

Texas Dairy Matters

Higher Education Supporting the Industry

Dairy Efficiency

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Monitoring dry matter intakes is one of the best indicators of the health and well-being of dairy cows. An excellent monitoring tool is called Dairy Efficiency (DE), which evaluates the efficiency of converting dry matter to milk. Dairy Efficiency is the result of dividing the pounds of 4% fat corrected milk (FCM) by the pounds of dry matter (DM) that were actually consumed. Milk is corrected to a FCM basis in order to equalize differences in pounds of milk and fat. Intake of dry feed is used since we are only interested in what a cow is actually consuming. Fat corrected milk (4%) is determined by multiplying pounds of milk by 0.4 and pounds of milk fat by 15. Dry matter intakes are determined by multiplying the pounds of each ingredient fed times the percent dry matter and subtracting feed that was not eaten (weigh backs). The percent DM of individual feeds is easily obtained by drying the feedstuffs with a Koster Tester. Rough estimates of the DM in feeds can also be determined from tables, such as those found in Hoard's Dairyman or the NRC, or from information online. The percent DM is used to calculate pounds of DM fed for each individual ingredient. Add all of the weights of the individual ingredients to get a total DMI for your group or herd. Remember to subtract the weigh backs.

Dairy Efficiency = lbs of 4% fat corrected milk / lbs of DM consumed

What are some numbers that we are looking for?

High group, mature cows	>1.7
High group, 1 st lactation	>1.6
One group TMR herds	>1.4
Fresh cows (<21 days)	<1.4
Concern	<1.3

Factors that affect feed efficiency are: milk production, feed intake, feed digestibility, days in milk, forage quality, forage quantity, age of cows, protein level, body weight change, high milk fat test, rumen acidosis, environmental stress, exercise/grazing, pregnancy, the use of bST, and feed additives. For example, herds with fewer days in milk will have a higher DE. Herds with more young cows may have lower DE as young cows divert nutrients to growth. High

milk production groups can have a higher DE than lower milk producing groups. Fresh cows usually have a lower DE since higher amounts of forages are often fed to prevent metabolic problems. Cows losing body weight favor higher DE since nutrients do not have to be consumed. Cows gaining weight will lower DE as nutrients are stored as body weight instead of being used for milk production. Hot or cold weather and cows walking to pasture will have lower DE as more nutrients are diverted to maintenance. Rumen acidosis will lower DE as feeds are lower in digestibility. High quality forage increases DE. Monitoring DE provides a way to monitor overall herd well being.

An example of calculating DE:

A Ingredients	B Lbs As Fed	C Dry Matter, %	D Lbs Dry Matter	
Alfalfa Hay	12	90	10.8	
Silage	25	30	7.5	
Soybean Meal	4	87	3.48	
Steam Flaked Corn	15	86	12.9	
Almond Hulls	3	88	2.64	
Citrus Pulp	10	88	8.8	
Cottonseed	6	88	5.28	
Mineral Pack	3	95	2.85	
Total	E → 78		G → 54.25	
Weigh Back	F → 5	Actual DMI	H → 50.77	
Pounds of Milk	factor	Fat%	Pounds of Fat	Factor
80	0.4	3.6	2.88	15
	$80 \times 0.4 = 32$		$80 \times 0.036 \times 15 = 43.2$	
4% FCM	75.2			
Dairy Efficiency	4% FCM / lbs of DM Consumed			
	75.2	50.77		
Dairy Efficiency	1.48			

- 1: Column A contains the ingredients that are being fed.
- 2: Column B is the amount of feed provided on an as fed basis.
- 3: Column C is the percent dry matter for each feedstuff.
- 4: Column D is calculated by multiplying the number in column B by the number in column C (remember to move the decimal 2 places to the left) to obtain the pounds of feedstuffs on a dry matter basis.

Example: 12 lbs fed x 90% dry matter (or 0.90) = 10.8 lbs of dry matter

- 5: Determine the actual pounds of feed intake. Five pounds (F) per cow were not eaten. Divide 5 (F) by 78 (E) and subtract from 1. Multiply by the total pounds of dry feed (G) to get H, pounds of dry matter actually consumed.
Example: $(1 - (5 \text{ lbs feed not eaten} / 78 \text{ lbs fed})) \times 54.55 \text{ lbs of dry matter fed} = 50.77 \text{ lbs of dry matter consumed}$
- 6: Calculate the 4% FCM by multiplying the pounds of milk by a factor of 0.4 and adding the quantity of the pounds of milk fat multiplied by a factor of 15.
Example: $(80 \text{ lbs of milk} \times 0.4) + ((80 \text{ lbs of milk} \times 3.6\% \text{ milk fat (or } 0.036) \times 15) = 75.2 \text{ lbs of } 4\% \text{ FCM}$
- 7: DE is fat corrected milk divided by pounds of dry matter consumed.
Example: $75.2 \text{ lbs of FCM} / 50.77 = \text{DE of } 1.48$