



## The Challenge of TMR Sampling

Total Mixed Rations (TMR) are designed to:

1. Provide balanced nutrition in every bite.
2. Prevent sorting of individual ingredients.
3. Allow the utilization of less palatable feeds by blending and disguising with larger amounts of palatable feeds.
4. Minimize ruminal pH fluctuations by avoiding slug feeding of grains.
5. Reduce feeding times and labor associated with feeding forages and concentrates individually.
6. Allow for flexible formulation so adjustments can be made due to changing forage quality and/or to take advantage of fluctuations in market and ingredient prices.
7. Group and feed based on different management strategies.

All of the above have combined to make TMR feeding the prevalent practice in large herds and it continues to grow in popularity. The multitude of ingredients used in a TMR also make it one of the most difficult feed types to subsample. All of the following can influence the quality (representativeness) of the sample:

1. Use of multiple ingredients (forages, grains, byproducts, minerals) of varying particle size are often difficult to blend and are prone to separation.
2. Lack of moisture in the ration can lead to separation of ingredients.
3. The composition of individual ingredients can change (forage or concentrate) that will cause the fed ration to be different from the formulated ration.
4. Mineral-vitamin premix – was the premix mixed according to specifications at the plant?
5. Protein-mineral-vitamin supplement – was the supplement mixed according to specifications at the plant?
6. Were the ingredients in the TMR added in the amounts specified in the ration formulation?
7. Were the scales working properly?
8. Were ingredients added according to manufacturer recommendations to allow for optimum blending?

9. Was the mixture allowed to mix for an adequate amount of time to insure complete blending?
10. Fresh samples should be taken before the cows are allowed access to the feed.
11. Multiple subsamples should be taken and combined to avoid sampling error.
12. Was the sample adequately blended and subsampled at the lab to insure a representative sample was used for analysis?

All of the above contribute to the difficulty of obtaining a representative subsample and often, confusing results. TMR analyses are most commonly used as a check to determine if the mix is meeting nutrient specifications and/or to evaluate if the "feeder" is blending the ration according to specifications. While TMR analyses have their merit, given the multitude of variables that can influence the results, often too much weight is placed on the analysis. In many instances, your forage analysis dollar is better spent reanalyzing and confirming the nutrient composition of the individual forage ingredients and making ration adjustments as required. Changes in forage quality and moisture will have a large impact on the ration. Typically, the result of a TMR analysis that does not meet specifications will result in reanalysis of the individual forages, so that you are further ahead to do this in the first place.