

# The Importance of Monitoring Ration Moisture Content When Feeding Total Mixed Rations

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# Feeding Total Mixed Rations (TMR)



# What is a TMR?

- Complete mix of all feed ingredients
  - Forages
  - Grains
  - Protein feeds
  - Byproduct feeds
  - Minerals and vitamins
  - Feed additives
- Homogeneous mixture
  - Moisture content

# Advantages of Feeding TMR

- Increase milk production, milk fat test
- Decrease feed costs
- Improve cow health
- Can include unpalatable feeds or feeds fed in small amounts
- Deliver consistent ration to cows every day

# Consistency is the Key to Feeding TMR

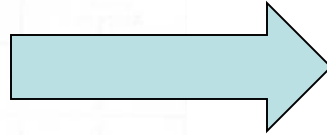
Deliver the same **AMOUNT** of the  
same **HOMOGENEOUS MIX** at the same  
**TIME** every day!!



**High Production Group TMR**  
**50:50 Forage and Concentrate (DM)**  
**40 kg 3.7% Fat 3.2% Protein**

**TMR ingredients (as fed)**

- 19 kg Barley silage
- 5 kg Alfalfa hay
- 2 kg Dehydrated alfalfa pellets
- 14.0 kg Dairy concentrate
- 40 kg



**14 kg concentrate contains:**

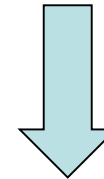
	kg	%
Barley	7.98	57.0
Wheat	0.48	3.4
Oats	0.70	5.0
Canola Meal	1.47	10.5
Soybean Meal	1.35	9.6
WDDG	0.60	4.3
Corn Gluten Meal	0.33	2.4
Mini-Vit Premix	0.42	3.0
Molasses	0.30	2.1
Co-I Salt	0.10	0.7
Canola Oil	0.07	0.5
Golden Flake	0.11	0.8
Other		0.7

+Buffer, Dynamate, Niacin, Flavor

**Formulated Ration**



**Mixed Ration**



**Delivered Ration**



**Consumed Ration**

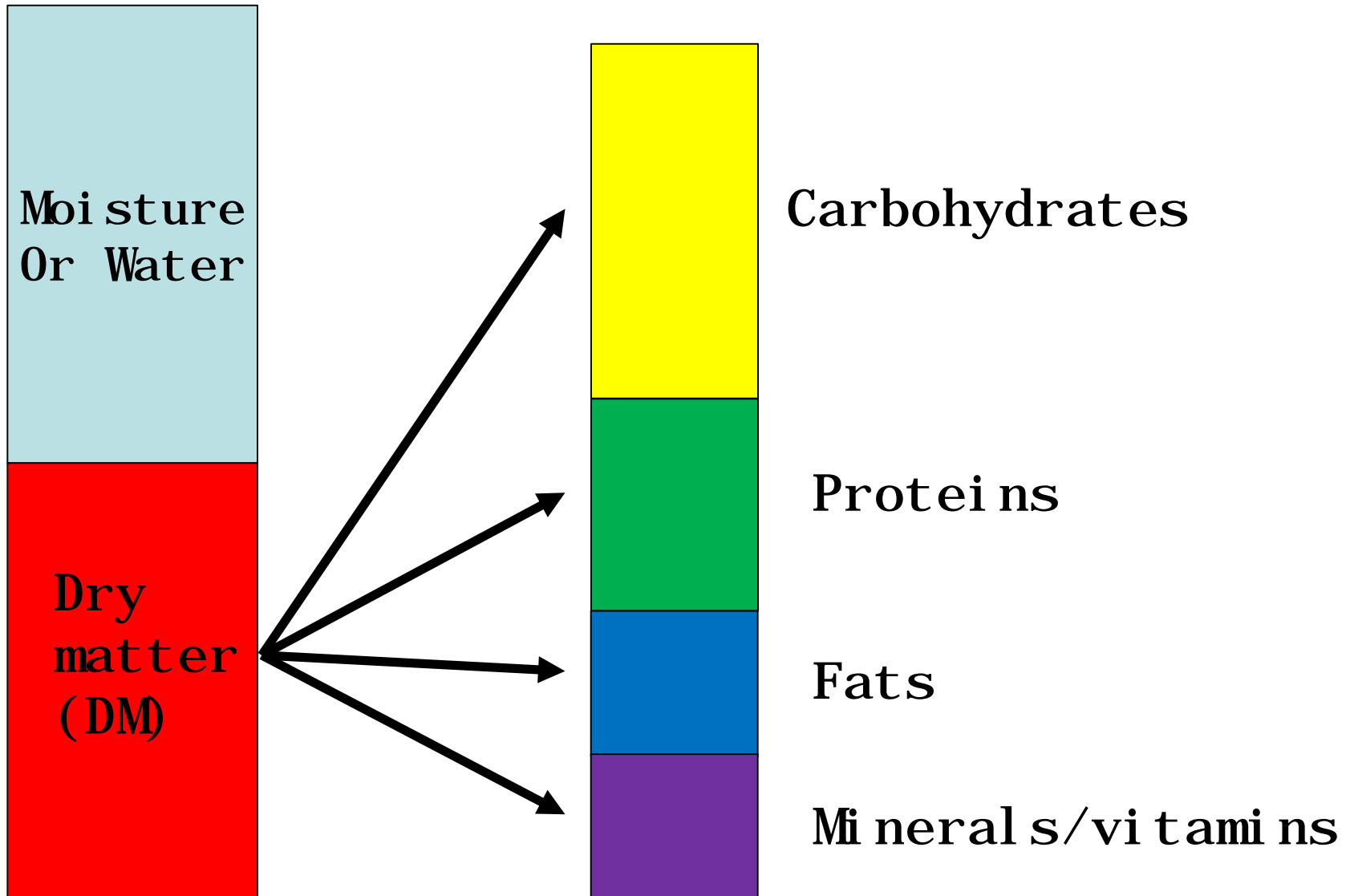


## What Can Affect Consistency of the TMR?

- Changes in the chemical composition of feed ingredients that are included in the TMR
- Forage moisture content!

# Moisture and DM Content of TMR

TMR

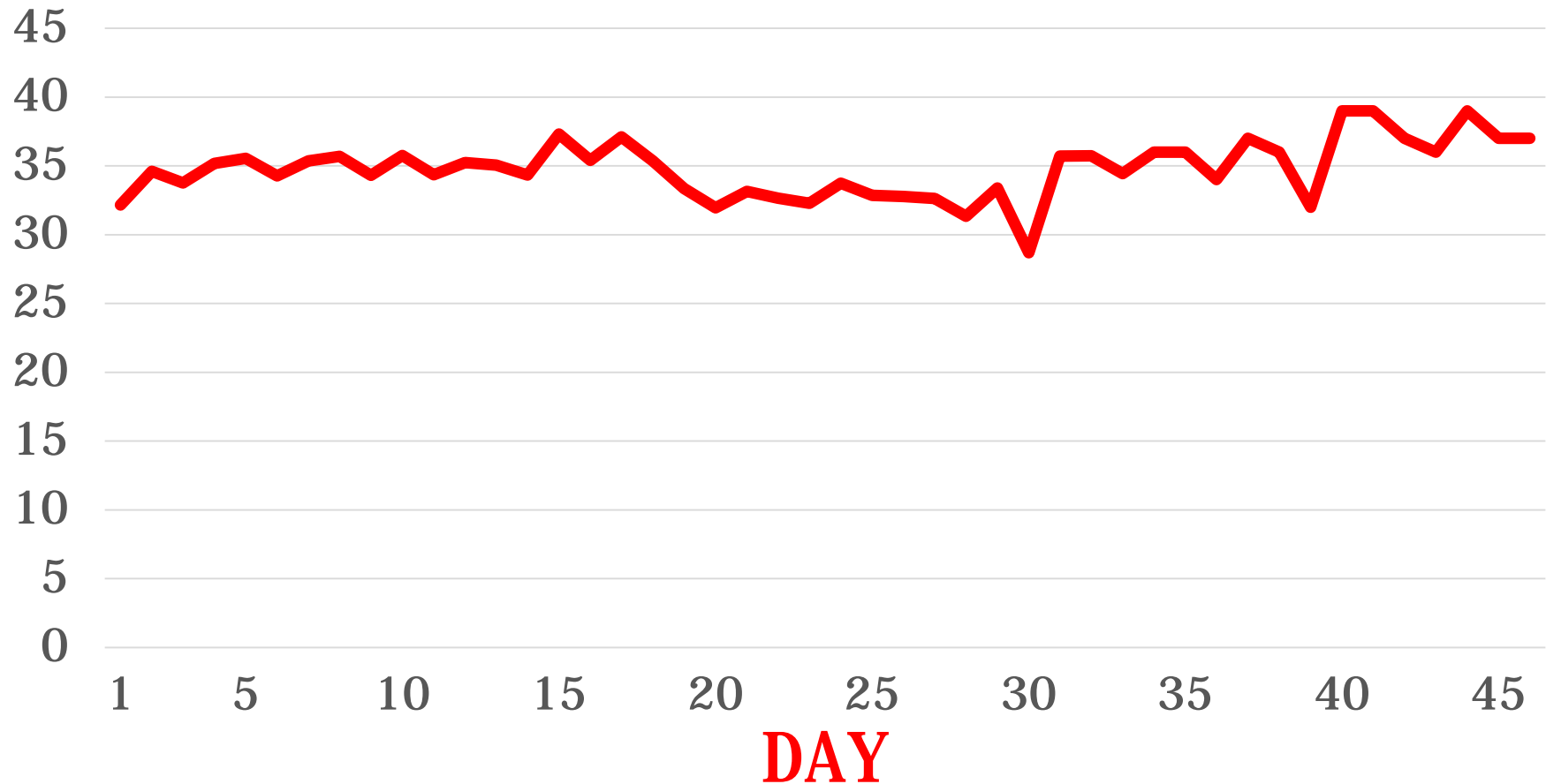




# Moisture and DM Content of TMR

- $\%DM = 100 - \%moisture$
- Nutrients are contained in the DM
- Rations are formulated on DM basis
- TMR ingredients weighed at mixing are on as-fed basis
- Need to account for changes in ingredient moisture or DM content

## Variation in Barley Silage DM Content (%)



- 29 to 39% range in moisture content from March/2015 to January/2016

## Effects of DM Changes on a Ration

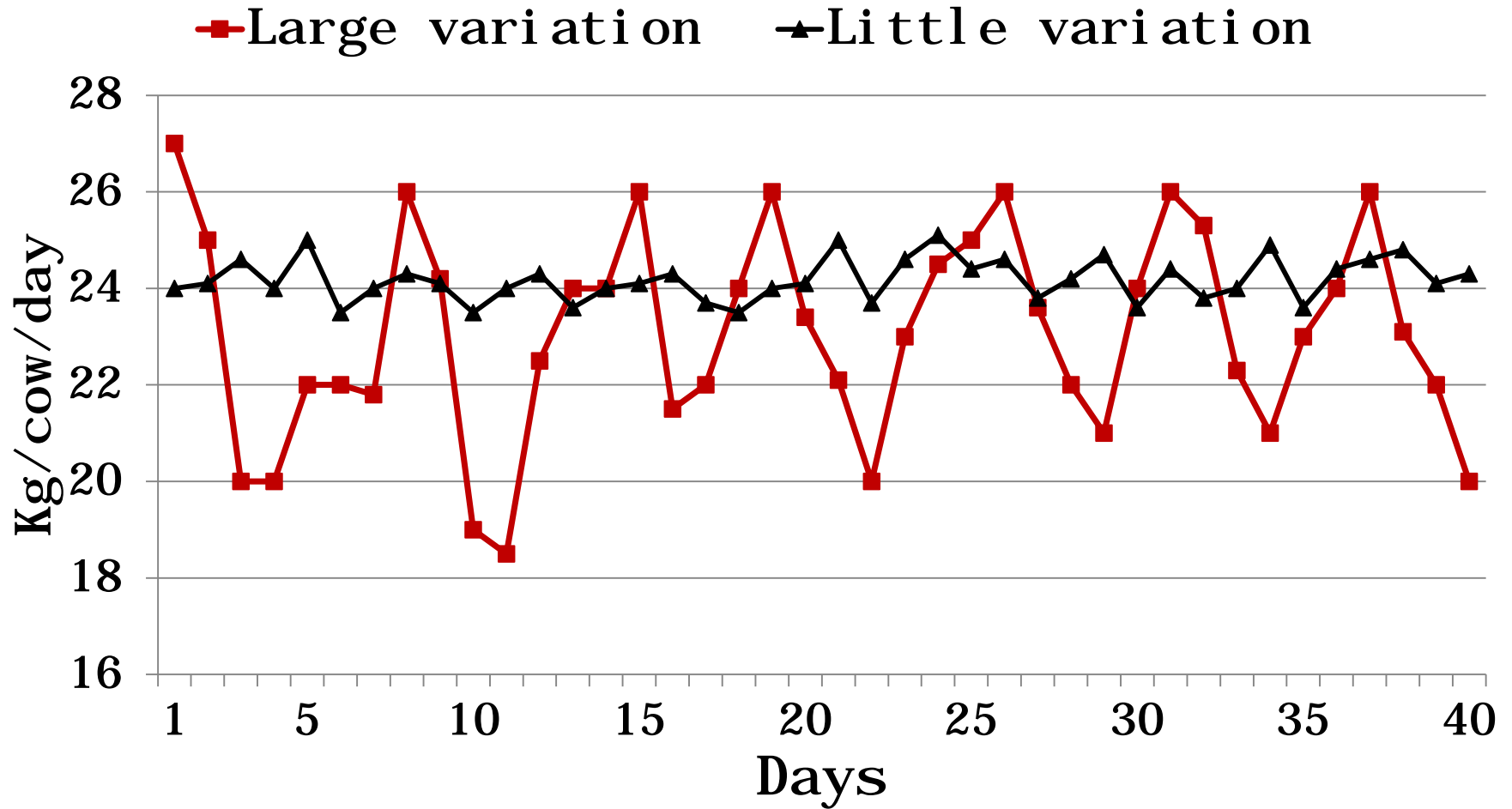
	Target (correct) values			Silages 5% wetter		
	Feed %DM	As fed kg	DM kg	Feed %DM	As fed kg	DM kg
Alfalfa silage	35	13.6	4.8	<b>30</b>	<b>13.6</b>	<b>4.1</b>
Barley silage	35	26.4	9.2	<b>30</b>	<b>26.4</b>	<b>7.9</b>
Concentrate	90	15.6	14	90	15.6	14
Ration total	50	56	28	<b>46</b>	<b>56</b>	<b>26</b>

- 2 kg/d less DM intake = 3.2 Mcal less energy (NE<sub>L</sub>) intake
- Approx. 2-3 kg/d loss in milk yield

## Failure to Account for Changes in Moisture/DM Content of Silages

- Results in mixing errors as forage to concentrate ratio in TMR changes
- If silage moisture content increases, underfeed DM leading to decreased milk production
- If silage moisture content decreases, overfeed DM leading to wasted feed

# Minimize Variation in Feed Intake



# Determining Moisture or DM Content On-Farm



- 50- 100 grams of representative silage sample



## Determining Moisture or DM Content On-Farm

- Weigh a plastic container or paper plate; tare the scale with its weight
- Collect 50-200 g of a representative silage sample, place it in container or on plate
- Weigh the silage sample
- Record this weight as the initial weight
- Dry the sample on full power setting of microwave

## Suggested Guidelines for Drying Time

- 2 to 5 min for initial drying
- 0.30 to 1 min for subsequent dryings
- Feel, mix sample after each drying
- Dry to constant weight, record as final weight

## Determining Moisture or DM Content On-Farm

- $\% \text{ DM} = (\text{final weight} / \text{initial weight}) \times 100$
- Initial weight = 50 g
- Final weight = 20 g
- $\% \text{ DM} = (20/50) \times 100 = 40\%$

# Koster Crop Tester



Heating element,  
fan mounted in base

Feed sample pan

Scale

# NIR Technology to Monitor Ingredient Moisture %



- Moisture Tracker™
  - Hand-held NIR scanning device
- Instantaneous DM/moisture readings for wide variety of ingredients
- US\$7,350

## Take-Home Messages

- Check forage moisture/DM content at least once a week; heavy precipitation
- Adjust amounts of forage in TMR when %DM changes by more than 2% units
- Failure to adjust rations can cost you money!