Total mixed ration prepared by trailer mixer or self-propelled mixer on diet quality and cows' yields

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Introduction

- The accuracy and homogeneity of the prepared total mixed ration (**TMR**) are important and necessary for health and productivity of the dairy cow.
- In the modern cow's ration, mixing a variety of feedstuffs with different physical properties makes it more challenging.
- Three types of TMR mixers: 1) Trailer mixer (**TM**) 2) stationary mixer 3) Self Propelled Loading mixer (**SPM**)
- TM or stationary mixer load by a loader, while SPM is loaded by a special mechanism, which is integral part of the SPM and enable more accurate preparation of the TMR.

Objectives

- To evaluate the accuracy and homogeneity of the same TMR prepared by TM or SPM, and the effects on yields of high producing dairy cows.

Experimental Procedures

- Two groups of 108 multiparous cows each participated in the study.
- The cows were fed the same diet prepared by TM or SPM by the same operator.
- The order of the ingredients loading and mixing time was constant and according to the manufacturer's instructions.
- Samples of the TMRs were taken weekly from 5 spots along each manger to evaluate the accuracy and homogeneity of the TMR.
- In another 7 times, 3 samples of the TMRs along the manger were taken and were passed through a separator to evaluate the distribution and homogeneity of the particle size of the ration.
- The chemical composition of the TMRs, and milk and milk solid yields were analyzed as repeated measurements with the PROC MIXED procedure of SAS.

The homology of TMRs composition and particle size were analyzed using the Homogeneity of Variance test – Hovtest-Barlett procedure of SAS.

Results

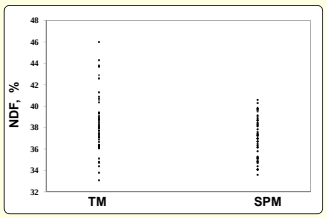
Table1. Chemical composition of the TMRs

	TM	SPM	SEM	P<	Planned
DM, %	60.0	60.9	0.28	0.06	57.0
Protein, %	15.4	15.6	0.20	0.37	16.5
ADF, %	19.8^{a}	18.8^{b}	0.15	0.005	17.5
NDF, %	38.7^{a}	37.4^{b}	0.20	0.005	31.8
Ash, %	9.1	8.8	0.07	0.03	

Table 2. Particle size distribution

Particle length	TM	SPM	SEM	P<
>19 mm	25.1^{a}	22.2^{b}	0.68	0.04
8 --19 mm	18.7	18.8	0.53	0.92
≤8 mm	55.9^{b}	59.2^{a}	0.8	0.04

Figure 1. Distribution of NDF and ADF content of the TMRs



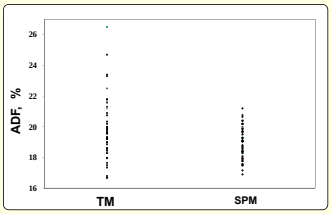


Table 3. Milk and milk solids yields of cows from 2 and 3 lactations

	TM	SPM	SEM	P<
Milk, kg/d	43.0^{b}	45.4^{a}	0.40	0.0001
Fat, %	3.54	3.42	0.05	0.11
Protein, %	3.22	3.21	0.02	0.73
Lactose, %	4.78	4.80	0.02	0.53
Fat, kg/d	1.48	1.52	0.03	0.25
Protein, kg/d	1.34^{b}	1.44^{a}	0.02	0.004
Lactose, kg/d	2.03^{b}	2.19^{a}	0.04	0.007
FCM 4% ,kg/d	39.2^{b}	40.6^{a}	0.28	0.001

Conclusions

- The actual chemical composition of the SPM TMR as compared to the planned TMR was more accurate and homogeneous than that of the TM TMR.
- Differences were observed in particle size distribution between the TMRs, but not in homogeneity.
- Milk yields were 5.6% higher in the SPM cows (from 2 and 3 lactations) , but fat percentage tended to be lower in this group.
- We assume that the high level of accuracy and homogeneity of the SPM TMR contributed to stabilize the rumen conditions and provided more adequate nutrients to meet requirements, which contributed to enhance the milk yields.