Preparing for AA Balancing

Via Integration of The Formulate2 Core Component Suite With Feed Ration Balancer (FRB)

An Overview of FRB Dataset Preparation and The Conference Room to Parlor Training Program

Prepared by
Central Valley Nutritional Associates, LLC

FRB Dataset and Ingredient Library
Audit & Preparation Protocol
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Introduction:

The Amino Acid (AA) balancing capability offered by the integration of the Formulate2 Core Component Suite with Feed Ration Balancer (FRB) is provided via the NRC 2001 Dairy Model. Unlike previous NRC approaches to determining nutrient requirements and supplies for dairy animals, NRC 2001 is an approach that models the dynamic nature of the animal's metabolic processes.

Coefficients for digestibility (TDNp), energy (DEp, NElp etc) and fractions of crude protein (RUP, RDP, MP and MP-AA) at productive levels of dry matter intake (DMI) are not fixed values but vary as level of DMI and diet composition vary. Accommodating this dynamic paradigm requires the presence of model specific values for feeds that are not present in other approaches to determining nutrient requirements and supplies such as NRC 1989 and other linear animal models.

Updating Existing Datasets (Non-NRC 2001):

If you are not currently using the NRC 2001 model, your dataset and ingredient library will need to be updated with the model-specific nutrient items required by NRC. FMS and CVNA will provide guidance and assistance with this process to help insure that both your dataset and ingredient library are in compliance with the NRC 2001 model prior to balancing diets for MP-AA content. Once you've completed the update work, CVNA will conduct an audit to verify that your dataset and ingredient library are fully prepared for AA balancing.

Auditing NRC 2001 Datasets:

If you are already using the NRC 2001 model, CVNA will perform an audit to confirm that the dataset is fully compliant with the NRC 2001 model. If required, FMS and CVNA will assist you with any adjustments needed to achieve full model compliance. This is necessary preparation for the training required when licensing the Formulate2 Core Component Suite as it is integrated with FRB.

The Conference Room to Parlor Training Program:

One of the most important aspects of licensing and using the Formulate2 Core Components is participating in the training needed to orient and prepare your dairy team to produce the desired results in the milk tanks of your customers. Once your dataset and ingredient library are fully prepared, CVNA will provide training to your team via the Conference Room to Parlor training program. This training covers software navigation, NRC 2001 science as it applies to AA balancing, the Core Component Toolset and the application of NRC science with the Component tools in the field to produce results in the milk tank.

Having your dataset and ingredient library in full compliance with the NRC 2001 model is necessary advance preparation for training. Along with providing theory and background, the Conference Room to Parlor training will focus on hands-on use of FRB and the Core Components to address real world diet formulation issues. Preparation of your dataset and ingredient library is a prerequisite to accomplishing the objectives of this training.

Dataset Preparation Notes:

If you prefer to retain your current mineral/vitamin requirement model you may do so by stating your preference to FMS in advance. In that case, although the implementation of the NRC 2001 model in your dataset will include the absorbable mineral sub-model, it will not be set as the default mineral model. Please allow a minimum of two weeks for dataset and ingredient library preparation in advance of training. For obvious reasons, the training will not be scheduled until the dataset preparation is completed, the audit performed and any remaining issues resolved.

Conference Room to Parlor

Using Formulate2 Core Component Tools
to Implement NRC 2001 Science in the Field

Orientation & Training
Presented by
Central Valley Nutritional Associates, LLC
in Collaboration with Dr. Charles Schwab, Schwab Consulting, LLC

Conference Room to Parlor Training Program
Overview

Training sessions will be presented by CVNA team members and Dr. Chuck Schwab Professor Emeritus, Animal Sciences, University of New Hampshire (UNH). Dr Schwab was part of the NRC 2001 committee, and he and his colleagues at UNH were responsible for development of the AA sub-model of NRC 2001. Dr. Schwab is part of the extended CVNA team and we are pleased to include his participation in the Conference Room to Parlor training.

The objectives of the training program are as follows:

1. Provide participants with orientation to the integration of the Formulate2 Core Component Suite with the FMS application Feed Ration Balancer (FRB).

2. Acquaint participants with the science behind the NRC 2001 AA sub-model.

3. Orient participants to the implementation of NRC science as embodied in the Core Component Toolset.

4. Train participants in the navigation and use of the Core Component tools.

5. Train participants with regard to use of the Core Component tools in the application of NRC science to diet formulation in commercial production environments.

6. Provide participants with the continuing, post training support needed to take the Component tools and the principles of NRC science to the field and produce the desired results in the milk tanks of the producers with whom they work.

As the bullet points above illustrate, the objectives of the Conference Room to Parlor approach don't stop at the conclusion of the Conference Room sessions. The "Parlor" segment of the program means that all CVNA team members will continue to be available and provide continuing support to training participants via email, telephone and online conferencing as they take the Core Component tools to the field and apply both tools and NRC science to diet formulation in commercial productions settings. The CVNA team will continue to stay engaged with training participants as needed to help ensure their success with the Core Component tools and AA balancing.

Training and Licensing

The overarching objective of the Conference Room to Parlor training program is a simple one. Placing tools in the hands of consultants with only a superficial introduction to them then walking away is a sure formula for confusion and the almost inevitable "automobile in the roadside ditch" experience. We want to avoid that experience and we want Core Component users to avoid it. The most effective way of doing that is to train users not only in the use of the Component toolset but also in the concepts on which the tools are based and then to stay engaged with them while they gain the experience needed to master the use of the tools. For those reasons, we've made the Conference Room to Parlor training a pre-requisite to licensing the Formulate2 Core Components for use with FRB. We want to do everything possible to

ensure the success of your dairy team as they address balancing diets for AA content with FRB and the Formulate2 Core Component toolset.

In pursuit of that objective, we'd prefer to focus the training program on the core leadership of your dairy team in order to prepare them to lead and teach the balance of the team. The number of participants is flexible but the idea is to keep the group small enough to be able to do a very thorough job of orienting participants and getting their questions answered in the time allotted for training. We want them to be fully prepared to teach and guide others.

The full CVNA team will continue to support both the leadership group and those trained by them via email, telephone and online meetings. Continuing support for anyone trained by CVNA as well as those trained by individuals who participated in the Conference Room to Parlor training is fully covered by the training fees for one year post training. Continued training support after the first year is covered under the Core Component software maintenance agreement.

The training program itself covers two full sessions of one day each (approximately 12-16 hours total) and encompasses five different presentations with the bulk of the second day planned as a hands-on session with FRB and the Core Components in order to give users experience with the software and to stimulate and answer questions. An outline of the training program follows.

The content of the training can be adapted to the needs of your team. However, training is a prerequisite for licensing and using the Formulate2 Core Component Suite. As noted above, training time is generally scheduled for two consecutive days. However, if desired, additional training days can be made available. Please contact CVNA for details, pricing and scheduling at dlfoster@formulate2.com.

Conference Room to Parlor

Training Program Outline

Pre-Training Advanced Preparation

Prior to the training sessions, as a group, participants in Conference Room to Parlor training will need to select one dairy herd currently being worked with and about which historical production data may be obtained. Historical data should include average milk flow and milk component composition data. This should be a reasonably well managed operation since this herd will serve as the test herd for implementation of the concepts covered in the training. The diet will be the subject of the "Application Exercise" segment of the training where it will be revised for AA balance using the NRC 2001 concepts and the Core Component tools. This revised diet will actually be implemented at the dairy and animal response will be monitored via milk and milk component data compiled by the training participants during the first six weeks post implementation. Arrangements will be made to share the collected data with CVNA team members weekly and team members will continue to act in a support role for participants during the first six weeks post implementation.

For purposes of simplifying the training exercise, it will be best to select a herd being fed a single diet. If that is not possible, then select a herd with the fewest diets fed to lactating animals.

Make sure the diet from the selected herd is set up for evaluation in FRB. If more than one diet is being feed, select the diet fed to the highest producing animals.

The tasks required to accomplish the advanced preparation may be divided amongst the group of participants. This exercise is an integral part of the program and participants will be called upon to present information on the herd and the diet.

Training Session One:

Introduction

- Introduction to CVNA team members
- Background information
- Model Vs Animal – The True Master of the Biology
- Important Questions in Commercial Production Venues
- Targets and Sight Pictures
- An Accurate Sight Picture is CRITICAL
- Animal Models and Sight Pictures
- Approaches to Modeling – Important Differences
- Animal Models and Major League Baseball
- Animal Models, Major League Baseball and Bounding Mechanisms
- Smacking the Ball out of the Park
- Clarifying the Sight Picture – RDP, MP-Lys and MP-Met
- Refactoring the NRC MP Requirement
- NRC AA sub-model Validation
- If You Edit – Re-validation Will Come!

MP-AA Balancing and NRC Science

- A review of the concepts of AA balancing
- MP-Lys & MP-Met as most limiting MP-AA
- MP-Lys & MP-Met sources
- The focus of the NRC 2001 AA sub-model

AA Balancing – Why NRC 2001?

- Introduction – fundamental concepts
- Brief review of animal model differences
- Consulting the ultimate expert
- Usable models
- Model approaches to predicting duodenal AA flows
- Predictive reliability
- How predictive reliability was built into the NRC 2001 AA sub-model
- Allowing the Master of the biology to tell her story – measured data
- Predicting passage of microbial protein to the duodenum
- Predicting flows of digestible EAA to the duodenum
- NRC 2001 data set diversity
- Predictive efficacy within the data set
- Extending the NRC 2001 AA sub-model
- Predictive reliability in the field – Farm #1
- Predictive reliability in the field – Farm #2
- Predictive reliability in the field – Farm #3

Training Session Two

Formulate2 Core Component Tools – An Introduction

This section will cover the functions of the AA and MP Calculator and how to use them to generate MP-Lys and MP-Met gram requirements for a given level of milk and milk protein production. It will also address refactoring the NRC MP requirement using the functions on Tab One of the Calculator.

We will also address using Tab Two of the Calculator to address changes in rumen fermentation by adjusting the NRC MCP yield prediction.

The final Calculator related information will address use of the functions on Tab Three of the Calculator to evaluate MP-Lys and MP-Met supplies of existing diets. These functions are used to develop a "starting point" when revising diets for AA balance.

- Introduction
- Core Component members
- Core Component updates
- The NRC Editor – Differences in NRC 2001 model implementation
- Registering Core Component installations
- The AA and MP Calculator – Background
- The Calculator and NRC 2001 AA sub-model reliability
- MP-Lys and MP-Met plots and yield equations
- Using the Calculator – Tab One
    - o Using the Calculator – Re-factoring the NRC MP requirement
- Using the Calculator – Tab Two
    - o Using the Calculator – Accounting for changes in rumen fermentation
- Using the Calculator – Tab Three
    - o Using the Calculator – Determining a starting point

We will also cover selected items related to use of the Core Component Optimizer.

Core Component Tools and NRC Science in the Field

This presentation will address using the Core Component Toolset to implement NRC 2001 science in commercial production venues and cover such topics as:

- The Three Absolutes
- Fundamental principles involved with use of the Calculator functions in determining a "Starting Point" for AA balancing.
- The goals and objectives of AA balancing
    - Maintaining current production of milk and milk components with improved efficiency
    - Opportunities to improve milk and milk component yields without increasing diet cost
    - Opportunities to address optimal yields and ROI
- Using component tools to achieve goals and objectives
    - Techniques and Tips

Reports of Pre-Training Advanced Preparation Activities

- Presentation of Data
- Observations
- Discussion

Application Exercise & Follow up arrangements

In this final segment we will use the NRC 2001 concepts and principles reviewed and discussed during training to revise the diet selected by participants in the Pre-Training Advanced Preparation exercise. This will be accomplished by using the Core Component Toolset to apply NRC science to this specific diet. This will be a group exercise with input from everyone involved.

Arrangements will be made with participants to follow up with them as the revised diet is implemented at the dairy and response data is collected.

Conclusion
Closing comments and discussion