

Effect of two different source of forage on the organic matter digestibility in Mediterranean Italian Buffalo cows

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ABSTRACT: The present study aimed to evaluate the influence of two different source of forage (haysilage and hay) during the lactation on organic matter digestibility (OMD) in buffalo cows. Lactating buffaloes ($n = 40$) at 29.6 days in milk (DIM) were equally divided as function of previous milk yield into Group 1 (meadow hay, $n = 20$) and Group 2 [haysilage (*Lolium multiflorum*), $n = 20$]. The diets were isoenergetic [0.92 milk unit forage (MUF) on dry matter basis] and isoproteic (16.2 % crude protein on dry matter basis) and administered as total mixed ration (TMR). From all the buffaloes, for each group and in two sampling time (first sampling, DIM = 74.0 and second sampling, DIM = 129.0) the faeces were collected in order to evaluate the *in vivo* digestibility. Overall the trial, the subjects fed haysilage showed higher OMD than those fed hay (66.1 vs 45.7; $P < 0.01$), moreover the *in vivo* digestibility was affected by the DIM, in particular in the group fed hay (40.6 vs 53.4; $P < 0.0001$, respectively). This work underlines the importance of the administration of the haysilage (*Lolium multiflorum*) as source of high quality forage because it gives, overall the lactation, more nutritive principles compared with meadow hay.

Key words: Forage, Buffalo cows, Organic matter digestibility, Days in milk.

INTRODUCTION - As knows, the maize silage is the most important source of forage used to feed cattle and buffalo in the flat area, because of normally this crop gives an high quantity of dry matter (~ 26,0 Tons) and milk forage unit (~ 22100) per hectare. On the other hand, the maize plant needs a good management with high costs to produce a good quality product. In the hill place of the South Italy is almost impossible to produce maize silage because of the land structure is unsuitable for this crop.

In this places is easier to crop meadow hay which is used as source of forage in cattle and buffalo diets even if often it gives low performance in terms of milk yield, in particular in the first phase of the lactation, due to its high NDF content ($\pm 65\%$ on dry matter basis)

having low digestibility.

In the last ten years, the haysilage of the *Lolium multiflorum* which, also in the buffalo cows gives good performance in terms of milk yield is used as good alternative to the maize silage.

In order to improve the knowledge on the nutritional characteristics of this cultivar, aim of this work was to evaluate the *in vivo* digestibility of buffalo cows using *Lolium multiflorum* haysilage *vs* meadow hay in the first 130 days of the lactation.

MATERIAL AND METHODS - Forty lactating buffalo cows (on average 29.6 ± 4.0 DIM) that were assigned to group 1 (meadow hay, 20 subjects) and group 2 (haysilage, 20 subjects) and maintained in open yards that allowed 15 m² and a feeding trough space of around 1.0 m for each buffalo. A total mixed ration (TMR) consisting of 50% forage (0.92 MFU/kg of dry matter (DM), 16.2% crude protein/DM, 42% NDF/DM and 26% ADF/DM) was fed once daily. Individual feedstuff, TMR and orts were sampled once weekly on a random day and analysed as per AOAC methods.

At 74 and 129 DIM, the organic matter digestibility (OMD) was evaluated by the AIA method (Van Keulen and Young, 1977) collecting from the rectum of each animal a sample of faeces (200 g). Samples of TMR and faeces were analysed as per AOAC.

The OMD was calculated by the following equation: $[(Cf - Cd) / Cf] \times 100$ where Cf and Cd are the concentration of internal marker (acid insoluble ashes) in the faeces and in the diet, respectively. Data were processed by t-test (SAS, 2000) as function of the days in milk and treatment.

RESULTS AND CONCLUSIONS - In table 1 are reported the OMD of the two forage sources at different DIM. Overall the trial, the subjects fed haysilage showed significantly higher OMD than those fed hay (66.1 *vs* 45.7; $P < 0.01$). The OMD value obtained with haysilage diet is close to that (67.3%) found by Zicarelli *et al.* (2005) with animals, in the first lactation phase (< 135 DIM), fed diet (50% forage, 0.85 MFU/DM, 14%CP/DM, 42% NDF/DM and 26% ADF/DM) supplemented with *Saccharomyces cerevisiae*.

In a feeding trial, Han *et al.* (2004) found that Angus steers received alfalafa hay showed a lower dry matter digestibility than eating the same crop as hay silage (592 g kg⁻¹ *vs* 631 g kg⁻¹, $P < 0.05$, respectively). In our case at 74 DIM the difference in OMD between the hay and the haysilage group was high (40.6% *vs* 72.0%; $P < 0.0001$, respectively), while at 129 DIM it was lower but still significant (53.4% *vs* 62.3%; $P < 0.01$, respectively).

As showed, the OMD in the meadow hay group at beginning is low and then grows up; as knows, it happens because at 74 DIM the buffalo cow uses more body reserve than the nutrient from the diet to produce milk, on the other hand at 129 DIM (beginning of the anabolic phase) the animal needs more nutrient to maintain the milk production and to rebuild the body losses had during the first period of the lactation.

The high value in OMD of the haysilage group in the first 74 DIM was probably due to the higher presence of leaves compared to the stem, the first having higher NDF and ADF digestibility than the second one.

In this case, as sometime happens, the chemical composition and the MUF of the two diets were the same but the organic matter of haysilage diet were used from the animals in best way (milk production, data not shown).

This *in vivo* method can be used practically to understand the real nutritive requirements in the different stage of the lactation of the Mediterranean Italian Buffalo. Moreover could be interesting to study the *in vivo* digestibility of different kind of diet and for different milk production (low, medium and high).

This work underlines the importance of the administration of the haysilage (*Lolium multiflorum*) as source of high quality forage because it gives, overall the lactation, more nutritive principles compared with meadow hay. The decision on which crop to use should be based on factors such as production costs, forage yields, and local growing conditions.

Table. 1. Organic matter digestibility of the two forage sources at different stage of lactation. (means \pm d.s.)

Forage sources	Organic matter digestibility		
	DIM 74	DIM 129	ALL
Meadow hay	40.6 \pm 14.5 ^{AX}	53.4 \pm 14.5 ^{AY}	45.7 \pm 14.5 ^A
Haysilage	72.0 \pm 14.5 ^{BX}	62.3 \pm 14.5 ^{BY}	66.1 \pm 14.5 ^B

Capital letters A and B compared means within the DIM of the different forages, capital letters X and Y compared means between the DIM of the same forage (A vs. B=P<0.01; Y vs X=P0.01, respectively).

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