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Author: Michael Galyean Jhones Sarturi		Responsible faculty: (Signature/Date)  12/11/2018	

PURPOSE

This document outlines the standard operating procedures for the Burnett Center at the New Deal Farm. Specific experiments may warrant modifications to the general procedures described below.

RECORDS MAINTAINED AT THE BURNETT CENTER

A. Records Maintained at the Burnett Center

1. Daily Log of Events. A daily log of events will be maintained for each experiment. Events recorded might include weather, cattle observations, medical, or feed milling problems, and so on. In addition, the daily log should indicate that the Burnett Center "Seven-Point Check" (detailed below) has been accomplished for the day. **The log should be initialed every day by the Manager, Assistant Manager, Project Coordinator, or Principle Investigator.**
 - Seven-Point daily check items:
 - a. All cattle fed properly
 - b. All sick or injured cattle treated
 - c. Morning cattle check completed
 - d. Morning water tank check completed
 - e. Afternoon cattle check completed
 - f. Afternoon water tank check completed
 - g. Feed mill records properly posted to designated files
2. Pen Listing. A complete listing of the identification number (ear tag numbers) of cattle in each pen for each experiment should be maintained in a notebook or on a computer disk in the Feed Mill Office.
3. Diet Formulations. Copies of diet formulations for each experiment should be maintained in a notebook or on a computer disk in the Feed Mill Office.
4. Feed Records. Daily records of feed requested and feed delivered to each pen for each experiment should be printed from the computer system in the Feed Mill Office. The records will be maintained on a computer disk, and a paper copy will be maintained in the notebook (along with the Daily Log) for each experiment.
5. Premix Records. Records and inventory of each batch of premix (nutrient or drug) prepared will be maintained in the experimental notebook or in the office of the Principle Investigator. Information recorded should include the date, lot number, and expiration date of each ingredient in the premix, and total quantity of each ingredient in the premix. The record for each premix should be initialed by the person who weighs the ingredients and supervises the mixing process.



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Experimental drugs in premixes should be adequately labeled according to regulatory directions for use.

6. Waste Feed Records. A record of feed removed from feed bunks because it is unfit for consumption (wet feed, sorted feed, and so on) will be maintained for each experiment. The quantity of feed removed from the bunk should be weighed and its dry matter content determined. Visual estimation of the quantity of feed removed should only be done with approval of the Project Coordinator or Principle Investigator.
 7. Health Records. Cards recording the date of any medical treatments will be prepared when an individual animal is treated. The card should include a brief diagnosis, medical treatments administered (including the lot number and expiration date), and be initialed by the person administering the treatment.
 8. Cattle Removed from Pens. A record of cattle removed from pens will be maintained in the notebook for each experiment located in the Feed Mill Office. Generally, decisions to remove cattle from pens should be made by the Principle Investigator or Project Coordinator in conjunction with the Manager and Assistant Manager.
- B. Records Maintained by the Principle Investigator
1. Experimental Protocol and Project Correspondence. Paper copies of the protocol and all correspondence relating to each experiment will be maintained on file in a secure location.
 2. Approved Animal Care and Use Form. The Principle Investigator is responsible for filing an Animal Care and Use Form to the University ACUC for review and approval before any cattle can be received for an experiment. A copy of the approved ACUC form will be on file in the Principle Investigator's Office with the Experimental Protocol and Project Correspondence.
 3. Allotment Procedures. A written record of the manner in which cattle are allotted to treatments will be maintained by the Principle Investigator for each experiment.
 4. Feed and Premix Records. Feed records will be transferred from the Feed Mill Office (either paper copies or computer files) at the end of every weight gain measurement period (typically 28 to 35 days) for each experiment. The Principle Investigator will maintain these records on file or on a computer disk. In addition, the Principle Investigator will be responsible for providing appropriate forms to be used in mixing of any premixes needed for the experiment and will maintain paper copies on file of such records for any premixes manufactured during the course of the experiment.
 5. Animal Weight Records. A paper copy of all animal body weights taken during each experiment will be maintained on file in the office of the Principle Investigator. In addition, computer files of these same records will be maintained on a disk in a secure computer system.



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6. Necropsy Results. Results of any post-mortem examinations that are conducted for any cattle that die during the course of an experiment will be maintained in the files of the Principle Investigator. Veterinary post-mortem examinations are typically conducted only when specified in the experimental protocol for a particular research study, although all unexpected deaths will be notified immediately to Texas Tech University veterinarian.

CATTLE RECEIVING AND WORKING PROCEDURES

General: The cattle working facilities at the Burnett Center are designed to allow cattle to be unloaded from or loaded on trucks and (or) brought from pens to routine weighing with a minimum of labor and animal stress. Care is taken to avoid loud noises, use of electric cattle prods, and other stressful procedures when cattle are worked. Cattle receiving and working procedures can be subdivided into the following categories: 1) initial processing; 2) sorting; and 3) routine weighing. A description of routine weighing procedures (**see Cattle Weighing Procedures**) is given in a subsequent section and will not be described here. Sorting procedures will be described briefly; however allotment procedure (**see Cattle Allotment Procedures**) are described in a subsequent section. Aspects of initial processing that involve vaccinations, deworming, and other animal health issues are planned in conjunction with the Texas Tech University Veterinarian and reviewed periodically.

A. Initial Processing Summary

1. When cattle arrive in the morning or early afternoon, they are unloaded into pens without feed and water, and processing is started immediately. When arrival is in the late afternoon or at night, cattle are placed in holding pens with access to feed and water and processed the following morning. At the time of unloading, cattle are inspected carefully to access any injuries or health problems.
2. Processing of yearling cattle includes the following items:
 - a. Individual unique identification tag placed in the ear;
 - b. Vaccination with a seven-way clostridial vaccine;
 - c. Vaccination with a modified live preparation of IBR, PI3, BVD, and BRSV;
 - d. Treatment for internal and external parasites with a pour-on product;
 - e. Individual body weight measurement;
 - f. Clipping of excess hair from the tail
 - g. Initial processing may include palpation for previous growth-promoting implants and administration of implants when dictated by the experimental protocol.
3. When lightweight, highly stressed cattle are received, processing will include all items in the above. In addition, rectal temperature may be taken as deemed appropriate based on visual observation of each animal, and those animals with an arrival rectal temperature of $\geq 104^{\circ}$ may be treated with an antibiotic (unless otherwise contradicted by the experimental protocol). Depending on their physical



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condition, these cattle may be housed in one of four sick pens isolated from the rest of the cattle or they may be commingled with the group.

4. After processing, animals are sorted to pens with access to feed and water by a “gate cut” process. After 7 to 10 days, sorting into body weight blocks (sorting 1) and sorting to smaller pen allocations (sorting 2) according to a predetermined plan detailed by the experimental protocol will be performed. The initial 7 to 10 days can be used to accommodate any extra management related to specific experimental protocols. Depending on number of cattle to be worked, sorting 1 and 2 can be performed in one day or two consecutive days, aiming to avoid excessive time of animal handling.

B. Sorting Procedures Summary

1. Eighteen sorting pens are available in the cattle working facilities at the Burnett Center. In the event that more than 18 sorting pens are required, cattle are sorted out of their temporary pens into the number of sorting groups required for the experiment.
2. Placards that correspond to the final pen assignment are placed in the slots located above the sorting pens.
3. Cattle within a sorting group are worked individually through the hydraulic working chute/scale in the working facility.
4. The ear tag number of the animal in the chute is read and its pen assignment determined.
5. The animal is released from the chute and moved to its assigned sorting pen.
6. Once all the animals in a sorting group have been sorted, they are moved to their permanent pens in the Burnett Center partially slotted floor pens or to assigned dirt-floor pens as dictated by the experimental protocol.

C. Flooding contingency plan for the dirt-floor receiving pens

1. Slope: Pens contain approximately 1.5% slope to induce drainage
2. Concrete area inside pens: 240 ft² (12x20) of concrete floor is available in the front of each pen (feed bunk line), and 160 ft² (8x20) of concrete floor is available in the back of each pen.
3. Concrete area in the back-alley: If needed, animals can be granted access to the back-alley space for each pen (concrete floor). Such management will provide additional 300 ft² (15x20) of concrete floor for each pen, and still maintain organizational structure of each lot of animals within pens.
4. If flooding prolongs for multiple days (rare exception), as emergency last instance, animals can be temporarily allocated into the Burnett Center concrete-slotted floor pens until acceptable conditions are reestablished at the receiving pens.

CATTLE HEALTH EVALUATION AND TREATMENT



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General: As noted in the **Records Maintained** section, all cattle housed at the Burnett Center are observed at least twice daily for signs of illness or injury. Animals that require attention are removed from their pens and brought to the cattle working facility for further observation. Treatment protocols are planned in cooperation with the Texas Tech University Veterinarian, and only FDA-approved treatments at label dose are administered. A health card is filled out by the person administering the treatment, and this card is filed with other records from the experiment in the Feed Mill Office. The record should include: 1) the animal identification number; 2) the animal's pen number; 3) a brief statement of diagnosis; 4) the name and dose of all medications given, including lot number, and expiration date; and 5) the name and initials of the person administering the treatment.

- A. Treated cattle will normally be returned to their assigned pen, unless it is deemed necessary to move the animal to a separate pen to promote recovery from the illness or injury. When removal is deemed necessary, it must be approved by the Principle Investigator.
- B. At the discretion of the Principal Investigator and the University Veterinarian, cattle that die suddenly or of unknown causes may be examined post-mortem.
- C. This examination can be performed by the Texas Tech University Veterinarian, or when more detailed examination is required by the Texas Veterinary Medical Diagnostic Laboratory (P.O. Box 3200, Amarillo, Texas 79116-3200, 806-353-7478).
- D. Cattle that die of known causes, such as injury or chronic illness, and cattle that are examined post-mortem at the Burnett Center will be composted or rendered, unless prohibited by drug withdrawal requirements.

CATTLE WEIGHING PROCEDURES

General: Weights of cattle are generally obtained on an individual basis to determine their daily gain. One other purpose for weighing cattle individually is to use the weights to block the cattle into weight groups or to sort animals into treatment groups. At the Burnett Center, animals are weighed individually on a single-animal scale (f Silencer chute; Moly Manufacturing, Lorraine, KS, mounted on Avery Weigh-Tronix load cells, Fairmount, MN; readability ± 0.45 kg) to the nearest 1 lb. Accuracy of this scale is tested before each experimental weigh period with certified (Texas Department of Agriculture) test weights (1,000 lb). When necessary (usually related to interim weight measurements or large animals at the time of shipment to slaughter facility), individual and pen weights can be taken on scale designed for multiple animals, following calibrations required by the scale and the accuracy test already described.



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- A. The particular method of weighing cattle should be detailed in the experimental protocol. At the Burnett Center, the standard for weight measurements is to obtain the weight before cattle are allowed access to fresh feed in the morning. Some experimental protocols may require, particularly for initial and final weights, that cattle be withheld from feed and water before weights are obtained, or that two weights on consecutive days be obtained.
- B. On weigh days, one pen of cattle is brought in the animal working facility at a time. The scale is zeroed, and each animal from the pen is weighed. The scale is checked periodically as animals within a pen are weighed to ensure that the indicator returns to zero when no animal is on the scale. After all animals from the pen have been weighed, the scale is checked for zero, cattle are returned to their respective pens, and the next pen is weighed. All weights should be recorded in black or blue ink on an animal weight form provided by the Principle Investigator, with any changes or corrections initialed by the person taking the weights. The form should be signed and dated after completion of the weighing process and kept on file in the office of the Principle Investigator.
- D. Procedure Summary
1. Calibration of the scale is done in advance (day before or morning of weighing procedure) with 1,000lb of calibration weights.
 2. The scale is turned on and zeroed.
 3. Cattle are brought into the facility one pen at a time and weighed individually.
 4. The scale is checked periodically as animals within a pen are weighed for a zero reading with no load, and the scale is zeroed between each pen.
 5. Cattle are returned to their respective pen.

CATTLE ALLOTMENT PROCEDURES

General: Before an experiment is started, animal body weights (obtained at initial processing or another designated weigh period) and assigned individual identification numbers (tag numbers) are recorded in a computer spreadsheet file. Typically, the number of animals available for an experiment should exceed the number needed to conduct the experiment by 5 to 10%. Animal body weight and identification data in the spreadsheet format can be sorted by weight or other criteria (e.g., frame size, or breed) for subsequent allotment of animals to treatment. A typical procedure is to sort data in the spreadsheet file from the least to the greatest body weight and eliminate (cull) the lightest and heaviest animals from the larger group. A random number table can then be used to assign each animal to a treatment beginning with the animals of lightest body weight and proceeding through the animals of heaviest body weight. Thereafter, treatments can be randomly assigned to pens (within weight blocks) by use of a random number table. Cattle are sorted to assigned treatments (pens) as dictated by the computer-based allotment using the general sorting procedures (see



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Cattle Receiving and Working Procedures) outlined previously. A pen listing, which details the identification numbers of cattle in each pen on an experiment, should be provided to the Manager or Assistant Manager at the time of sorting, so that the pen listing can be filed in the Feed Mill Office with other records from the experiment. Also as noted previously (see **Cattle Weighing Procedures**), the form used for recording animal body weights and all animal body weight data will reside in the files of the Principle Investigator.

FEED PURCHASING AND PROCESSING

- A. Grains are purchased through commercial sources and also locally. Sorghum (milo) and corn must meet or exceed U.S. No. 2 standards.
- B. Roughages (primarily cottonseed hulls and ground alfalfa) are purchased through commercial sources. Other roughage sources are purchased through commercial sources as needed for particular experimental protocols.
- C. Protein sources, mineral and vitamin concentrates, and other ingredients are purchased through commercial sources or obtained from donors.
- D. Steam flaking, dry rolling, and hammer mill processing are available for grain sources. Typical standards for grain flaking are 30 to 40 minutes of steaming time to a grain moisture content of 19 to 21%, with addition of a commercial grain conditioner. The desired bushel weight is 27 to 28 pounds for flaked milo and corn, with bushel weight checked hourly during a production run.

EVALUATION OF FEED BUNKS (BUNK READING)

- A. General: Feed bunks are inspected visually (read) once daily approximately 0700 to 0800. Feed bunks are evaluated to determine the amount of feed to be fed to each pen for that day. At the Burnett Center, feed is allotted to pens so that 0 to 1 lb of feed is left in the bunk at the time of bunk reading. All cattle are fed once per day in the morning, unless a particular experiment dictates other feeding times. At the time of bunk reading, a computer-generated feed bunk reading sheet is used to determine what each pen received during the previous 3 days, so that the amount to feed the pen for the current day can be based on the previous pattern of consumption and any feed remaining in the bunk. When the pattern of consumption for the previous 3 days has been steady, the standard Burnett Center procedure for cattle that are on "feed" is to increase the feed allotted to a pen by 0.3 to 0.4lb per animal daily, with the increase not exceed 0.5lb per animal daily. For cattle being "started on feed", it is generally desirable to maintain feed in the bunk at all times, and increases per animal daily may be as large as 1 to 2 lb daily. When the feed allotted to a pen needs to be decreased, the decrease is based on a visual estimate of feed remaining in the bunk at the time of the bunk reading. When feed is decreased to a pen, the bunk reading process on the following day takes into account the feed offered on the previous day plus the estimated feed remaining in the bunk on the previous day.



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B. Procedure Summary:

1. Feed bunks are read, starting at approximately 0700 to 0800.
2. The quantity and consistency of feed intake for the previous 3 days is noted.
3. The quantity of feed remaining in the bunk is recorded on the feed bunk reading sheet.
4. Data for feed remaining in each bunk is recorded on the bunk-reading computer program stored on the computer in the Feed Mill Office.
5. A suggested value for the current day's feed allotment to the pen is generated by the computer program. The person reading the bunks decides to use the suggested value or to modify the value as needed.
6. An actual feed call for each pen is recorded in the computer program and the feed delivery sheet is printed for use in the feed delivery.

FEED MILLING, MIXING AND DELIVERY

- A. General: Following bunk reading, the amount of feed suggested for each pen within a particular experimental diet is totaled and the process of feed milling begins. Each diet in use for a given experiment has a formulation sheet (percentage of each ingredient on an as-fed basis) on file in the Feed Mill Office. In addition, each diet formulation is logged into the computer-controlled feed mixing system in the Feed Mill Office.
- B. Mixer Capacity and Batch Size: The main feed mixer (clam-shell bottom Marion paddle mixer) at the Burnett Center Feed Mill has a capacity of 45 cu ft. As a general rule, the maximum batch size for a given diet is 350 to 500 lb because of limits set by the computer-controlled mixing system. Hence, when the total quantity of feed needed for a given diet is greater than 500 lb, multiple batches are required to produce the total. Batch size will generally be a function of the feed delivery system (see below) used for a given experiment. Once the batch size for a given diet is determined, it is input to the computer system for initiation of milling. Ingredients are delivered to the mixer from the individual ingredient bins as dictated by the computer system.
- C. Feed Delivery System: Milled feed (containing ingredients with 70% DM or greater, and liquid supplements) is conveyed to a tractor-pulled mixer wagon (Roto-Mix 84-8, Roto-Mix, Dodge City, KS; scale readability of 0.45 kg), which is mixed with wet ingredients when called for in the diet (ingredients with less than 70% DM), then used for feeding each pen. The mixer wagon is cleaned when necessary to ensure minimal cross contamination among dietary treatments. In this system, the total quantity of feed needed for all the pens of cattle being fed a given diet is calculated and used to determine the batch size for the computer-controlled mixing system. The Roto-Mix 84-8 unit is positioned below the delivery spout located outside the Feed Mill Office, and when mixing is complete, the computer system is ordered to discharge the feed



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from the mixer, into the surge bin, and onto the drag conveyor chain for delivery to the Roto-Mix unit. Once all feed has been delivered to the Roto-Mix unit, a check is made to ensure that the weight recorded in the Feed Mill Office corresponds to the weight delivered to the Roto-Mix unit, after which feed is delivered to the pens being fed that diet. A feed call/delivery sheet located on a clipboard on the Roto-Mix unit is used to guide the Roto-Mix unit operator in determining the quantity of feed to deliver to each pen. At the time of delivery to each pen, the quantity of feed delivered is recorded in black ink on the space provided for that pen on the feed call/delivery sheet. After delivery to all pens is complete, the Roto-Mix unit operator returns to the Feed Mill and repositions the Roto-Mix unit. At the completion of feeding, feed deliveries are input into a computer in the Feed Mill Office for processing and storage, and the paper copy is filed in the notebook for the experiment. The Burnett Center has two of the tractor-pulled Roto-Mix 84-8 units, which provides adequate backup in the case of equipment failures.

D. Feed Milling and Scale Accuracy/Calibration:

1. The computer-controlled feed milling/mixing system at the Burnett Center is designed so that individual ingredients in a diet are weighed by computer control as dictated by the batch size and percentage of each ingredient in the as-fed formulation. Micro-ingredients, premixes, protein sources, and urea are weighed to the nearest .01lb, whereas other dietary ingredients (grain and hay) are weighed to the nearest 0.1lb. Fat and molasses are added to the mixer via spray bars and weighed to the nearest 0.1lb. Tolerances are preset in the computer system for the three scale systems in the Feed Mill. The high and low tolerances, respectively, for the concentrate/roughage scale (Scale 1) are 2.5 and 2.0 lb, 0.03 and 0.05 to 0.1 lb for the micro-ingredient/premix scale (Scale 2; the range in high tolerance is a function of auger flighting, with the high tolerance for large-flight augers at 0.1 lb) and 0.5 and 0.5 lb for the liquid scale (Scale 3). The scales used to weigh dietary ingredients are calibrated every 120 days by an outside professional; however, the Burnett Center has 1,000 lb of certified (Texas Department of Agriculture) weights (in 50-lb increments) that can be used to check scale calibration at any time. Calibration of the scale unit on the T&S hopper used with the IPFCS unit and the Rotomix 84-8 unit is done by Burnett Center personnel every 120 days using the 1,000 lb of certified calibration weights.

2. Procedure Summary.

The quantity of feed needed for a given experimental treatment diet is totaled to determine the batch size needed, and this quantity is input to the computerized feed milling/mixing system. After completion of mixing, the quantity of feed required for all the pens on a given treatment is discharged from the mixer and sent to either the T Roto-Mix 84-8 unit, for delivery to each pen.



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Feed is delivered in suggested quantities (to the nearest 1 lb) via Roto-Mix 84-8 unit to the designated pens, and the quantity delivered is recorded in black or blue ink.

FEED BUNK WEIGHBACKS

- A. General. Feed remaining in the bunks is collected and weighed back on every day that cattle are weighed during an experiment. These weigh-backs allow for accurate determination of the intake and feed efficiency by the cattle in each pen. The feed bunks are swept clean, and any remaining feed is weighed to the nearest 0.5 lb on an Ohaus electronic platform balance. A sample of approximately 200 to 400 g is taken from the feed bunk weigh-back, weighed to nearest 0.1 g, and placed in a 100°C oven for 24 h to determine the dry matter (DM) content of the feed weigh-back sample. Combined with the DM content of the diet determined from routine diet sampling (see **Routine Diet Sampling**), the DM value of the quantity of feed weigh-backs is used to calculate the DM intake by the cattle in a given pen.
- B. Procedure Summary.
1. The Ohaus 600-g portable balance is calibrated before use.
 2. Each feed bunk on an experiment is swept clean just before cattle are weighed.
 3. Any feed remaining is weighed to the nearest 0.5 lb and recorded.
 4. A sample of approximately 200 to 400 g is obtained from the remaining feed.
 5. Samples are weighed to the nearest 0.1 g on an Ohaus portable balance and placed in a 100°C oven for approximately 24 h.
 6. The DM intake by cattle in a given pen is calculated as the DM offered less any DM remaining in the feed bunk, divided by number of animals per pen.

ENTRY OF FEED INTAKE RECORDS

- A. General. Feed intake by pens of animals on a given experiment is recorded on a daily feed delivery form that is generated by the computer located in the Feed Mill Office. As noted in a previous section, the actual amount of feed delivered to each pen is recorded in black or blue ink on the data form. Mistakes are crossed through and initialed by the person making the recordings. No white out is used. Once entries are made in the computer, they are stored on the computer fixed disk, with paper copy retained for back-up. The daily feed delivery form is then stored in the notebook for each experiment located in the Feed Mill Office. At the conclusion of each weigh period of the experiment, a computer file with data for the weigh period of the experiment is transferred (electronically or via disk) to the office of the Principle Investigator for analysis and filing.

ROUTINE DIET SAMPLING

- A. General. Diet samples are obtained on a weekly basis for all the treatment diets on a given experiment. Samples are collected as feed is discharged into the bunk by the



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Roto-Mix 84-8 unit, or taken directly from the feed bunk soon after feed has been delivered. Sub-samples from the same dietary treatment are composited to an approximately 400 to 500 g sample. One portion of the sample is stored frozen for subsequent determination of the chemical composition (minimum of crude protein, acid detergent fiber, calcium and phosphorus), whereas another portion is dried at 100°C for 24 h to determine the dry matter content of the diet. Frozen samples are typically composited by treatment diet for each weigh period of the experiment. The calculated average for DM values during a weigh period of each experiment are used in conjunction with feed bunk weigh-back samples to determine the feed intake by the animals in each pen as described in the **Entry of Feed Intake Records** section. One further objective in taking diet samples is to obtain samples during drug level and mixing homogeneity determinations.

B. Procedure Summary.

1. Sub-samples related to each bunk of a respective dietary treatment are composited to an approximately 400 to 500 g sample. Sub-samples can be obtained as feed is discharged into the bunk by the Roto-Mix 84-8 delivery unit or taken directly from the feed bunk.
2. Samples are taken at the beginning, midpoint, and end of delivery from the mixer to Roto-Mix 84-8 unit or from the middle and each end of the feed bunk.
3. One portion of the sample is stored frozen for each 28- to 35-day period until further compositing by period and laboratory analyses are completed.
4. The Ohaus 600-g portable balance is calibrated before each use.
5. Samples are weighed to the nearest 0.1 g on an Ohaus portable balance and placed in a 100°C oven for 24 h.
6. After 24 h, samples are weighed on the Ohaus portable balance, and DM values are calculated.

SAMPLING OF FEED INGREDIENTS

A. General. Sampling of all food ingredients used in treatment diets is conducted every 14 days during an experiment. Generally, 500 to 1,000 g of each ingredient are collected. This procedure is done to determine a DM content of each feed ingredient, with DM values used to calculate the average DM-basis formulation of treatment diets at the conclusion of the experiment, and for formulation of premixes on a DM basis. These samples also can be used to determine the chemical composition of a particular feed ingredient when questions arise pertaining to the chemical composition of the complete treatment diet.

B. Procedure Summary.

1. Each feed ingredient is collected into an eight-inch aluminum pan or similar receptacle.
2. The Mettler electronic balance or the Ohaus portable balance is calibrated before each use.



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3. Samples are weighed to the nearest 1 g on the Mettler balance (nearest .1 g on the Ohaus portable balance) and placed in a 100°C oven for 24 h.
4. After 24 h, samples are weighed to the nearest 1 g or 0.1 g depending on the balance used, and DM values are calculated.
5. Samples are discarded unless a composite is dictated by a specific experimental protocol.

MIXING OF PREMIXES

- A. General-Use Premix. Each diet formulated at the Burnett Center is formulated as a complete diet. The treatment diets each contain from 2 to 5% of a general-use premix, which contains various major minerals, trace minerals, and feed additives. The base product or carrier in the standard Burnett Center premix is cottonseed meal, and mixed with the cottonseed meal are antioxidant, potassium chloride, ammonium sulfate, magnesium oxide, plain salt, various trace minerals, vitamin A, vitamin E, monensin, and tylosin. Premixes are mixed in the ribbon-type floor mixer located in the Texas Tech University Feed Mill and conveyed to an overhead bin at the Burnett Center. The average batch size of premix is 2,000 lb. The appropriate quantity of cottonseed meal (weighed to at least the nearest 1 lb) is delivered to mixer. Other ingredients are weighed to the nearest 0.1 lb or to the nearest 1 or 0.1 g, depending on the quantity needed (nearest 45g for weights greater than 10,000 g, nearest 1 g for weights of 600 g to 10,000 g, and nearest .1 g for weights less than 600 g). The actual weight of each premix ingredient will be recorded on a premix form and initialed by the person or persons making the premix. A copy of this premix form will be filed in the office of the Principle Investigator. Following the addition of all ingredients, the premix is allowed to mix thoroughly (at least 10 minutes) before being conveyed to an overhead bin. Samples of each batch of premix are obtained for analysis of drug levels (Rumensin), dry matter, and crude protein.
- B. Specific Use Premixes. Certain protocols call for the inclusion of new investigational drugs or feed additives, approved feed additives, or other supplements to experimental diets. In such cases, a specific premix for the individual additive(s) will be formulated, a maximum of 1,000 lb will be mixed in the Hayes and Stoltz ribbon-type mixer located in the Texas Tech University, and mixed premix will be bagged in poly bags for subsequent use. Such bagged premixes will be transported to the 3rd floor of the Burnett Center Feed Mill for use in the computer-controlled micro-ingredients delivery bins. Weights of ingredients in such premixes will be taken using the guidelines noted above for General-Use premixes.
- C. Procedure Summary for General-Use Premix.
 1. Calibrate all balances used for weighing premixes before starting.
 2. Weigh ingredients required in quantities of less than 600 g to the nearest 0.1 g on the Ohaus portable balance. Weigh ingredients required in quantities between 600 and 10,000 g to the nearest 1 g on the Mettler electronic balance. Weigh



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ingredients required in quantities between 10,000 g and 200 lb on the Ohaus platform scale.

3. The suggested quantity of cottonseed meal is delivered to the mixer to the nearest 1 lb.
 4. All other ingredients are added by hand to the mixer and allowed to mix thoroughly for at least 10 minutes.
 5. The mixed premix is conveyed to an overhead bin in the Burnett Center after samples are taken for analysis.
- D. Procedure Summary for Specific-Use Premixes.
1. Follow steps 1 and 2 of the General-Use Premix Summary.
 2. Add the required quantity of ground milo (weighed to the nearest 1 lb on the mixer scale) to the Hayes and Stoltz mixer.
 3. Add the remaining ingredients to the mixer and mix for a minimum of 10 minutes.
 4. Discharge all premix from the mixer, and ensure complete clean out of mixer.
 5. Transfer the mixed premix to poly bags (or other containers as dictated by experimental protocols), seal the bags, and move the bags to a location determined by the Manager or Assistant Manager.

CARCASS DATA COLLECTION

- A. General. Cattle from experiments conducted at the Burnett Center are typically sent to a commercial slaughter facility at the conclusion of the experiment. Cattle are individually weighed before shipment to the slaughter facility and loaded on trucks without respect to treatment assignment.
- B. Many experiments require collection of detailed carcass information. Individual data typically include hot carcass weight, incidence and severity of liver abscesses or other causes of liver condemnation, fat thickness at the 12th rib, longissimus muscle area, marbling score (USDA Quality Grade), and USDA Yield Grade. When required for an experiment, carcass data are collected by personnel from the Texas Tech University Meats Laboratory or by personnel of the Beef Carcass Research Center at West Texas A&M University.

MANURE HANDLING

- A. General. The partially slotted floor pens at the Burnett Center are constructed so that manure is worked through the slots by cattle. A 2.5-foot deep pit under the pens collects manure, which is moved to the east end of the pens by a scraper. Manure collected by this system can be spread on adjacent farmland or conveyed to a settling pond/lagoon system. The partially slotted floor confinement pens at the Burnett Center are cleaned after each experiment, whereas dirt pens are cleaned using a tractor/loader as deemed necessary.