The Program of Investigation of the Food and Container Institute for the Armed Forces and Its Relation to the Support the College Meat Sections May Render to the Defense Effort

By B. W. Gardner, Jr.,

Quartermaster Food and Container Institute, Chicago, Illinois

Introduction

This general discussion of the program of investigation in animal products has been prepared to elaborate on those points which are being investigated by the different divisions of the Food Laboratories, QMF&CI, and to indicate where present planning dictates necessity for further investigational work.

Dehydrated Meat Products

In addition to the developmental work conducted at the Institute cited under dehydrated meats of the Program of Investigation, cooperative research by different members of industry is currently under way. That part of the developmental work related to development of new methods of dehydrated meat is suited to cooperative work with members of industry, and may profitably be augmented by work conducted by research and educational institutions on a cooperative or contract basis. The histological work concerning changes during dehydration of meat is also being conducted at the Institute. The histological and histochemical characteristics of dehydrated meat are concerned with all of those changes occurring during dehydration and subsequent storage. This research is currently being investigated under contract for the QMF&CI. The Food Laboratories are planning to inaugurate research concerning chemical changes occurring during processing. This research will possibly be along the line of protein and lipid changes occurring during one or more methods of dehydration. It is thought that the investigation involving both histological and chemical changes could be done at the same time, using the same set of samples.

Also planned is an investigational research in chemical changes occurring during storage of dehydrated meat. The need for additional research beyond the scope of the current work and anticipated work undoubtedly exists.

While it is recognized that information obtained from research will permit a wider scope of developmental work, it is felt that new products such as steaks, stew meat, pork sausage, or hamburger should be created as expeditiously as possible, using currently available information. Investigation of new methods of dehydration, for example, utilization of dielectric principles, merits serious consideration. It is also felt that an effort should be made to adapt marginal dehydration procedures, such as lyophilization, to large scale manufacturing conditions. The investigation of manufacturing procedures for raw vs. cooked meat also merits consideration. Under the general heading of developmental work, storage studies should be conducted for the purpose of comparing the end products of commercially dehydrated meat prepared by such procedures as (1) atmospheric drying, (2) vacuum drying, (3) atmospheric drying with a given velocity of air and violent agitation.
DEHYDRATED EGGS

The developmental work concerned with the improvement in standard method of dehydrating eggs is being conducted by the Food Laboratories in cooperation with industry. It is primarily concerned with improvements that can be perfected during operation of vendors' plants while they are fulfilling Armed Forces contracts. In addition, cooperative research is being conducted to develop new procedures for assuring a safer, more stable, and more acceptable product. The developmental work involving new methods of adapting marginal methods of dehydrating eggs to large scale production consists of evaluation of products submitted to the Institute, and determining the validity of the claims made by the inventors of the different types of products and those claims concerning their method of manufacturing.

Microbiological research concerned with the pathogenicity of Salmonella in acidified low moisture whole egg powder is being conducted at the Institute. The scope of this investigation includes determination of Salmonella loads in processing stages in egg drying plants, and determination of minimal pasteurizing conditions for destroying Salmonella in liquid whole eggs at temperature ranges from 135-145°F. Information obtained from this research will be of value in producing a superior dehydrated egg product as well as a superior frozen whole egg product, which will be discussed later under the heading, "Perishable and Semi-Perishable Products."

CANNED ANIMAL PRODUCTS

The developmental work concerned with creating new and improving existing canned meat products has been a cooperative endeavor, including the entire canned meat industry as represented by individual members and such organizations as the National Meat Canners Association and the Associates, Food & Container Institute. During the past two years over 200 canned meat items have been evaluated to determine their potential value for Armed Forces ration use. During times of national emergency this type of activity is sharply curtailed and the appearance of new canned meat items in Armed Forces rations depends almost entirely upon improvement of marginally acceptable canned meat items. The fields of activity concerned with short-time high temperature sterilization techniques and high voltage electron bombardment for processing canned meats are currently being investigated by the Institute. However, no active work is being conducted at the present time. Active work in these fields is perhaps of paramount importance and should be given immediate attention. The Institute is conducting active work in the field of dielectric heating in processing of meat for canning, on heat treatment in canning meats; on the mode of heat transfer. Some evidence indicates that additional and more intense type of research along this line is necessary. Chemical changes occurring in meat protein during processing, which is also included in the Institute's program, is only a partial duplication of the research being done on the effect of heat treatment on chemical changes occurring in canned meat products during processing. The former phase is concerned only with protein changes, while the latter includes lipids, carbohydrates if they are present, and both organic and inorganic compounds of various minerals. The investigation of the effect of adding edible chemicals to canned meat products prior to processing would perhaps produce conclusive evidence in a much shorter time than many other phases of this investigation. It would appear that the microbiological
studies are adequately covered at the present time. However, a more widespread attention to these points by a greater variety of research organizations might result in more information in a shorter period of time. The performance studies to determine the maximum shelf life of canned meat products are being conducted by the QMF&CI through controlled storage studies. Samples of canned meat products subjected to field storage conditions are received through the Military Operations Office and the Office of The Quartermaster General. In addition, the Institute is holding products under simulated warehouse conditions for long periods of time (ten years or longer) to determine their maximum shelf life. The investigative methods of evaluating canned meat products are considered to be of less importance when compared to the other investigations of canned animal products.

Nevertheless, information obtained from this type of research would be of value in furthering the types of research and development work cited in this paragraph.

**PERISHABLE AND SEMI-PERISHABLE PRODUCTS**

Activities in this field of investigation are primarily developmental work. The need for this developmental work is dictated almost entirely by deficiencies which become apparent in specifications or by newly created needs due to changing military conditions. Therefore, this part of the Program of Investigation closely parallels the Specification Program of the Institute. The investigations which would be classified as improving commercial items and developing new items for Armed Forces use are as follows:

1. Frozen prefabricated veal.
2. Frozen prefabricated lamb.
3. Frozen prefabricated beef hindquarters for submarine use.
4. Frozen eviscerated turkeys.
5. Developing specification requirements, including formulae, for frozen and chilled sausage products.
6. Frozen table grade eggs.
7. Frozen table grade pasteurized eggs.
8. Frozen table grade pasteurized concentrated eggs.

The activities classified under improvement of existing specification items for use by the Armed Forces are as follows:

1. Storage life of lard packed cured and smoked hams.
2. Feasibility of procuring low moisture, low salt canned bacon.
3. Storage life of poultry scalded at several commercial temperature ranges.
4. Evaluation of frozen sausage products which have been seasoned by soluble spices.

5. Evaluation of frozen sausage products to which have been added various kinds of antioxidants.


The Institute does not have an active program of investigational work in development of processing techniques. However, there are some fields of activity which should be given consideration. These are:

1. Investigation of the injecto-cure method for bacon.

2. Investigation of high voltage smoke precipitation method for cured and smoked meat products.

3. Investigation of high pressure, high vacuum techniques for accelerating the curing of meat products.

Research on deteriorative changes in hams during storage and development of preventative measures is being conducted by the Food Laboratories. The entire program of Investigation of Perishable and Semi-Perishable Products is extremely flexible and is subject to more frequent revision than are other parts of this program.

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CHAIRMAN BRATZLER: I think we have time for one or two questions.

Does anyone have a question? I am sure all of us have received a lot of ideas for some new research projects.

Thank you ever so much, Bert.

MR. GARDNER: I might just add, I did not get over my fourth point, and that is, if you wish to be of assistance to us, contact me personally. You can write a letter, or come in and see me, and I will set up a mechanism. Frankly, it is not as difficult as it may sound, as I have outlined it here. I am sorry I did not get to that point. Just contact me, and we will get together.

CHAIRMAN BRATZLER: I am sure all of you will find Bert cooperative. He has been there long enough so that he can dodge some of the red tape, if I may say so.

The next speaker requires no introduction. His topic is, "Training of Armed Forces Personnel in the Slaughter of Livestock," by Mr. J. B. Fruncioni, Jr., Louisiana State University.

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