

## Introduction of the ammonia nitrogen parameter as a percentage of total nitrogen in NIR profiles of TMR

Ammonia in livestock feed, due to the concentrations that are usually detected, certainly should not be considered a toxic contaminant (rumen production is much higher), but it is considered an effective PROTEOLYSIS INDICATOR. Proteolysis, when it occurs in uncontrolled conditions, gives rise to the toxic metabolites represented by Biogenic Amines.

We have decided to introduce this parameter in the NIR profile of TMRs as it has often been requested by technicians and, until now, it has been performed enzymatically with costs and times that are decidedly different from simple NIR reading.

### Expression of the result.

It is varied: Ammoniacal Nitrogen, Ammonia as  $\text{NH}_3$  or  $\text{NH}_4^+$ , Nammoniacal/Ntotal,  $\text{NH}_3/\text{Ntotal}$ , TVB or TVN.

We have opted to express it as a % ratio of ammonia nitrogen to total nitrogen, because the more protein a food has, the more it will be subject to proteolysis: looking at the absolute value of ammonia would be misleading and would distort its nature as an index.

The INTERPRETATION OF THE RESULT is not simple and its meaning varies with the composition of TMRs and with the aims pursued by the food specialist.

### TMRs WITHOUT haylages

It is the simplest case, generally in hays and livestock feeds, the physiological content of ammoniacal nitrogen is less than 1% of the total nitrogen. Higher values indicate the presence of fermented/poorly preserved components of the blend or heating phenomena subsequent to the production of TMRs.

### Unifeed WITH haylages

The expected ammoniacal nitrogen content will be variable and directly proportional to the endowment of silages that make up off the TMRs. The correct interpretation of the value obtained with the analysis passes through an in-depth knowledge of the wagon components which allows a reliable "expected value" to be formulated. In this type of TMRs, ammoniacal nitrogen can essentially be considered in the aggregate index for evaluating the correct fermentation/storage of silage. However, comparing the obtained value with the expected one, high values can also reveal a post-mixed fermentation.

### Statistics of the results obtained from ammonia nitrogen / total nitrogen in the types of TMRs

	Mean	Standard Deviation (+/-)	Range (68% of samples)	
			mean - Dev.St	mean + Dev.St
Lactation PR:	<b>0,52</b>	<b>0,43</b>	0,09	0,96
Lactation GP:	<b>1,98</b>	<b>0,87</b>	1,12	2,85
Bulls:	<b>1,95</b>	<b>0,85</b>	1,11	2,80
Dry:	<b>2,47</b>	<b>0,80</b>	1,68	3,27

"PR": Parmigiano Reggiano; "GP": Grana Padano.

In conclusion, this index is certainly useful in many cases but it should always be used with utmost attention as it could lead to misleading conclusions.