NDS Dynamics

Time to Think Spring!!!!

The Small Ruminant Model (SR-NCPS)

By Ermanno Melli
RUM&N Sas Research & Development

The evolution of biological dynamic models is a continuous process that proceeds in parallel with our biological knowledge improvement. Rationing software must develop on the same way in order to be able to adopt more and more developed models and to meet the needs of more and more demanding and prepared nutritionists and professionals.

With the goal to move forward on the way of the development of a multi-species platform and to offer a tool able to formulate more precise rations for Small Ruminant (Sheep and Goats), RUM&N Sas released the **SR-NCPS**, acronym of **Small Ruminant Net Carbohydrate and Protein System**. It is a dynamic computer model based on the structure of the Cornell Net Carbohydrate and Protein System for Sheep, designed and developed for the evaluation of diets and the performances allowed for **Sheep** and **Goats**.

The **SR-NCPS** model simulates nutrient supply effects, rumen fermentations, intestinal digestion, absorption and metabolism on performances. Feed biological values are predicted based on carbohydrate and protein fractions and their ruminal degradation rates, forage, concentrate and liquid passage rates, microbial growth, and physically effective fiber. Particularly, the predicted supply of nutrients from each feed is driven by new solid and liquid ruminal passage rates, which are significantly different from those observed in Cattle.

The purpose of the model is to predict the requirements and the utilization of protein and energy, based on different influences that could modify demands and use of feeds for productions. Metabolizable energy and protein (ME and MP) requirements vary for animal type, environment characteristics, management and feeding system. You can use this model for your sheep and goats to: predict the effects on production from the diet, predict the effects on a digestive and metabolic level, balance and evaluate the recipe, satisfy the requirements for a variety of environmental and management conditions, predict the effects of gastrointestinal parameters and compare model evaluations with those made by traditional systems.

New RUM&N Website Presentation

By RUM&N Staff

Dear NDS Friends, we are proud to announce to you that we have completely renovated our website in order to get closer to the Users and to better communicate our main distinctive features and basic values.

The new website represents more than a simple re-styling: it is aimed to better show what RUM&N has to offer to support field nutritionists and researchers. It is a user-friendly tool where all the useful information is categorized and all links, tutorials and documents can be found in the Reserved Area. All registered Users can access their Reserved Area and automatically start the download choosing from a list of setup and updates; this way Users will have what they need when they decide, without passing through our office for links or basic information.

We also believe it will be a key communication tool for those who are not familiar with our platforms and wish for further information. All software is well described in the Software section and Free Trial versions are available for NDS Professional, Nutrimix Professional and NDS Light in the Reserved Area.

It is still a work in progress: we wish to reach all our customer's needs, as in our daily work with NDS Professional and the other software. Soon, there will be a Newsletter section – where you will find all past Newsletters and an Online Instructions Manual on how to better use and take advantage of the platform.

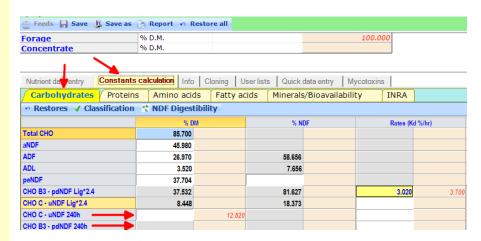In the meantime, we invite you to register and create your account on www.rumen.it!

Changing uNDF in NDS
By Buzz Burhans, Ph.D.
NDS NA Staff

NDS users might have noticed some changes involving uNDF (<u>undigestible</u> <u>NDF</u>, CHO C) on recent NDS updates. For instance, on the "Constants calculation" tab of the Feed Analysis screen, the "Carbohydrates" sub-tab now shows two alternative fields for uNDF and pdNDF (<u>potentially digestible NDF</u>), *i.e.* (total aNDF - uNDF), *Figure 1* below. The current version of these fields is shown first (with labels ending in "Lig*2.4"); the current version estimates these values using a calculated value for uNDF of lignin*2.4. A second version of uNDF, with labels ending in "240h", is now visible below those original fields. These new fields will hold laboratory analytical values for the uNDF, which is determined as the NDF remaining undigested after a digestibility assay run to 240 hours. The material remaining undigested at 240 hours is assumed represent the undigestible portion of the NDF, remaining undigested even if the digestion went on to infinite time.
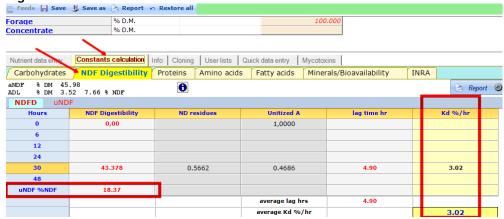

The reason for adding the uNDF 240h fields to NDS is that upcoming changes in the estimation of the digestion rate for NDF (Kd) used in the CNCPS model will use the uNDF 240h values to derive the NDF Kd (*i.e.* CHO B3 Kd) instead of uNDF 2.4*Lig, which has been used in all previous versions of CNCPS. Work by Mike Van Amburgh's group at Cornell has already shown that this will improve the accuracy of the model, and they are continuing to refine the algorithm for predicting CHO B3 rates using uNDF 240h.

 The ability to recalculate the Kd of feeds is already implemented in NDS; doing so requires a digestibility value at a given hour, requires knowing the appropriate lag time for the lab that did digestibility assay, and knowing the uNDF (*Figure 2* below). NDS currently uses the lignin value (ADL) to calculate the estimated uNDF. When the new rates algorithms are finalized from Cornell and implemented into the CNCPS model, the uNDF 240h from the lab will be used instead. uNDF 240h is currently available from some, but not all, forage analysis labs, and in the December update NDS implemented the ability to import this value when feed analyses are imported. Note that even though NDS can now import the uNDF 240h, rates are still being calculated using the uNDF Lig*2.4 until the Cornell group releases a new algorithm for the rate determination.

Furthermore, in the future the CNCPS model will use a three pool NDF fractioning system (fast, slow, and undigestible) instead of the current 2 pool system (uNDF and potentially digestible NDF), which will provide improved estimates of NDF digestion. The NDS software team is working to be fully prepared to implement these new changes when they are released, thus as new model elements such as this are made available NDS is incorporating them right away to speed the implementation and testing when they are finally fully deployed by Cornell.

Figure 1

Another location that uNDF appears in NDS is the on the ration page, where it is expressed as a percent of bodyweight. (*Figure 3* below) This value is useful for assessing rumen fill, especially when considered with the value for NFDi %BW to the right of it on the screen.

Figure 2

Because rumen function is critical to what we do as practicing nutritionists, in addition to showing uNDFI as described above, The RU.M.&N group (producer of NDS software) also gives us some insight into the ruminal environment. Both the ruminal VFA production and rumen pH predictions are on the right side of the "Rumen" tab on the lower right quadrant of the ration screen (*Figure 4* below). Unique to NDS, info on this tab, combined with uNDFI, can be a great asset for monitoring rumen factors affecting performance and is very useful for troubleshooting as well.

Figure 3