just what the exact amounts should be must be provided by experts in these fields. It has been suggested (3) that factories depending on daylight should have a window or skylight area of at least 25 percent of the floor space. Each part of the room should receive light not less than 10 foot-candles in intensity. For artificial light, the same intensity should be available and for visual control work, a

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[3] Numbers in parenthesis refers to Literature Cited page 4

[4] The views expressed herein do not necessarily reflect those of the National Pickle Packers Association; nor are they intended to conflict with requirements of regulatory agencies that are now in force.

minimum of 30 foot-candles is suggested. Each seeing task, according to Wilder (4), should give attention to the following points.

1. The size of the objects to be seen.
2. The degree of contrast between the objects and their surroundings.
3. The time during which the objects may be observed.
4. The brightness of the objects.

More specific information concerning good lighting practices can be obtained from the "Code of Lighting . . ." prepared by "The Illuminating Engineering Society" in New York, as well as from current articles entitled, "Lighting for Easy Seeing" (5) and "Levels of Illumination." (6)

Special problems in ventilation, such as handling vinegar fumes, likewise should be given attention.

Adequate amounts of light and fresh air are not to be minimized from the sanitation standpoint; as supplementary features, they can contribute measurably to an effective sanitary program.

3. Floors: The floors of the processing (de-salting), finishing, and packing rooms should be smooth, and made of waterproof materials. They should be provided with sufficient slope to drain properly. Floors in other parts of the plant, particularly those over the above-mentioned rooms, should be tightly constructed. All floors should be kept clean.

4. Walls and Ceilings: Walls and ceilings (or overhead construction) of the processing, (de-salting), finishing, and packing rooms should be tight and made of hard surfaced material that can be kept clean and in good repair. They should be kept painted where practicable.

5. Control of Insects and Rodents: Practical measures should be maintained at all times for insect and rodent control. Attention should be given to all contributing factors to the rodent problem, such as, (a) plant construction, (b) rodent food sources, (c) rodent harborages, (d) rubbish, and (e) surrounding or adjoining premises. An adequate rodent control or elimination program requires thorough consideration to all these factors. In event the situation (type of building for example) is such that complete control cannot be accomplished and maintained, then provisions should be made for rodent-proof rooms for protection of raw materials and finished products. The lack of control of rodents on the part of the plant operator in the protection of food will weigh heavily against him in any examination by regulatory agencies. This point cannot be over-emphasized.

6. Toilets and Wash Rooms: Adequate toilet facilities for each sex should be provided. These should be installed in conspicuous and convenient locations and should be kept clean. Toilets should be well screened, and have tightly fitting walls and floors, and self-closing doors.

Washing facilities in or nearby the toilet rooms should be provided. These should be provided with hot and cold running water, soap (liquid, powder, or cake), and individual towels.

Good toilet and washing facilities, that are maintained in a clean condition, are essential to the personal hygiene of the workers. They likewise reflect, and contribute to, the sanitation level of the plant.

7. Handling, Storage, and Protection of Products and Ingredients: All products and ingredients should be handled and stored in a sanitary manner for their protection against contamination, adulteration, and deterioration. This means an over-all protection program against rodents, insects, maggots, worms, trash, excreta, grease, and any other foreign material that may condemn or make questionable the final product or the conditions under which the product was manufactured. This also means, as mentioned earlier (Item 5), that rat-proof rooms should be provided for basic ingredients in event the rodent control program cannot be satisfactorily carried out and maintained.

8. General Plant Orderliness, Cleanliness, and Maintenance: The plant in general should be orderly and clean, and provisions set up to keep it so. This program should be highly organized, with a specific clean-up crew assigned to the task. They should be thoroughly taught their respective clean-up jobs and be under the direction of a supervisor. The supervisor should be responsible for the over-all cleanliness of the plant and its operations.

B. EQUIPMENT

In maintaining a desirable sanitation level, the cleaning of equipment plays an important part. The ease and effectiveness with which a piece of equipment can be kept in a sanitary condition is influenced by its design and location, as well as the method used for cleaning. The packer has the responsibility of maintaining his equipment, regardless of type of construction or design, in a sanitary condition. Frequent and thorough washing of all equipment coming in contact with the product is a primary requirement. Additional cleaning and sterilizing aids can be employed for specific jobs to which they are suited and where they are effective. When old equipment is to be replaced, it should be done with the view toward obtaining something that is more easily and effectively cleaned, as well as being able to do the manufacturing job required.

The equipment should be conveniently located near hot and cold water outlets and should be spaced to provide easy access to the cleaning operation. Insofar as possible, the equipment should be taken apart for thorough cleaning. All valves, pumps and other necessary equipment should be of the approved sanitary type.

Some of the types of equipment the packer must deal with in maintaining his sanitation program are as follows: (a) processing (de-salting) tanks, (b) finishing tanks, (c) pasteurizing tanks, (d) continuous pasteurizers, (e) mixing tanks (for brine, sweet liquor, etc.), (f) filling lines, (g) cucumber slicing and cutting machinery, (h) closing machines, (i) packing and sorting tables, (j) vinegar and brine lines, (k) handling utensils such as pails, buckets, trays, and tubs.

C. MANUFACTURING PRACTICES

1. Raw Products, Including Green Stock and Salt Stock: A strict grading and inspection program should be installed for green stock. The procedure should not only include the customary practice of grading for size and shape for the purpose of paying the grower, but grading according to quality should also receive consideration. Inspection should be maintained for the elimination of green stock showing evidence of the following: (a) pickle worm, (b) mold spots, (c) bacterial decay, (d) ground-in dirt, (e) foreign material, and (f) other unsound stock. Maximum tolerances for the above items should be established and rigidly obeyed. Green stock for genuine dills and pasteurized types of pickle products should receive a thorough washing so that the adhered dirt is effectively

removed. A pre-soaking, prior to mechanical washing, is suggested for stock difficult to clean.

2. Ingredients; Inspection: Ingredients used in the manufacture of the various pickle products, in addition to being handled and stored in a sanitary manner, should meet prescribed standards as to type and purity. These tests on ingredients such as sugar, spices (and essential oils), vinegar, salt, and water should be carried out according to accepted procedures outlined by the Association of Official Agricultural Chemists (7) and the American Public Health Association. (8, 9) Other vegetable ingredients (i.e., pepper hulls, onions, cauliflower, etc.) purchased by the plant for use in pickle products likewise should be given rigid examination with respect to grading and sanitary conditions as described earlier for raw products.

3. Pasteurized Products from Fresh and Cured Stock: In general, pasteurization is required for pickle products that do not contain sufficient amounts of added vinegar and sugar to stop fermentation by certain organisms. There are probably a dozen or more different types of cucumber pickle that fall in this classification, such as: various types of fresh dills; fresh, sliced cucumber pickle; and low-acid and low-sugar sweet pickle (from salt stock). Also, many non-cucumber products are included (e.g., dilled tomatoes, sweet peppers, and fresh vegetable relishes) that are prepared from uncured stock.

Sufficient heat should be employed to kill all types of organisms that are capable of fermenting the combined ingredients composing the unpasteurized product. The heat treatment, however, should be controlled so that the maximum amount of the original crispness of the fresh stock is retained. A procedure involving the use of a maximum internal product temperature of 165° F., maintained for 15 minutes, followed by prompt cooling is recommended (10) for pasteurized pickle products. Routine tests can be made on finished products, if desired (See section on Methods).

It is suggested that the industry define the various types of pasteurized pickle products made from fresh stock as has been mentioned earlier for products from brine stock.

4. Other Processes and Practices: a. *Handling of Sweet Liquor or Brine:* The final liquor or brine used in the filling operation should be kept in a closed or protected system, free from insects, corrosive metals, grease contamination, and should be effectively filtered where necessary. This applies to both the "direct" and the "over-flow" types of filling operations.

b. *Washing of Glass:* It is suggested that all glass be washed if it is known to be a contributing source of dirt, dust, or other foreign or contaminating material which would lower the sanitation level of the product. This places the responsibility directly on the pickle packer to inspect his new glass upon arrival at the plant, and during storage at the plant.

c. *Bulk Containers:* All bulk containers such as tank cars, barrels, kegs, pails, etc., should be thoroughly cleaned before use. They should be maintained in a good condition and stored in such a manner as to be protected from gross contamination.

d. *Use of Produce Cucumbers:* The use of produce cucumbers or slicing types for pickle products is a practice that does not contribute to improved quality of the industry's pack. Unrestricted use of produce cucumbers, with their tough, bitter skins, dark color, large seeds, inferior internal texture, and poor shape does not seem justified in the best interest of the betterment of the industry, and should be actively discouraged.

e. *Waste Disposal:* Waste disposal should be considered from the practical standpoint. Points for study concern whether the waste is merely contributing to a bad odor, an unsightly situation, or whether it is a serious problem such as creating a breeding place for rodents and insects. If it contributes to the latter, then accumulated waste would be regarded as a serious, even dangerous condition, and one that probably influences the general sanitation level of a plant.

Approved waste disposal systems or methods of handling accumulated waste are required regardless of the location of the plant. There is a tendency for plants located in sparsely populated, or rural areas, to be lax in giving proper attention to handling of waste. Large urban areas, with aggressive sanitation and public health programs, do not tolerate neglect in this connection.

D. PERSONNEL

The situation with regard to the behavior of plant workers and suggestions for stimulating good sanitation practices on their part have been well presented by the Food and Drug Administration. (2) They say, in part: "The human element, although most difficult to control, cannot be subordinated to other factors in a sanitary appraisal. Man, en masse, is not clean . . . where education lags, insanitary practices continue. It is reasonable to demand that the food handler have clean hands, that he refrain from committing nuisances which spread filth, and that he acquire a consciousness that substances for human consumption are being prepared, to the end that his activities not defile those products. . . . Clean aprons, smocks, and caps have the advantage of creating in the workers' minds the attitude that they are clean, that dirt becomes quickly apparent on such garments, and that they should conduct themselves in accord with their dress."

To maintain a high level of personal hygiene, the workers should, of necessity, be provided with certain essentials. The minimum requirements would appear to be in the form of sanitary lockers and dressing rooms, as well as adequate toilet and washing facilities. The advantages of clean uniforms and other wearing apparel have been outlined earlier. With such provisions made for the employees, they are in a much better position to live up to the regulation that usually reads, "Employees shall be clean in person and habit at all times. . . ."

Individual States have various regulations regarding medical examinations and other required information concerning the employees' health status which are applicable in food handling establishments. These may range from an initial medical examination required at the start of employment and annually thereafter, to regulations cautioning the employer that persons with known communicable diseases, or carriers, shall not be employed. Obviously, all State and local regulations must be observed. However, a different slant on required medical certificates and health cards is presented by the Food and Drug Administration (2): "Medical certificates possessed by employees are no guaranty of good behavior and their ownership may be viewed with skepticism until knowledge has been obtained regarding the type of examination which led to issuance and length of time they have been held." It would appear that regardless of rules and regulations, the employer is primarily responsible for the facts concerning the employee's state of health.

E. METHODS OF ANALYSIS

Methods of analysis for fermenting brine stock, finished pickles from brine stock, and pasteurized types of pickle should be provided for the plant operator. Such methods can be divided into three main classes: chemical, bacteriological, and microanalytical.

1. **Chemical:** Accepted chemical procedures for such constituents as salt, acidity (volatile and non-volatile), sugars, alcohols, vitamins and gases, as well as other compounds, are given in the book prepared by the Association of Official Agricultural Chemists (7).

2. **Bacteriological:** Detailed bacteriological methods for the examination of brined, salted, and pickled vegetables and vegetable products have recently been prepared (11) and will be published in the October, 1946 issue of the *American Journal of Public Health*. This work deals with the examination of various types of pickle products and fermenting brine stock for one or more of the following general classes of non-pathogenic micro-organisms: Coliform bacteria, acid-forming bacteria, yeasts, cocci, halophiles, butyric acid bacteria, mycoderma scum (film-forming yeasts), and molds. The above report also gives required information on: Collection, storage, and preparation of samples; significance of observations; supplementary chemical tests; and microscopic examination.

3. **Microanalytical:** Microanalytical methods refer to procedures for determining and identifying insects and insect fragments, excreta, maggots, hairs, and other foreign matter classified as adulterants in relation to the manufacturing practices. These procedures have been published by the Food and Drug Administration as (a) "Microanalytical Methods" (12), and (b) "Microanalysis of Food and Drug Products (2). The former publication is designed chiefly for use by analysts in regulatory work and is restricted as to general distribution. However, much of the material comprising it has been included in the 6th edition of the book of methods of the Association of Official Agricultural Chemists (7) which has been previously mentioned.

SANITARY SURVEY

IN order to more thoroughly understand the over-all sanitation problem in connection with pickle plants, it is suggested that a sanitary survey of representative factories be sponsored by the pickling industry. Such a study, conducted by a trained sanitarian, has recently been carried out by the National Canners Association to provide an objective approach to their plant sanitation problem. In their survey a comprehensive questionnaire dealing with various aspects of plant sanitation was used. This excellent sanitary survey questionnaire, which is reproduced in the N.C.A. publication "Plant Sanitation" (13), could (with their permission) be readily adapted for pickling establishments.

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