

# AgNext FACT for Dairy User Guide

The AgNext Feed Additive Calculator Tool (FACT) for Dairy is intended to be a tool for producers to estimate methane emissions in dairy cows and also to make decisions about feed additives on their operations. This user guide will define each of the inputs within the AgNext FACT for Dairy. Please refer to the [video tutorial](#) for an in-depth demonstration on how to use and understand the tool.

- **Inputs**
  - **Rations**
    - Dry matter intake: pounds of dry matter per head per day
    - NDF: See the “Finding NDF Content of Lactating Dairy Cow Rations” instructions beginning on page 3.
    - Ration cost: costs of rations per head per day
  - **Performance**
    - Body weight: Input the starting weight of the animal
    - Average daily gain: Rough estimate of how much the animal is gaining per day
  - **Milk Production and Composition**
    - Milk production: Input the pounds per day
    - Milk fat: Input as a percentage
    - Milk protein: Input as a percentage
    - Other milk solids: Input as a percentage
  - **Milk Prices:** latest USDA prices can be found [here](#)
    - Milk pool price: Input price divided by hundred-weight
    - Butterfat price: Input as price divided by pounds
    - Other solids price: Input as price divided by pounds
    - Other premiums: Input as price divided by pounds
  - **Feed Additives:** can be inputted for user to understand different percent reductions
    - Estimated impact on methane production: Percent difference from baseline. Reduction should be inputted as a negative percentage
    - Estimated impact on dry matter intake: Can put in positive or negative numbers
    - Estimated impact on milk production: Can be neutral, positive, or negative
    - New milk fat yield: New estimate of milk fat yield given additive use
    - Milk protein yield: New estimate of milk protein yield given additive use
    - New milk other solids: New estimate of other solids yield given additive use
    - Additive costs: Can be inputted to understand how feed additive costs can impact an operation
    - Carbon price: Looks at the actual price of what one would be paid for reducing emissions.
      - More resources about carbon prices can be found at:
        - <https://carboncredits.com/carbon-prices-today/>
        - <https://agnext.colostate.edu/carbon-markets/>



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# AgNext FACT for Dairy User Guide

- **Outputs**

- Baseline scenario: Shown in green
- Additive scenario: Shown in orange

- **Charts**

- Total enteric emissions as pounds of CO<sub>2</sub>e per head per day
  - Can see the baseline scenario in green compared to the additive scenario in orange. Can see how the usage of a feed additive impacts methane emissions compared to the baseline.
- Total enteric emissions as pounds of CO<sub>2</sub>e over hundred-weight
  - Can see the baseline scenario in green compared to the additive scenario in orange. Similar to above, but looking at pounds of CO<sub>2</sub>e over hundred-weight.
- Total enteric emissions kg CO<sub>2</sub>e per kilogram of fat and protein corrected milk
  - Can see the baseline scenario in green compared to the additive scenario in orange. Similar to above, but looking at kg CO<sub>2</sub>e per kilogram of fat and protein corrected milk.
- Income over feed costs: price over hundred-weight
  - Based on the economic inputs entered into the form this chart show what the actual cash in/cash out is in the given scenario comparing the baseline in green with the additive scenario in orange.
- Gross margin: shows the difference between the baseline scenario and feed additive scenario. If this amount is shown in red, that would indicate that one is losing money on that feed additive scenario. If it is shown in green, that means an individual is making money in the given scenario.

Visit [agnext.colostate.edu/dairy-fact](https://agnext.colostate.edu/dairy-fact) for a detailed instructional video and more information about the AgNext FACT for Dairy

## Connect with AgNext



**AgNext**

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# Finding NDF Content of Lactating Dairy Cow Rations

This document covers finding the NDF content of dairy rations for the most common feeding management programs and feed analysis results. If you are using one of these programs, follow the steps to find the value.

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# AMTS.Cattle Professional Management Console

**Step 3.** Find the cell titled “Forage NDF (% DM)”. Input this value into cell D18 of the AgNext Feed Additive Calculator Tool (FACT) for Dairy.

AMTS.Cattle.Professional (Sample Lactating Dairy Farm)

File View Tools Windows Help

Home Tree Create Farm Open Farm Farm

Group/Ration Comparison Report

90% Page 1 of 1

AMTS

### Group/Ration Comparison Report

Group	mid_group
Barn/Lot	Main Barn
Ration	mid_group recipes
Inputted DMI	51.100
Predicted DMI	49.230
Inputted/Predicted DMI	103.8
ME (% Rqd)	104.9
MP (% Rqd)	100.2
Inputted Milk	77.0
ME Allowable Milk	82.7
MP Allowable Milk	77.2
ME Allowable Milk/DMI	1.62
MP Allowable Milk/DMI	1.51
ME Allowable Gain	N/A
MP Allowable Gain	N/A
DMI/ME Allowable Gain	N/A
DMI/MP Allowable Gain	N/A
Diet CP (%DM)	18.5
Diet RUP (%DM)	6.2
<b>Forage NDF (%DM)</b>	<b>24.3</b>
Forage NDF (%BW)	0.86
Forage NDF (%NDF)	84.5
aNDFom (%BW)	1.01
Bacterial MP (% Total MP)	51.7
EE (%DM)	5.5
peNDF (%DM)	20.6
aNDFom (%DM)	28.7
Peptide (% Rqd)	262
NH3 (% Rqd)	207
MET (% Rqd)	97
LYS (% Rqd)	100
Ca (% Rqd)	93
P (% Rqd)	99



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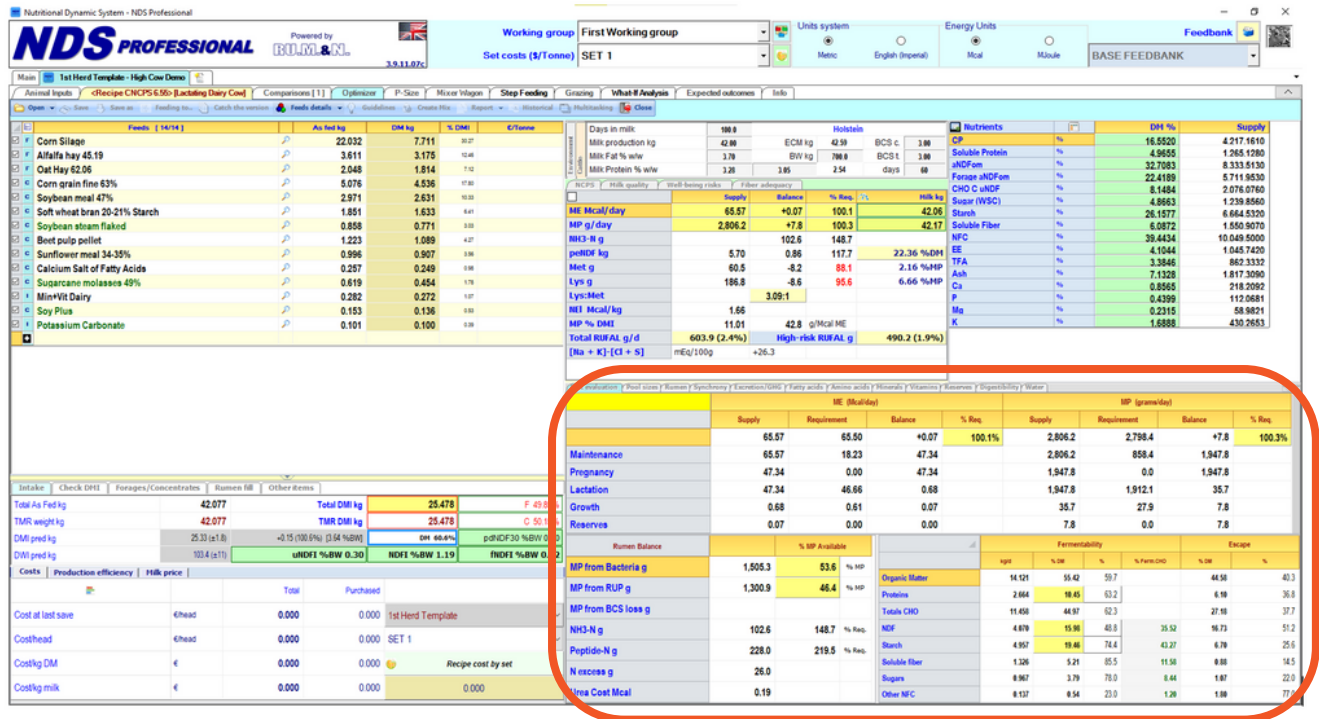
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# National Dynamic System – NDS Professional

Step 1. From the “Main” tab, select the lactating cow ration from the barn



Step 2. Locate the diet evaluation.



# National Dynamic System – NDS Professional

**Step 3.** Under Fermentability, find the NDF content as a percentage of dry matter.

Diet evaluation / Pool sizes / Rumen / Synchrony / Excretion/GHG / Fatty acids / Amino acids / Minerals / Vitamins / Reserves / Digestibility / Water										
	ME (Mcal/day)				MP (grams/day)					
	Supply	Requirement	Balance	% Req.	Supply	Requirement	Balance	% Req.		
	65.57	65.50	+0.07	100.1%	2,806.2	2,798.4	+7.8	100.3%		
Maintenance	65.57	18.23	47.34		2,806.2	858.4	1,947.8			
Pregnancy	47.34	0.00	47.34		1,947.8	0.0	1,947.8			
Lactation	47.34	46.66	0.68		1,947.8	1,912.1	35.7			
Growth	0.68	0.61	0.07		35.7	27.9	7.8			
Reserves	0.07	0.00	0.00		7.8	0.0	7.8			
Rumen Balance		% MP Available			Fermentability			Escape		
MP from Bacteria g	1,505.3	53.6	% MP		kg/d	% DM	%	% Fems CHO	% DM	%
MP from RUP g	1,300.9	46.4	% MP		Organic Matter	14.121	55.42	59.7	44.58	40.3
MP from BCS loss g					Proteins	2.664	10.45	63.2	6.10	36.8
NH3-N g	102.6				Totals CHO	11.458	44.97	62.3	27.16	37.7
Peptide-N g	228.0	219.5	% Req.		NDF	4.070	15.90	48.8	35.52	16.73
N excess g	26.0				Starch	4.957	19.46	74.4	43.27	6.70
Urea Cost Mcal	0.19				Soluble fiber	1.326	5.21	85.5	11.58	0.88
					Supars	0.967	3.79	78.0	8.44	1.07
					Other NFC	0.137	0.54	23.0	1.20	1.80



**Step 4.** Input the NDF (% DM) into cell D18 of the AgNext Feed Additive Calculator Tool (FACT) for Dairy.

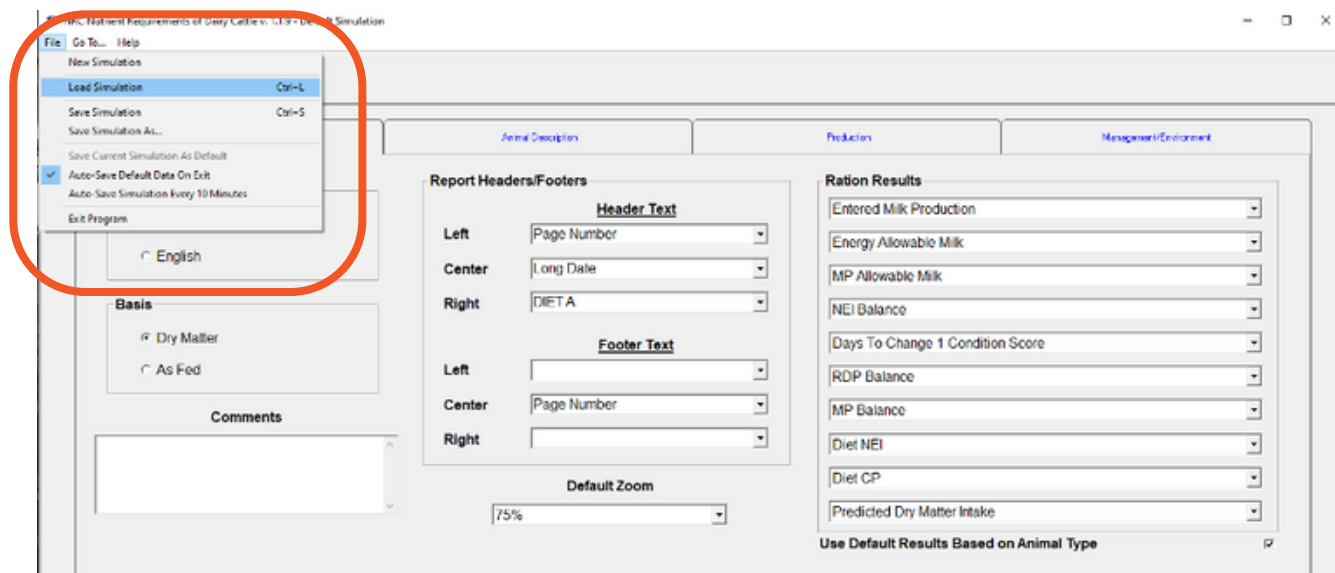


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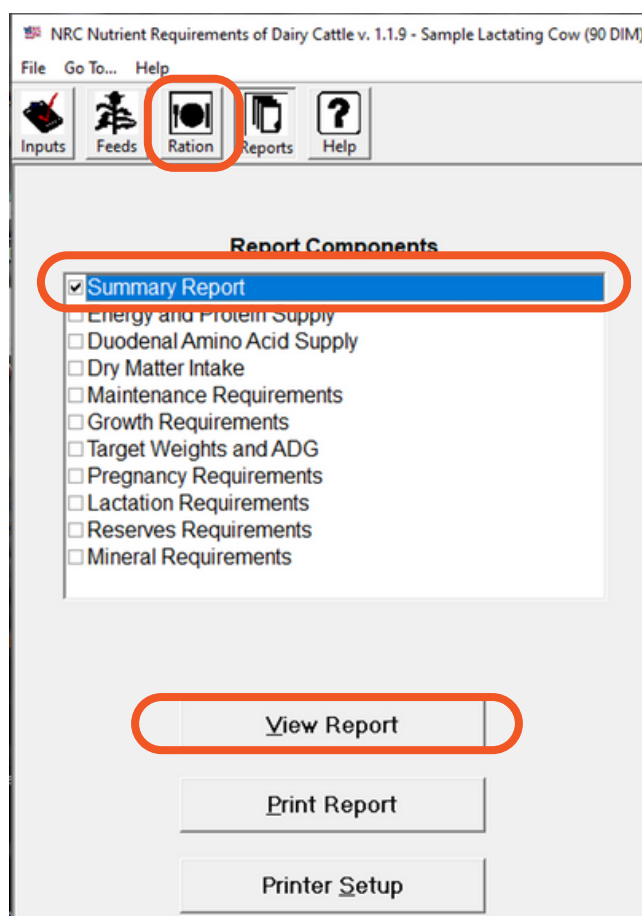
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# NRC Nutrient Requirements of Dairy Cattle

**Step 1.** Load the appropriate simulation file.



**Step 2.** Select the Reports tab and check the Summary Report line from the list and view report.



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# NRC Nutrient Requirements of Dairy Cattle

**Step 3.** In the Summary Report, locate the second page of the report

**Report Components**

- Summary Report
- Energy and Protein Supply
- Duodenal Amino Acid Supply
- Dry Matter Intake
- Maintenance Requirements
- Growth Requirements
- Target Weights and ADG
- Pregnancy Requirements
- Lactation Requirements
- Reserves Requirements
- Mineral Requirements

**Summary Report**

**Animal Inputs**

Animal Type: Lactating Cow  
 Age: 65 months  
 Body Weight: 610 kg  
 Milk Fat: 3.50%  
 Days in Milk: 90

Milk Production: 54.5 (g/day)  
 Days Pregnant: 0  
 Breed: Holstein  
 Milk True Protein: 3.00%

**Diet Nutrient Balances**

Requirements	NE1 (Mcal/kg)	MP (g/kg)	Ca (g/kg)	P (g/kg)	K (g/kg)
Maintenance	10.7	1899	22	11	209
Pregnancy	0.0	0	0	0	0
Lactation	37.7	3440	66	19	82
Growth	0.0	0	0	0	0
<b>Total Required</b>	<b>48.5</b>	<b>2479</b>	<b>88</b>	<b>30</b>	<b>291</b>
<b>Total Supplied</b>	<b>47.4</b>	<b>1270</b>	<b>92*</b>	<b>30*</b>	<b>353*</b>
<b>Balance</b>	<b>-0.9</b>	<b>-200</b>	<b>4</b>	<b>0</b>	<b>61</b>

\* Note that these values are total values, not supplied.

**Animal Performance**

DMI - Actual: 30.0 (g/day)  
 DMI - Predicted: 30.0 (g/day)

NE1 Allowable Milk: 53.2 (kg/day)  
 MP Allowable Milk: 50.0 (kg/day)

Milk Production: 54.5 (g/day)

Days to lose one condition score: > 301

Daily Weight Change due to Reserves: -0.2 (g/day)

**Protein Values**

RDP Required: 2955 (g/d)  
 RDP Supplied: 2679 (g/d)  
 RDP Balance: -276 (g/d)

RUP Required: 2109 (g/d)  
 RUP Supplied: 1871 (g/d)  
 RUP Balance: -238 (g/d)

MP - Bacterial: 1566 (g/d)  
 MP - RUP: 1571 (g/d)  
 MP - Endogenous: 142 (g/d)

CP - Diet: 15.8 (%DM)  
 CP - RDP: 9.6 (%DM)  
 CP - RUP: 6.2 (%DM)

**Step 4.** Under Diet Concentrations, locate NDF

**Report Components**

- Summary Report
- Energy and Protein Supply
- Duodenal Amino Acid Supply
- Dry Matter Intake
- Maintenance Requirements
- Growth Requirements
- Target Weights and ADG
- Pregnancy Requirements
- Lactation Requirements
- Reserves Requirements
- Mineral Requirements

**Diet Concentrations**

NDF: 31.2 (%DM)  
 Forage NDF: 24.5 (%DM)  
 ADP: 20.6 (%DM)  
 NFC: 42.9 (%DM)  
 Undegraded TDN: 75 (%DM)  
 ME: 2.48 (Mcal/kg DM)  
 NE1: 1.58 (Mcal/kg DM)  
 NEg: 1.19 (Mcal/kg DM)  
 Ca: 0.6 (%DM)  
 P: 0.4 (%DM)  
 Ethanol-Soluble: 6.0 (%DM)  
 DCAD: 170 (mEq/kg)

**Target Diet Concentrations**

NE1: 1.61 (Mcal/kg)  
 MP: 116 (g/kg)  
 Ca: 3 (g/kg)  
 P: 3 (g/kg)

**Diet Summary**

Feed Name	kg/day (Dry Matter)	kg/day (As Fed)	g (Dry Matter)
Lehrman Forage 18% moisture	5.41	6.43	18.02
Com Silage normal	17.01	17.92	59.99
Com Grain, steam flaked	8.61	7.90	27.71
Calcium soap of fatty acids	0.30	0.31	1.00
Lactogen	0.30	0.30	1.00
Colostrum, whole milk fat	2.17	2.20	7.19
Soybean Meal, 48% CP	2.40	2.68	7.90
Blood Meal, ring dried	0.13	0.17	0.50
Calcium Carbonate	0.04	0.04	0.10
3-hydroxyisovaleryl-threonine (1:1:1:0)	0.06	0.06	0.20
Salt	0.15	0.15	0.50
Vitamin premix 1	0.16	0.16	0.50



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# NRC Nutrient Requirements of Dairy Cattle

**Step 5.** Input the NDF (% DM) into cell D18 of the AgNext Feed Additive Calculator Tool (FACT) for Dairy.

### Diet Concentrations

NDF: 31.2 (%DM)  
 Forage NDF: 24.5 (%DM)  
 ADF: 20.6 (%DM)  
 NFC: 42.9 (%DM)  
 Undiscounted TDN: 75 (%DM)  
 ME: 2.48 (Mcal/kg DM)  
 NE1: 1.58 (Mcal/kg DM)  
 NEg: 1.19 (Mcal/kg DM)  
 Ca: 0.6 (%DM)  
 P: 0.4 (%DM)  
 Ether-Extract: 6.0 (%DM)  
 DCAD: 170 (mEq/kg)

### Target Diet Concentrations

NE1: 1.61 (Mcal/kg)  
 MP: 116 (g/kg)  
 Ca: 3 (g/kg)  
 P: 3 (g/kg)

### Diet Summary

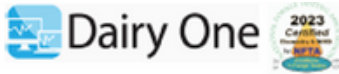
Feed Name	kg/day (Dry Matter)	kg/day (As-Fed)	% (Dry Matter)
Legume Forage Hay, immature	5.41	6.43	18.02
Corn Silage, normal	12.01	34.22	39.99
Com Grain, steam-flaked	6.61	7.50	22.01
Calcium soaps of fattyacids	0.30	0.31	1.00
Tallow	0.30	0.30	1.00
Cottonseed, Whole with lint	2.25	2.50	7.49
Soybean, Meal, solv. 48% CP	2.40	2.68	7.99
Blood Meal, ring dried	0.15	0.17	0.50
Calcium Carbonate	0.03	0.03	0.10
MonoSodium Phosphate (1 H2O)	0.06	0.06	0.20
Salt	0.15	0.15	0.50
Vitamin premix 1	0.36	0.36	1.20



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# Commercial Lab Results Example



FORAGE TESTING LABORATORY  
 DAIRY ONE, INC.  
 730 WARREN ROAD  
 ITHACA, NEW YORK 14850  
 607-257-1272 (fax 607-257-1350)

-----  
 |Sampled | Recvd |Printed |ST|CO|  
 |07/13/23|07/17/23|07/26/23| | |  
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19MAR2023  
 Colorado State University  
 1171 Campus Delivery  
 Fort Collins, CO 80523

-----  
 ENERGY TABLE - NRC 2001  
 -----  

	Mcal/Lb	Mcal/Kg
DE, 1X	1.64	3.62
ME, 1X	1.45	3.20
NEL, 3X	0.86	1.90
NEM, 3X	0.91	2.00
NEG, 3X	0.61	1.35
-----		
TDN1X, %	82	

 -----

COMMENTS:  
 1. THIS REPORT HAS BEEN CORRECTED  
 TO REFLECT NEW ANALYSIS  
 RESULTS, SAMPLE KIND CODE OR  
 NAME AND ADDRESS FIELDS.  
 PLEASE COMPARE IT WITH YOUR  
 ORIGINAL.

Sample Description	Farm	Code	Sample
CORN SNAPLAGE, Dry		437	29388620
-----			
GREEN			
-----			
Analysis Results			
Components	As Fed	DM	
-----			
% Moisture	7.2		
% Dry Matter	92.8		
% Crude Protein	11.6	12.5	
% Adjusted Crude Protein	11.6	12.5	
Soluble Protein % CP		42	
% NDF	18.4	11.2	
% aNDF	17.9	19.3	
% Lignin	1.4	1.5	
% NFC	56.5	60.9	
% Starch	50.5	54.4	
% Ash	3.40	3.67	
% TDN	75	81	
NEL, (mcal/kg)	1.85	2.00	
NEM, (mcal/kg)	1.85	1.99	
NEG, (mcal/kg)	1.25	1.34	
% Calcium	.52	.56	
% Phosphorus	.35	.37	
% Magnesium	.16	.18	
% Potassium	.79	.85	
% Sodium	.106	.115	
PPM Iron	142	153	
PPM Zinc	73	78	
PPM Copper	14	15	
PPM Manganese	47	50	
PPM Molybdenum	< 1	< 1	
% Sulfur	.15	.16	
% Crude Fat, EE	3.46	3.72	
Gross Energy, cal/g	4,164	4,488	
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