SANITARY PROBLEMS RELATED TO POULTRY PLANT OPERATIONS

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Poultry plant sanitation starts with the purchase of only healthy birds. The eviscerating plant must be so arranged that air currents are counter to the flow of the birds. Not eviscerating gives a sanitary and acceptable product. Plant walls and floors must be smooth for easy sanitizing. Present day equipment is manufactured with sanitation problems in mind, but this does not mean that the plant operator can omit the careful inspection of his equipment. Making a vent that does not puncture the intestines is the most important sanitary problem of the eviscerating operation. An ample supply of chlorinated potable water is essential.

The term "Poultry Plant Operations" is rather all-inclusive. One can consider the big commercial flocks, hatcheries, broiler projects, poultry evisceration, and poultry canning in all in the class of poultry plants, and therefore, they have sanitary problems. In this presentation we will limit ourselves to the problems which are encountered in the modern eviscerating plants.

GENERAL SANITATION

In connection with sanitation there are problems of rodent and insect control which are really separate from sanitation in a certain sense, but they still belong with sanitation. I will not attempt to discuss these in any detail because they are problems which are worthy of extended discussions in their own rights. Suffice it to say that the problems of rodent and insect control which are found in any food plant apply to poultry plants, and the same precautions must be observed.

One has only to read the Notices of Judgment of the Food and Drug Administration to be impressed with the number of times that seizures are made because a food product is prepared in a plant, or under conditions, which make it possible for the product to be contaminated due to unsanitary conditions within the plant.

In order to handle the sanitary problem which arises in any poultry plant, it is necessary that some one person be made responsible for maintaining the proper sanitary conditions within the plant. This person should have authority to make the changes that he feels are necessary, and he certainly must have the backing of the executives of the organization, otherwise his efforts will be wasted. We find that most plant operating personnel are quite willing to do their part in maintaining sanitary conditions if they know why they are to do certain things and what the results will be. Someone has to be able to educate the plant personnel on the precautions that must be taken.

Plant operators should instruct their buyers and handlers that they are not interested in the purchase of diseased poultry. There are, of course, certain diseases which cannot be recognized in the live fowl, and these are removed later when the eviscerated fowl is inspected. However, any fowl showing any evidence of disease at time of purchase should not be put into feeding batteries. They should be destroyed immediately and the body handled so as to eliminate any possible contamination.

There are two types of eviscerating operations in general use at this time: the hot method in which the fowl is eviscerated immediately after picking, and the cold method in which the fowl is chilled or frozen and thawed again before evisceration. Since eviscerated poultry first came on the market, the demand for this type of poultry has continued to increase, and the New York dressed type is now almost obsolete. We are now, I believe, entering a new stage in which the demand for cut-up chickens and pieces or segments may represent a third phase in the poultry industry. If one maintains good sanitary conditions in the eviscerating operation, the problem of maintaining sanitary conditions for the cut-up birds is then another step and does not require particular stress.

The hot evisceration of poultry is in the interest of better quality in the finished product, because the intestinal tract is removed before it has any opportunity to contaminate with off odors the meat surrounding it. It does offer greater problems in sanitation because in most instances the poultry is fed in or near the same building in which it is eviscerated.

With the cold process of evisceration, the poultry may be killed, pickled, and packed in one location; and take to another location, entirely separate, for evisceration. The eviscerating plant was designed and planned solely for purposes of evisceration, and did not encounter the problems which are inherent with the other type of installation.

Since the hot eviscerating method is becoming much more popular and widespread, we must consider the sanitary problems which arise in this operation. As mentioned previously, the feeding of the poultry, as well as killing and picking,
is probably done in the same building in which the evisceration takes place. In the feeding and killing rooms there will always be a certain amount of dust from the feed and from the feathers of the bird. This means that the eviscerating department must be separated from the preliminary operations by a tight wall in which all doors are self-closing and with a minimum amount of space for pass doors to permit the movement of birds through the wall into the eviscerating section.

The birds may be fed for a few days previous to slaughter in feeding batteries. It is important that these feeding batteries be cleaned regularly as soon as the birds are removed from them. This cleaning should be done in a room which is separated from all other operations to prevent the dust and fecal material from being spread through the building. An attempt should be made to salvage the fertilizer from the pans. If this is done the droppings should be stored in containers isolated from the building. In small towns which are not equipped with adequate sewage disposal systems, it is imperative to find some one who is willing to remove the droppings from the plant and use them for fertilizer.

**Slaughter**

Birds that are to be slaughtered the next day are usually fed the evening of the day before slaughter. Water is supplied. This, of course, is done to reduce the amount of material in the intestinal tract. At time of slaughter the bird is removed from the feeding battery, and suspended by both legs in moving shackles with head downward. There are various methods of killing, the common one being to sever the jugular vein as near the head as possible. This may be preceded or followed immediately by electric stunning. This latter operation is intended to reduce the struggling of the fowl, loosen the feathers, and possibly minimize the spattering of blood and flying dust from the feathers. In a plant with a large kill regularly, the salvage of the blood may be worth consideration. A large killing operation in a small town with inadequate sewage facilities will certainly put a real load on the sewers by the amount of blood sent to the disposal plant. As an approximation, the blood from one fifteen-pound turkey or four head of chickens is equivalent to one person in BOD estimations. The area of the plant over which the blood may spatter should be of such material and finish that it can be cleaned regularly to give minimum opportunity for blood to dry and to produce stains on the wall. The circulation time of the blood in the living fowl is about ten seconds. Actually, in killing, more time than that must be allowed for the blood to drain from the extremities and the capillaries. Most installations allow at least forty-five seconds for the fowl to bleed before it reaches the scalding tank.

**Feather Removal**

The method of removing feathers from the bird has changed through the years. Not too long ago, dry picking was considered the only proper procedure. This was a very slow process, and left many pin feathers on the bird. It was abandoned in favor of scalding. There has been a lot of work done on this subject to determine the proper temperature at which a bird should be scalded in order to get the best results. Variations in the scalding temperature range from below 130°F, which is known as a semiscald, to temperatures above 150°F, which is known as a high-scald. The in-between range is generally spoken of as slack-scalding. The temperatures that are used are largely dependent upon the type of bird being scalded and the final form in which it is to be sold. The highest scalding temperatures permit the much more rapid picking of the bird, but damage the appearance of the skin. Immersion, and/or spray type scalders are used in plants today. In one of the latest installations which I have seen pictured, both types of scalding are used. The body is spray-scalded and the neck and the bracelets about the hocks are immersion-scalded to give the best results. Normally, the water used in the scalding tank, or in the spray process, will contain some wetting agent to assist in the penetration of the water through the feathers. With the spray scald, of course, the hot water is picked up from the area underneath the scalding and recirculated. No matter which method is used, the scalding water is sure to become contaminated, and care must be taken to get rid of the dirt and feathers which accumulate. Some of this can be done by regulating the amount of in-flow which enters the scald tank and make up for that lost. At least once a day the scald tank should be removed from the bottom of the scald tank by drawing off the water through the bottom valve. In view of the treatment which the fowl receives after leaving the scald tank, the contamination from the scald water may not be too great if these precautions are taken.

Feather removal is practically all automatic in a plant of any size. The rotating rubber fingers which are used for the removal of feathers, need attention. They can be sources of surface contamination unless they are kept clean. Feathers hard to remove are usually plucked by machines which are operator-controlled. The wax dipping, which was practiced for some years for the removal of pinfeathers, is becoming obsolete due to the very doubtful sanitary condition of the wax.

As soon as possible after the bird is killed, it is advisable to arrange some place where the contents of the crop may be removed and the fecal material forced out of the vent by pressure on the abdomen.

The carefully picked bird should then be very thoroughly washed with whirling rubber fingers operating in a cold water spray, or other approved methods. In a small plant such a piece of equipment may not be available. The time of a hose with a spray nozzle, with water under as much pressure as possible, will probably do an equal job. The pressure is essential to make sure that all foreign material is dislodged from the body of the bird. It is advisable to chlorinate the water used for washing the birds at approximately 10 ppm. The chlorine will improve the sanitary condition of the surface.

At this point, any fowl that are intended for New York dressed style of packing should be allowed to cool, and is then ready for sorting according to weights and grades before final packing. As soon as the birds are packed in the proper containers they should be frozen as rapidly as possible. Plants that are not equipped for hot evisceration may pack New York dressed style for shipment to other plants.
plants may pack New York dressed and freeze during the season of heavy operations in order to have a supply of poultry on hand which can be thawed out and eviscerated at a later date when the supply of poultry for hot evisceration is limited.

**Evisceration**

The frozen birds are prepared for evisceration by removal from the boxes and placing in tanks through which cold water is circulating in such a manner that the tank is kept overflowing. The time factor will depend upon the size of the bird. Normally, an over-night immersion is ample.

It is evident from the foregoing that hot evisceration can result in some very substantial savings in refrigeration, and as we have mentioned earlier in this talk, hot evisceration does give a better finished bird.

We are now ready to start the actual eviscerating operations. Some years ago the operator of a large and well-patronized tea room, specializing in fried chicken, wrote an article on why her tea room was so successful. She emphasized the fact that she had visited plants of a number of possible suppliers, and had selected the plant for her supply the one that did the most sanitary job of evisceration. After seeing a number of different eviscerating plants, one can easily realize the reasons why this tea room operator made the selection that she did.

The first step on the evisceration line is an inspection of the fowl for pinfeathers. Those which are improperly “pinned” are put to one side for more attention. In one style of installation the skin of the neck is cut completely around at the head, and then slit to the base of the neck. The oil sack is removed and the bird is suspended by the neck and feet so that the back is horizontal and parallel to the floor. In this way the bird is kept away from any surfaces which might offer contamination. The shackel chain moving across the eviscerating table is synchronized with trays which travel around the table so that a tray is directly underneath the bird in the shackel to carry the viscera past the inspector. From the standpoint of sanitation, the vent cut is the most important operation in the evisceration of fowl. The size of the bird, its age, and condition, as well as the speed of the line, will all have a bearing upon the ease with which this cut can be made without puncturing the intestines. Recently there have been advertisements of electrically operated vent cutters which are reported to eliminate the danger of intestinal perforation. We have not seen any of these in actual operation, nor have we visited with anyone who has seen them. The abdominal cut must be as long as possible, but should be centered in the abdomen so as to give a better appearance of the finished bird if it is to be sold as a whole eviscerated product and not as a cut-up. The person making the abdominal cut must be accurate and careful as well as fast enough to avoid holding up the eviscerating operation. Carelessness can ruin any visitor's reaction to a clean, well-operated plant.

Removal of the viscera from the abdominal cavity should be carefully done so as not to break the intestines. Experienced operators can remove the complete alimentary tract as a unit. This procedure permits the inspecting veterinarian to see the entire viscera of the bird at the same time that the carcass is passing before him. He is able to decide whether the entire bird shall be passed for food, condemned, or portions condemned. Following the inspection, the gizzard, liver, and heart are removed from the viscera. Care must be taken not to get the content of the gaul bladder on the liver. The contents of the gizzard are removed separately from any other operation. All giblets are thoroughly washed and then wrapped in parchment or other suitable material, if to be sold with the entire bird; otherwise, the giblets are packaged in suitable separate containers.

When the bird and viscera reach the end of the inspection table the contents of the tray are dumped into a hopper which conveys them to another floor away from the actual eviscerating operations. Then the tray continues under the table where it is subjected to washing and sanitation before it reaches the front end of the table for another trip.

**Packing**

The interior of the bird is then given another inspection, and any parts not previously removed are taken out either by hooks or by suction. The head and feet are removed, and the bird is suspended in the shackel by one wing for the final inspection and washing.

An ample supply of potable cold water is essential at this stage in the operation. The outside of the bird is washed by a special device known as an outside bird washer, or similar equipment, which will insure the complete washing of the outside with a small amount of roughing to remove any adhering material. As a sanitary precaution, use water which has been chlorinated to at least 10 ppm. Twenty ppm should be used if there are no complaints made by the personnel in the plant. Some may complain that this much chlorine effects the eyes and nose.

The bird is now ready either for packing as such, or to go to a cut-up table where it will be cut into parts for packing. If the bird is to be packed as a unit, it is normally wrapped in some type of a foil or burl sack or other material which protects it from surface contamination. The box in which it is packed should be kept in a clean, dry place, so that it will not become moldy and offer possible contamination of the bird packed in it. The same thing applies to the storage of boxes for cut-up poultry.

In the foregoing, we have attempted to give a rather quick outline of the operations which are involved in the evisceration of poultry. We have pointed out some of the sources of contamination, and we would like to give a few of the precautions which we feel must be emphasized.

**Precautions Suggested**

Hand washing facilities should be amply provided so that people working on the inspection table, or anywhere else, can wash their hands whenever necessary with a minimum amount of movement from their place because they may slow up the operation if they have to walk very far. Floors should be kept dry to avoid slipping. Any material that falls on the floor should be immediately removed, and all floors should be given a very thorough cleaning and sanitizing treatment at night, or whenever the operation is completed. All viscera, after leaving the inspection table, should be handled in such a manner that it will not become fly-in-
fested or become a possible source of rodent infestation. Normally, the viscera can be sold to rendering plants, the price received depending upon the current prices for meat scrap or tankage and fat.

In the dairy industry we use certain tests which give a picture of the sanitation and sanitary practices employed within a plant. These are applicable to a poultry eviscerating operation. If you want to know the amount of airborne contamination that is in any room, filter some water, place it in a shallow pan, and allow the pan to remain uncovered in the room that you are checking for a definite length of time. At the end of the test period filter the water again and examine the filter pads for foreign material. You may be surprised at what you find, and it may show you that the sanitation is not all that you think it is.

The effectiveness of the final washing operation may be checked by making small agar plates in light foil containers which can be applied with the agar surface down on the skin of the bird. After being in contact with the surface of the bird for a brief interval, the agar plate is removed and placed in a sterile petri dish where it is incubated as normally done in bacteriological work. The presence of large numbers of bacteria on such a plate will indicate very promptly that the washing is not being done properly, or that the water has been poorly sanitized. Regular chlorine content determinations of the water should be made to insure the proper chlorine content.

We must remember that it is much easier to maintain a high sanitary standard than to suddenly be forced to change from what is a poorly sloppy one to one which will meet with inspection of qualified inspectors.

The use of black light at night will certainly show up all poorly cleaned areas, as well as rodent runs and other possible sources of contamination.

Swabs made of wall areas, conveyor belts, and other flat surfaces, scrubbing a definite area each time, and plating the material which is removed by the swabs, will also reveal the thoroughness and effectiveness of the cleanup job.

It has often seemed to me that the cleanup crew is one of the most neglected, but one of the most important groups in any plant. Too often the cleanup crew is composed of the last hired employees, and those who are considered incapable of doing anything else. Actually, the work of the cleanup crew may determine the reaction which the visitors will have to your plant. If the cleanup crew does not do a good job, and no one takes the effort to explain to them why they are expected to do a good job, you can be almost certain that the job that they do will be as sloppy as they think they can get by with and not meet with criticism. Certainly, someone should make the effort to explain to the cleanup crew why they are doing each job and what the significance of the various things they do mean in the final analysis of your sanitation program. Do not limit the cleanup crew to the plant only, but have them, or some crew, look after the surroundings. You must remember that any visitor to any plant is impressed either favorably or unfavorably by the condition which he notes as he approaches the plant.

In addition to the appearance value, a good thorough cleaning of the surrounding area will eliminate possible sources of rodent and fly infestation.

The health of the personnel in the plant must be considered. People appearing with sores on the hands or arms should not be permitted to work on the eviscerating line. The same is applied to people who have serious head colds and are sneezing and coughing all of the time. It is expected that each new employee will be given a health examination before they are put to work. However, you cannot always expect to have a medical examination each day, so the man in charge of the different operations must check with his employees to make sure that their health will permit them to work in his department. Possibly some changes may be made between departments to permit those who are not in physical condition to work in one department, to work in another.

Since so many of the operations are done by the personnel, it is only wise that they be checked regularly to make sure that they are clean and not possible sources of contamination to the products which they are handling. The employer should provide ample toilet facilities so that there can be no valid excuses.

There is one general test which can be applied to any product, particularly by the plant operator or those in charge of plant operation and sanitation. After seeing the operation, knowing what is done, and how it is done, are you still willing to eat the products that come from your plant?

Sanitary control is an essential if we are to hope to build and maintain a reputation for a quality product.

Speaking from the standpoint of industry, we must do all in our power to increase the demand for eviscerated poultry, because I am sure that everyone will agree with me that eviscerated poultry offers the housewife an excellent opportunity to get what she wants, and at the same time have the assurance that it will have been handled under conditions that are uniformly observed to produce a product which will meet her approval.

### Hugo Sommer—1900-1953

Dr. Hugo Sommer, Professor of Dairy and Food Industries, University of Wisconsin, passed away suddenly Friday, May 8, at Madison, Wisconsin. Dr. Sommer was born in Timothy, Wisconsin, and attended the Sheboygan, Wisconsin, High School. He attended the University of Wisconsin, where he majored in biochemistry. He received his doctorate degree in 1922. He joined the staff of the Department of Dairy Industry as Associate Professor in 1924, at the age of 24.

Dr. Sommer was the author of several textbooks, including *The Theory and Practice of Ice Cream Making* and Market Milk and Related Products. He received the Borden Award for outstanding work in Dairy Manufacturing in 1942. Dr. Sommer was a member of Alpha Zeta, Gamma Alpha, Sigma Xi, Pi Lambda Epsilon, The American Chemical Society, The American Dairy Science Association, The International Association of Milk and Food Sanitarians, and The Wisconsin Dairy Technology Society. His survivors include his wife and two sons, Warren and David.

K. G. Weckel