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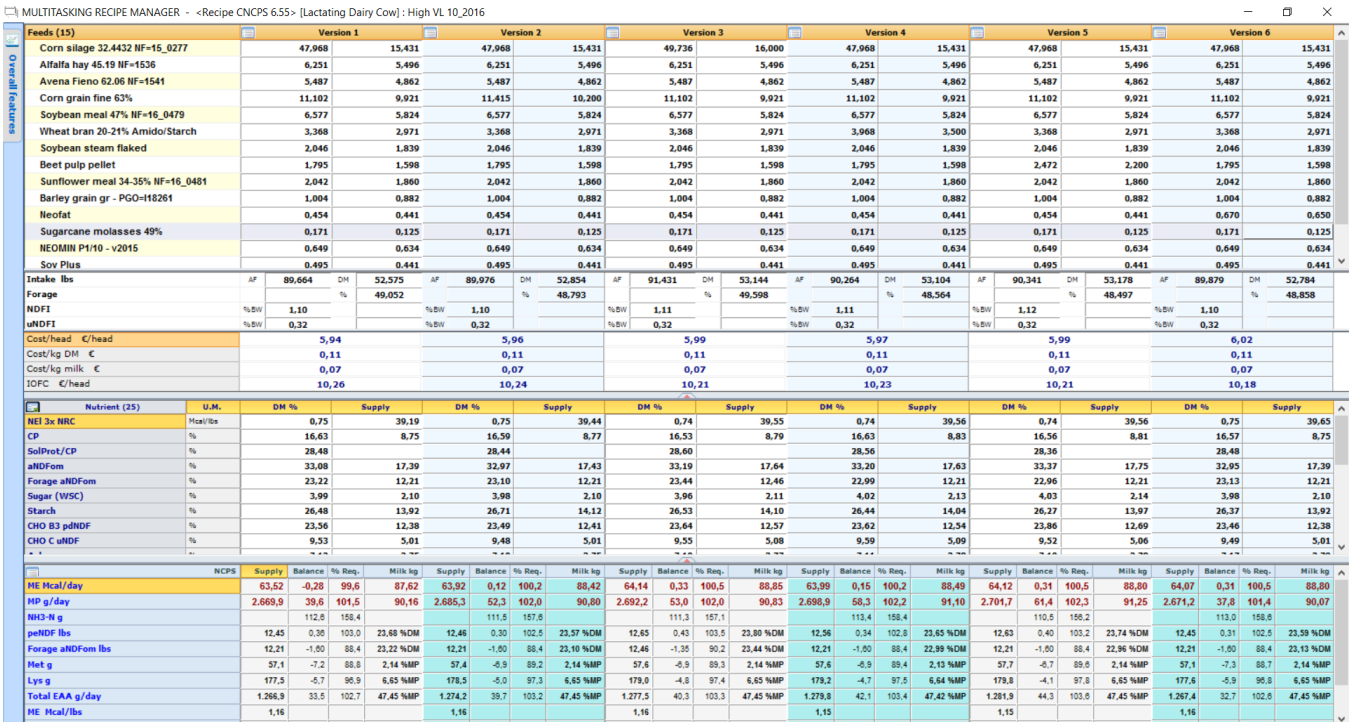
NDS Multitasking Recipes Manager

By RUM&N Staff

By definition, the word **multitasking** describes a concept of performing multiple tasks (processes) over a certain period of time by executing them concurrently. New tasks start and interrupt already started ones before they have reached completion, instead of executing the tasks sequentially so each started task needs to reach its end before a new one is started. As a result, one executes segments of multiple tasks in an interleaved manner, while the tasks share common processing resources.

Multitasking does not necessarily mean that multiple tasks are executing at exactly the same time (simultaneously), but it imply some level of parallel execution. In other words, it does mean that more than one task can be part-way through execution at the same time, and that more than one task is advancing over a given period of time.
Applying to ration formulation the concepts described above, with the aim of providing new operational procedures, the development group at RUM&N, designed a new and alternative approach to recipe formulation called **Multitasking Recipes Manager**.

The tool is designed to actively compare, side by side, several versions of a given recipe formulated for a specific animal type. From a functional standpoint, every time you change something relate to feed type, feed amounts, feed costs or animal type (animal inputs, activity, environment) for a specific version, the system runs all the calculations and the outputs of that specific version will be updated, while the other versions will remain unchanged. Through this approach, it is possible to dynamically compare, in a single screen, what impact specific inputs may have compared to others, dramatically increasing productivity and the decision-making process of the formulation.


MULTITASKING RECIPE MANAGER - <Recipe CNCPS 6.55> [Lactating Dairy Cow] : High VL 10_2016

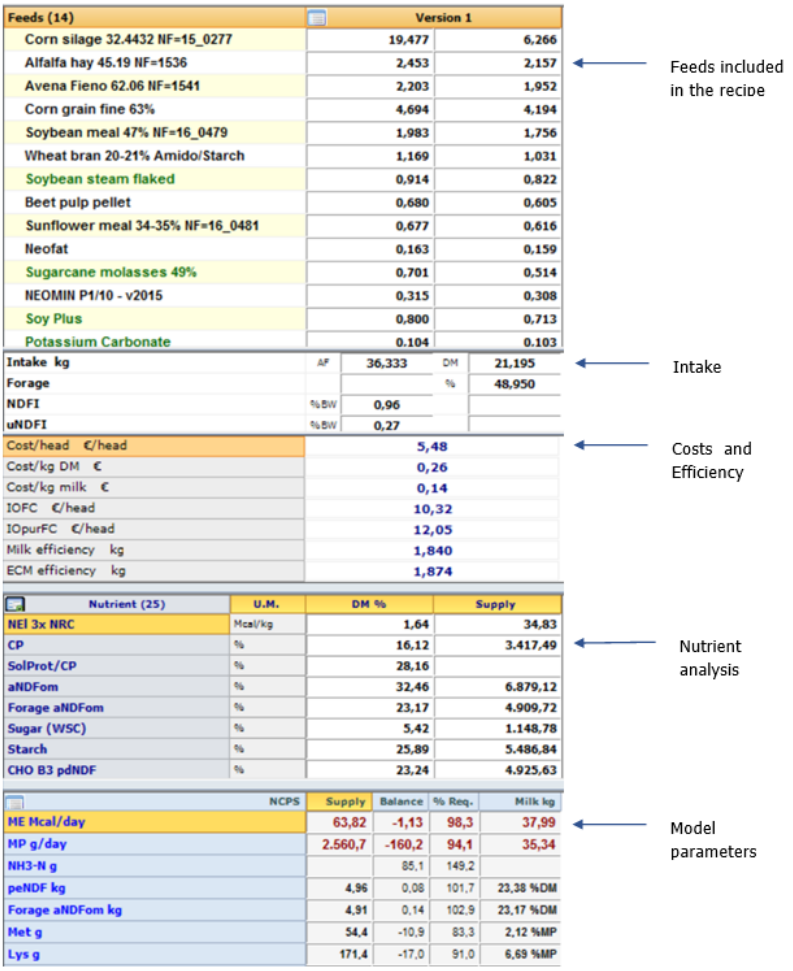
Feeds (15)	Version 1		Version 2		Version 3		Version 4		Version 5		Version 6	
Corn silage 32.4432 NF=15_0277	47,968	15,431	47,968	15,431	49,736	16,000	47,968	15,431	47,968	15,431	47,968	15,431
Alfalfa hay 45.19 NF=1536	6,251	5,496	6,251	5,496	6,251	5,496	6,251	5,496	6,251	5,496	6,251	5,496
Avena Fieno 62.06 NF=1541	5,487	4,862	5,487	4,862	5,487	4,862	5,487	4,862	5,487	4,862	5,487	4,862
Corn grain fine 63%	11,102	9,921	11,415	10,200	11,102	9,921	11,102	9,921	11,102	9,921	11,102	9,921
Soybean meal 47% NF=16_0479	6,577	5,824	6,577	5,824	6,577	5,824	6,577	5,824	6,577	5,824	6,577	5,824
Wheat bran 20-21% Amido/Starch	3,368	2,971	3,368	2,971	3,368	2,971	3,968	3,500	3,368	2,971	3,368	2,971
Soybean steam flaked	2,046	1,839	2,046	1,839	2,046	1,839	2,046	1,839	2,046	1,839	2,046	1,839
Beet pulp pellet	1,795	1,598	1,795	1,598	1,795	1,598	1,795	1,598	2,472	2,200	1,795	1,598
Sunflower meal 34-35% NF=16_0481	2,042	1,860	2,042	1,860	2,042	1,860	2,042	1,860	2,042	1,860	2,042	1,860
Barley grain gr - PGO=18261	1,004	0,882	1,004	0,882	1,004	0,882	1,004	0,882	1,004	0,882	1,004	0,882
Neofat	0,454	0,441	0,454	0,441	0,454	0,441	0,454	0,441	0,454	0,441	0,670	0,650
Sugarcane molasses 49%	0,171	0,125	0,171	0,125	0,171	0,125	0,171	0,125	0,171	0,125	0,171	0,125
NEOMIN P1/10 - v2015	0,649	0,634	0,649	0,634	0,649	0,634	0,649	0,634	0,649	0,634	0,649	0,634
Sov Plus	0,495	0,441	0,495	0,441	0,495	0,441	0,495	0,441	0,495	0,441	0,495	0,441
Intake lbs	AF 89,664	DM 52,575	AF 89,976	DM 52,854	AF 91,431	DM 53,144	AF 90,264	DM 53,104	AF 90,341	DM 53,178	AF 89,879	DM 52,784
Forage		% 49,052		% 48,793		% 49,598		% 48,564		% 48,497		% 48,858
NDFI	%BW 1,10		%BW 1,10		%BW 1,11		%BW 1,11		%BW 1,12		%BW 1,10	
uNDFI	%BW 0,32		%BW 0,32		%BW 0,32		%BW 0,32		%BW 0,32		%BW 0,32	
Cost/head €/head	5,94		5,96		5,99		5,97		5,99		6,02	
Cost/kg DM €	0,11		0,11		0,11		0,11		0,11		0,11	
Cost/kg milk €	0,07		0,07		0,07		0,07		0,07		0,07	
IOFC €/head	10,26		10,24		10,21		10,23		10,21		10,18	

Nutrient (25)	U.M.	DM %	Supply	DM %	Supply	DM %	Supply	DM %	Supply	DM %	Supply	DM %	Supply
NEl 3x NRC	Mcal/lbs	0,75	39,19	0,75	39,44	0,74	39,55	0,74	39,56	0,74	39,56	0,75	39,65
CP	%	16,63	8,75	16,59	8,77	16,53	8,79	16,63	8,83	16,56	8,81	16,57	8,75
SolProt/CP	%	28,48		28,44		28,60		28,56		28,36		28,48	
aNDFom	%	33,08	17,39	32,97	17,43	33,19	17,64	33,20	17,63	33,37	17,75	32,95	17,39
Forage aNDFom	%	23,22	12,21	23,10	12,21	23,44	12,46	22,99	12,21	22,96	12,21	23,13	12,21
Sugar (WSC)	%	3,99	2,10	3,98	2,10	3,96	2,11	4,02	2,13	4,03	2,14	3,98	2,10
Starch	%	26,48	13,92	26,71	14,12	26,53	14,10	26,44	14,04	26,27	13,97	26,37	13,92
CHO B3 pdNDF	%	23,56	12,38	23,49	12,41	23,64	12,57	23,62	12,54	23,86	12,69	23,46	12,38
CHO C uNDF	%	9,53	5,01	9,48	5,01	9,55	5,08	9,59	5,09	9,52	5,06	9,49	5,01

NCPS	Supply	Balance	% Req.	Milk kg	Supply	Balance	% Req.	Milk kg	Supply	Balance	% Req.	Milk kg	Supply	Balance	% Req.	Milk kg	Supply	Balance	% Req.	Milk kg	Supply	Balance	% Req.	Milk kg
ME Mcal/day	63,52	-0,28	99,6	87,62	63,92	0,12	100,2	88,42	64,14	0,33	100,5	88,85	63,99	0,15	100,2	88,49	64,12	0,31	100,5	88,80	64,07	0,31	100,5	88,80
MP g/day	2.669,9	39,6	101,5	90,16	2.685,3	52,3	102,0	90,80	2.692,2	53,0	102,0	90,83	2.698,9	58,3	102,2	91,10	2.701,7	61,4	102,3	91,25	2.671,2	37,8	101,4	90,07
NH3-N g		112,6	158,4			111,5	157,6			111,3	157,1			113,4	158,4			110,5	156,2			113,0	158,6	
peNDF lbs	12,45	0,36	103,0	23,68 %DM	12,46	0,30	102,5	23,57 %DM	12,65	0,43	103,5	23,80 %DM	12,56	0,34	102,8	23,65 %DM	12,63	0,40	103,2	23,74 %DM	12,45	0,31	102,5	23,59 %DM
Forage aNDFom lbs	12,21	-1,60	88,4	23,22 %DM	12,21	-1,60	88,4	23,10 %DM	12,46	-1,35	90,2	23,44 %DM	12,21	-1,60	88,4	22,99 %DM	12,21	-1,60	88,4	22,96 %DM	12,21	-1,60	88,4	23,13 %DM
Met g	57,1	-7,2	88,8	2,14 %MP	57,4	-6,9	89,2	2,14 %MP	57,6	-6,9	89,3	2,14 %MP	57,6	-6,9	89,4	2,13 %MP	57,7	-6,7	89,6	2,14 %MP	57,1	-7,3	88,7	2,14 %MP
Lys g	177,5	-5,7	96,9	6,65 %MP	178,5	-5,0	97,3	6,65 %MP	179,0	-4,8	97,4	6,65 %MP	179,2	-4,7	97,5	6,64 %MP	179,8	-4,1	97,8	6,65 %MP	177,6	-5,9	96,8	6,65 %MP
Total EAA g/day	1.266,9	33,5	102,7	47,45 %MP	1.274,2	39,7	103,2	47,45 %MP	1.277,5	40,3	103,3	47,45 %MP	1.279,8	42,1	103,4	47,42 %MP	1.281,9	44,3	103,6	47,45 %MP	1.267,4	32,7	102,6	47,45 %MP
ME Mcal/lbs	1,16				1,16				1,16				1,15				1,15				1,16			

Given the ability of the **Multitasking Recipes Manager** to allows modification and evaluation of multiple versions of a recipe on the same screen to new tabs, it is very useful, for example, for revising diets, developing comparative proposals

for alternate ration strategies, or formulating bids for multiple manufacturers with different products (for instance one with Protein Blend A vs another with Protein Blend B vs another with Protein Blend C).



Feeds (14)	Version 1	
Corn silage 32.4432 NF=15_0277	19,477	6,266
Alfalfa hay 45.19 NF=1536	2,453	2,157
Avena Fieno 62.06 NF=1541	2,203	1,952
Corn grain fine 63%	4,694	4,194
Soybean meal 47% NF=16_0479	1,983	1,756
Wheat bran 20-21% Amido/Starch	1,169	1,031
Soybean steam flaked	0,914	0,822
Beet pulp pellet	0,680	0,605
Sunflower meal 34-35% NF=16_0481	0,677	0,616
Neofat	0,163	0,159
Sugarcane molasses 49%	0,701	0,514
NEOMIN P1/10 - v2015	0,315	0,308
Soy Plus	0,800	0,713
Potassium Carbonate	0.104	0.103

Intake kg	AF	36,333	DM	21,195
Forage			%	48,950
NDFI	%BW	0,96		
uNDFI	%BW	0,27		

Cost/head €/head	5,48
Cost/kg DM €	0,26
Cost/kg milk €	0,14
IOFC €/head	10,32
IOpurFC €/head	12,05
Milk efficiency kg	1,840
ECM efficiency kg	1,874

Nutrient (25)	U.M.	DM %	Supply
NEl 3x NRC	Mcal/kg	1,64	34,83
CP	%	16,12	3.417,49
SolProt/CP	%	28,16	
aNDFom	%	32,46	6.879,12
Forage aNDFom	%	23,17	4.909,72
Sugar (WSC)	%	5,42	1.148,78
Starch	%	25,89	5.486,84
CHO B3 pdNDF	%	23,24	4.925,63

NCPS	Supply	Balance	% Req.	Milk kg
ME Mcal/day	63,82	-1,13	98,3	37,99
MP g/day	2.560,7	-160,2	94,1	35,34
NH3-N g		85,1	149,2	
peNDF kg	4,96	0,08	101,7	23,38 %DM
Forage aNDFom kg	4,91	0,14	102,9	23,17 %DM
Met g	54,4	-10,9	83,3	2,12 %MP
Lys g	171,4	-17,0	91,0	6,69 %MP

Feeds included in the recipe

Intake

Costs and Efficiency

Nutrient analysis

Model parameters

The main Multitasking screen is organized in five sections, each with its specific data:

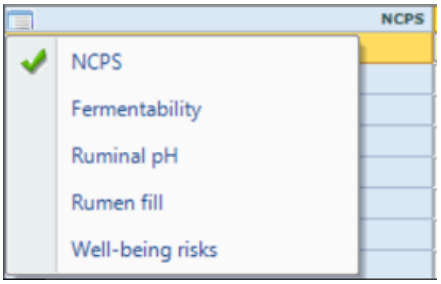
- Feeds included in the recipe
- Intake
- Costs and Efficiency
- Nutrient analysis
- Model parameters
  - NCPS summary
  - Fermentability
  - Rumen Ph
  - Rumen fill
  - Well-being risks

In order to facilitate the management of the Multitasking screen, data are also organized by columns; if we consider the first section, the first column contains the list of the ingredients of the recipe, beside it there are two columns with the AF and DM amounts of the ingredients. These two columns are grouped and labelled Version 1, and their data match those of the initial recipe until some changes are made. It is possible to add further versions, labelled Version 2, Version 3, etc., by right clicking on the header of any existing version.When more than one version is displayed, data are shown with an alternate color of the background, to enhance their relation to a specific version:

Feeds (15)	Version 1		Version 2		Version 3	
Corn silage 32.4432 NF=15_0277	21,758	7,000	23,314	7,500	20,205	6,50
Alfalfa hay 45.19 NF=1536	2,835	2,493	2,835	2,493	2,835	2,49
Avena Fieno 62.06 NF=1541	2,489	2,205	2,489	2,205	2,489	2,20
Corn grain fine 63%	5,036	4,500	5,036	4,500	5,595	5,00
Soybean meal 47% NF=16_0479	2,983	2,642	2,983	2,642	2,983	2,64
Wheat bran 20-21% Amido/Starch	1,528	1,348	1,528	1,348	1,528	1,34
Soybean steam flaked	0,928	0,834	0,928	0,834	0,928	0,83
Beet pulp pellet	0,814	0,725	0,814	0,725	0,814	0,72
Sunflower meal 34-35% NF=16_0481	0,926	0,844	0,926	0,844	0,926	0,84
Barley grain gr - PGO=I18261	0,456	0,400	0,456	0,400	0,456	0,40
Neofat	0,206	0,200	0,206	0,200	0,206	0,20
Sugarcane molasses 49%	0,078	0,057	0,078	0,057	0,078	0,05
NEOMIN P1/10 - v2015	0,294	0,288	0,294	0,288	0,294	0,28
Soy Plus	0.224	0.200	0.224	0.200	0.224	0.200
Intake kg	AF 40,671	DM 23,848	AF 42,226	DM 24,348	AF 39,677	DM 23,848

While the topmost two sections are designed to accept inputs to modify feed amounts, on as fed or dry matter basis, or the total intake of the recipe, the other three are for output only.

The model section can be customized in order to contain different sets of data, selectable with a context menu:



These sets of data are organized and displayed as in the main recipe screen.

Multitasking comes with many features able to support an efficient formulation work:

Creating and modifying versions: the first version (Version 1) contains data of the initial recipe. The most useful feature of Multitasking is the capability to manage more versions at the same time (side by side). This allows comparative formulation of different recipes that share a common set of ingredients, but can have different amounts for their ingredients in each version. The change of a certain amount and the consequential changes to the recipe evaluation can be observed in the output sections, giving a clear picture of its impact on analytical values, costs and model parameters.
Managing composites: If the initial recipe has composites in its ingredients list, these can be are displayed. The overall amount of the mix is still visible, along with the AF and DM amounts of its ingredients. Every time the amounts of the ingredients of the composite are edited, this is re-formulated, with changes to its overall amount, percent composition, analysis and cost. When the overall amount of the composite is changed, the amounts of its ingredients are also changed, according to their current percent inclusion. Changing the amounts of ingredients in a certain version, affects the composite and recipe values in that version only; so making different changes in different versions, is like having different composites for each version.
Ingredients list commands: there are some basic operation to manage the ingredient list and these commands work much like the corresponding commands in the recipe screen.
Feed costs management: If the costs of some ingredients need to be changed, it is possible to change the visualization of the screen in order to allow the change of the individual cost or cost origin of each ingredient. Since the amounts of the ingredients can change among different versions, we have a column for each version to show the related differences in terms of costs. Any change to a cost of an ingredient determines the update of the total costs of each version of the recipe.
Animal Inputs: a detailed view of the Animal input parameters is available. The grids are like those in the Animal Inputs tab of the recipe screen; each version can have its own set of parameters, since it is possible to edit the parameters of each version independently.
Multiple saving: the feature allows to save a selection of the versions as new recipes. Some descriptive data of the versions are changeable: name, description, ID Codes and notes. Initially, these descriptions match those of the recipe of origin but it is worth to change this information before saving, If the initial recipe is assigned to a pen of a farm, the resulting new recipes will also be assigned to that pen. The program will assign a new ID code automatically.
Comparing different versions with the comparisons tool of the recipe: it is possible to send a selected set of versions to the comparisons tool of the recipe screen. Each selected version becomes a different snapshot, which can be compared with the other stored snapshots (including the one obtained from the original recipe).
Settings: it is possible to set some setting about which data are displayed; these settings are saved when closing the Multitasking panel and kept the next time the feature is used again. The settings are related to costs or efficiency, nutrient and model parameters.
Reports: you can print three types of report: *Overall report* with all the recipes formulated on the Multitasking, *Recipe report* with one version of the version in a single, and *Multiple report* with recipes selected among the different versions.

Send us your comments on these topics! What do you think about the best and easiest ways for consultants to handle nutritional economics? Dave is at rumendvm@gmail.com; Buzz is at bburhans@dairynutritionhealth.com

Check the NDS-NA Facebook page for the latest information on NDS features

https://www.facebook.com/rumenNDSpro/

Note that the features and utilities developed by the NDS team described above are not components of the underlying CNCPS model, and do not change the CNCPS outputs or results. *Questions about use of these features should be directed to the NDS support team, and not to the CNCPS group at Cornell*

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