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VETERINARY FOOD INSPECTION PROCEDURES FOR SAMPLING AND EXAMINING GROUND BEEF REQUIRING FAT ANALYSIS

Departments of the Army, the Navy, and the Air Force, Washington, D.C.
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Section I

INTRODUCTION

1. **Purpose.** This bulletin provides military veterinary service personnel with technical instruction to assure uniformity in the procedures for the sampling and examining of ground beef requiring fat analysis; the security of official samples and the use of the meat fat content analyzing kit.

2. **Scope.** These instructions are applicable to the sampling and examining of bulk ground beef, and ground beef patties. Section I provides a list of standard inspection terms (MIL-HDBK-53) tailored to the sampling and examining of ground beef requiring fat analysis. Section II provides inspection

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procedures necessary to assure uniformity in the sampling and examining of these items. These instructions do not supersede contract or specification provisions.

3. **References.** a. AR 31-200, Army Commissary Operating Procedures.

b. A R 40-657/NAVSUPINST 4355.4A/AFR 163-2/MCO P10110.31B, Veterinary Food Inspection.

c. AR 40-920/AFR 163-9 Veterinary Laboratory Service.

d. AFM 145-1, Commissary and Subsistence Depot Operating Manual.

e. MIL-STD-105, Sampling Procedures and Table for Inspection.

f. MIL-HDBK-53, Guide for Sampling Inspection.

g. Defense Personnel Support Center Subsistence Inspection Manual No. 4155.6.

4. **Definition of Terms.** a. *Thermal Extraction Method (TEM).* A fat extraction method using the meat fat content analyzing kit (FSN 6695-926-4502).

b. *Inspection Lot.* As designated by the inspection supervisor. Generally it is the quantity ground meat (bulk and/or patties) produced in one 8-hour day from a specified grade of bone-in carcasses, wholesale market cuts, or a combination thereof. To be designated as an inspection lot, the ground beef produced and accumulated for subsequent offering to the Government must be kept separate and distinctly identified by the contractor to the satisfaction of the Government inspector. Units of product may not be added to or withdrawn from a lot by the contractor after the lot is offered for inspection, as lot integrity is compromised. In other words, a lot produced under a contractor inspection-Government verification procedures should be the same in

every respect when verified as when inspected by the contractor.

c. *Lot Size.* Number of pounds of ground or diced meat in the inspection lot.

d. *Sample.* One or more units of product randomly selected from an inspection lot without regard to quality.

e. *Sample Size.* The number of individual units of product randomly selected from the inspection lot.

f. *Sample Unit.*

(1) The sample unit for bulk ground beef shall be an approximate 8-ounce cross-sectional slice of ground beef derived from a unit package randomly selected from the production lot.

(2) The sample unit for ground beef patties shall be three to five adjacent patties from 1 layer (layer packed) or 1 stack (stack packed) of patties as applicable derived from a unit package randomly selected from the production lot.

g. *TEM Unit.* A 56.7-gram doughnut-shaped patty of meat taken from a sample unit. The patty must be approximately 3 inches in diameter with a 1/2- to 1-inch diameter hole centered in the patty.

h. *Sampling Pattern.* A listing of numbers obtained from a table of random numbers designating the specific sample units, or boxes, to be withdrawn from an inspection lot for examination.

i. *Random Method.* A method of sample selection giving each unit of product in the stationary inspection lot or subplot, an equal chance of being selected. The use of random numbers assists in this procedure.

j. *Random Number.* A number selected from the "Table of Random Numbers," Guide for Sampling Inspection H-53.

k. *Inspector.* Military Veterinary Service Inspector.

Section II

INSPECTION STEPS

5. **Submission of Inspection Lot.** The preferred method of sampling is from a stationary inspection lot. This method is not always practical due to inadequate holding area or storage facilities. When such conditions exist, it becomes necessary for the contractor to assemble the units of product in such a manner as prescribed by the inspection supervisor.

6. **Biased Sampling.** Biased selection of sample units must be avoided. True random selection of sample units will avoid such bias as drawing sample units from the same location in each of the boxes or

selecting sample units which appear to be defective or nondefective. Such procedures must be avoided to insure that sample units reflect overall quality of the lot.

7. **Frequency of Collecting Sample Units.** Sample units will be collected and examined at the frequencies and in the manner required in the contract, specifications or instructions issued by the procuring agency or inspection supervisor.

8. **Developing a Sample Pattern.** a. *Estimate of Lot Size.* Before the written sampling pattern can be

¹ DPSC publications are supplied in bulk to applicable Veterinary Inspection Activities or may be obtained direct from the Defense Personnel Support Center, ATTN: DPSC-STC, 2800 South 20th Street, Philadelphia, PA 19101. For Army users, unit requests will be submitted on DA Form 17 (Requisition for Publications and Blank Forms).

prepared, it is necessary to know or estimate the quantity of product to be produced; normally this quantity is best estimated in pounds. For example, the estimated number of boxes of ground beef on a 20,000 pound contract at 50 pounds per box is 400 boxes.

b. Determination of Sample Size. The sample size should be determined in accordance with the contract, specification or instructions issued by the procurement agency and inspection supervisor. In the absence of specific instructions, the sample size is determined by obtaining a code letter from table I, MIL-STD-105, based upon the lot size expressed in pounds and the inspection level S-3. The appropriate code letter is then referred to table II A, MIL-STD-105, which provides the sample size. This inspection level, S-3, and the lot size expressed in pounds will be constants unless otherwise specified.

c. Determining Boxes to be Included in the Sample.

(1) *Box identification.* All boxes in a given inspection lot will be numbered consecutively in order to facilitate identification of the randomly selected sample box.

(2) *Sample collection.* It is preferred to randomly select sample boxes after the inspection lot has been completely formed. If this is impractical, the identified sample boxes can be drawn after each pallet is filled. The last sample is not taken until the end of production. Only one sample unit will be selected from each box selected for sampling. (The number of sample boxes should always equal the sample size.)

d. Determining the Sample Unit to be Withdrawn From Each Sample Box. The inspector should have a predetermined method of numbering units of product within each box.

(1) Determine which unit of product within each box is to be the sample unit by use of a table of random numbers.

(2) If there are eight units of product within each box, and one sample unit must be withdrawn from each of 13 boxes selected, select at random 13 times, numbers between 1 and 8, and record.

(3) The written sampling pattern shall specify the ground beef patty layer or stack from which the sample units are to be drawn. For example, ground beef patties are packed 15 stacks per box. Random numbers in the range 1 through 15 are chosen to designate the one patty stack to be withdrawn from each designated box for sample unit selection. Specific patties withdrawn from each stack should vary with each sample stack selected.

9. Collection of Sample Units. a. One sample unit

is collected from the designated loaf or patty stack, as applicable, from each box specified in the written sampling pattern. While sample units are being collected from the lot, the inspector must avoid exposing and thereby compromising the sampling pattern.

b. Immediately after collection of a sample unit, the unit must be placed in a plastic bag or container and sealed. Each sample unit must be coded or identified with the following information:

- (1) Name of contractor.
- (2) Contract number.
- (3) Lot number.
- (4) Date of production.

10. Security of Sample Units. a. Inspection personnel shall maintain absolute security over sample units. For the protection of the Government and inspection personnel, the supervisor shall establish and maintain a security system that will prevent any possibility of the sample units being tampered with by unauthorized personnel.

b. Sample units of ground or diced beef shall be withdrawn from the sample box only after completion of the production lot or subplot. Immediately after withdrawal of each unit from the sample box, the unit shall be placed into a plastic bag or a type of container that can be secured and carried on person until examination or removal from the contractor's plant. Sample boxes will be double stamped with the provisional inspection approval stamp in accordance with TB MED 263.

c. Sample units, including portions extracted therefrom for TEM examining shall not be stored in a contractor's plant. Samples shall be stored in properly safeguarded Government or independent commercial storage facilities. Access to samples shall be limited to authorized inspection personnel only.

d. When examination facilities are available in the inspection office, samples shall be removed from the contractor's plant and secured under refrigeration at the inspection office until examination is completed.

11. Thermal Extraction Method (TEM). a. *Initial Preparation of the TEM Unit.*

(1) *Bulk ground beef.* The cross-sectional sample slice (end slices will not be used), approximately 8 ounces, shall be placed in a nonporous container and thoroughly mixed by hand to obtain uniform distribution of fat and lean. The area of the loaf from which the slice is taken should vary with each sample.

(2) *Ground beef patties.* Composite the three to five patty sample unit by placing the patties in a nonporous container and thoroughly mixing by hand to obtain uniform distribution of fat and lean.²

² The operating instructions on the meat fat analyzing kit require that beef for the TEM unit must be ground twice through a plate having holes 1/8 inch in diameter. When the contractor or commissary uses a final grind through a 1/8 inch plate, military inspectors will not subject the TEM unit to an additional grind through a 1/8 inch plate, unless required to do so by contractual documents, but will perform the TEM direct on the TEM unit after thorough hand mixing.

b. Final Preparation of Each TEM Unit.

(1) Remove 2 ounces of the ground sample unit and form it into the shape of a doughnut with an outer diameter of about 3 inches, with a hole measuring $\frac{1}{2}$ to 1 inch in diameter through the center,

(2) After forming, adjust weight to 56.7 grams to nearest 0.1 gram.

(3) Place formed TEM unit on the perforated rendering pan (disc). Do not allow any portion of the formed TEM unit to extend outward beyond the edge of the pan.

c. Fat Extraction.

(1) Follow the manufacturer's instructions located on the panel of the analyzer for heating the TEM unit and extracting (rendering) the fat.

(2) To determine percent fat, position the hair-line pointer exactly in line with the *bottom* of the meniscus (concave) of yellow fluid. Read fat to the nearest whole percent.

(3) To standardize examination procedures and operational use of the analyzing kit, always follow the instructions provided on the panel of the analyzer, the additional instructions in the contractual documents, and the following checklisted pre-use procedures:

(a) TEM units of ground meat shall not be examined when frozen. All TEM units should be of about the same temperature when examined, but not less than 34° F. or more than 55° F. at the time of examining.

(b) When operating the analyzer in cold rooms or coolers below 65° F, preheat the analyzer for a 15 minute cycle prior to examining the first TEM unit only. In addition, close the analyzer to maintain heat.

(c) Check accuracy of scale with the weight set prior to weighing the first TEM unit and again at intervals of each six units weighed.

(d) The balance pan of the scale shall be thoroughly cleaned with a damp cloth or absorbent paper prior to and after the weighing of each TEM unit.

(e) Time indicator is set for a time span of 15 minutes, plus or minus one minute. Periodically check time indicator with a watch. When time indicator is two minutes or more inaccurate, replace the time indicator.

(f) An electric voltage tester must be used to determine that correct voltage (115V) is flowing from the outlet to the heating element of the analyzer. Voltage of less than 110V will not attain accurate results.

(g) Check the temperature output of the heating element twice a week and record temperature on the panel of the analyzer. Heating elements showing temperatures of less than 380° F, measured as indicated below, will not attain accurate results. Further, the heating element should glow a cherry

red color and the TEM unit of ground meat should have a charred appearance at the end of the 15-minute period. To obtain readings, preheat the analyzer for 15 minutes, then place a bimetallic or mercury type stem thermometer on the perforated disc and funnel under the heating element for 15 minutes and read results.

(h) Only test tubes manufactured by the analyzer manufacturer shall be used. The inside diameter of the test tube is calibrated along with the graduated scale to attain accurate fat percent. An instruction manual with a catalog of replacement parts is provided with each kit by the manufacturer.

12. Disposition of Unused Samples. When testing is required by the contract, the contractor or his designated representative may indicate by letter the disposition of any unused samples at no expense to the Government. If the contractor does not wish return of the samples, the QAR may give all edible samples to a Government-operated mess or cafeteria. When such disposition is made, the QAR shall obtain informal receipt for materials from the recipient for retention in his files. If it is not practicable to donate food or nonfood samples, the supervisor shall destroy them. In each instance, the disposition of all samples shall be made a matter of record in the QAR's files.

13. Government Laboratory Sample. When requested by the procuring agency, in the case of centrally procured products or as authorized by commands for locally procured or produced product, sample units of bulk ground beef, or ground beef patties shall be randomly selected and prepared in accordance with the applicable contract, specification or instructions issued and forwarded to a Government laboratory for testing (AR 40-920/ARF 163-9).

14. Preservation of Laboratory Samples. When preservatives are added to laboratory samples, the exact amount and type of preservatives used must be noted on DD Form 1222, (Request for and Results of Tests). Normally preservation is accomplished by the addition and thorough mixing of 1 ml (16 drops) of formaldehyde solution USP (formalin), to each pound of specimen, or 1 drop per ounce. The amount of formalin added will be measured, not estimated. The formalin should not show heavy sediment in the bottle, and it will not be diluted. Add and thoroughly mix the formalin with the laboratory sample prior to placing in the container. Allow a headspace of $\frac{3}{4}$ inch when filling the container. If formalin is needed in the original sample, it should be added to the standby sample also, and thoroughly mixed prior to freezing. Inasmuch as formalin is a poison, the inspector should coordinate with the resident US Department of Agriculture inspector in

the use for formalin and the disposition of standby samples containing formalin.

15. Preparation of DD Form 1222. DD Form 1222 (Request for and Results of Tests) will be prepared and distributed as required by command directives or the procurement agency; e.g., DPSC, Subsistence Inspection Manual 4155.6.

16. Transmittal of Laboratory Sample. a. Laboratory samples will be placed in suitable containers to assure there will be no material change in the sample, from the time of its collection to its arrival at the laboratory. Normally the standard sample and specimen shipping container (NSN 8115-00-687-8027) will be used. When authorized by the laboratory, plastic bags or other containers may be used in lieu of glass jars for shipment of samples.

b. Containers will be well packed to prevent damage or breakage during shipment to the laboratory. Various transportation methods will be checked and samples forwarded to the laboratory in the most expeditious manner practical.

c. The inspector personally will mail, ship, or deliver the laboratory sample to a Government-owned laboratory.

17. Destination Sampling. a. Destination sampling of centrally procured ground beef may be requested as a part of a special monitoring program to evaluate the fat content. Prior to sampling the inspector

must have a copy of the specification, contract, or a valid document setting forth the essential contract requirements. Destination sampling and inspection procedures will be in accordance with origin sampling and inspection procedures; e.g., when the TEM of examining is used at origin the TEM will be used at destination.

b. Supplier-owned ground beef in freezer storage at destination which is pending contract litigation shall be sampled and inspected only when specifically authorized by appropriate authority; e.g., Contract Quality Assurance Element, Defense Personnel Support Center.

18. Ground Beef Analysis, Commissary Meat Market. a. The Commissary Officer is responsible for insuring that the fat content of ground beef produced in commissary meat markets for resale is within the range specified by AR 31-200, AFM 145-1 or MCO P4065.1C as applicable.

b. Veterinary Service personnel will verify the results obtained by the commissary as frequently as necessary to insure that the fat content of each ground beef category is not exceeded.

19. Applicability of Thermal Extraction Method. The method described above for the TEM examination of ground beef cannot be utilized to determine accurately the fat content of either ground veal or ground pork.

APPENDIX
INSPECTION EQUIPMENT

<i>Nomenclature</i>	<i>National Stock Number</i>
Formaldehyde solution, USP (Formalin)	6505-00-246-6199
Balance, Trip, Laboratory, Harvard, double beam	6670-00-401-7195
Weight Set, balance, Analytical, 1 mg to 100 Gram	6670-00-401-8800
Thermometer, self indicating, bimetallic	6685-00-273-7035
Thermometer, self indicating, bimetallic	6685-00-514-3757
Thermometer, self indicating	6685-00-053-0493
Analyzing, Kit. Meat Fat Content, 110 Volt, 60 cycle, AC	6695-00-926-4502
Grinder Meat Electric, Table Type, 8 lb per minute	7320-00-205-2353
Bag, plastic, polyethylene	8105-00-579-9286
Container assembly, sample and specimen shipping	8115-00-687-8027
Electric voltage tester (a suggested commercial item is Model WV-120A AC Power Line Monitor available from Allied Radio Corp., 100 North Western Avenue, Chicago, IL 60680).	

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