The effects of urease source and moisture content on the nutritive value of Brachiaria brizantha hay treated with urea

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Introduction Ammoniation has a high potential to increase the nutritive value (NV) of mature tropical grasses hays. Urea utilisation, like ammonia, seems to be a promising alternative for on-farm treatment of low quality forage in Brazil. Urea has the advantages over anhydrous ammonia of being widely available, easier to handle and, in some countries, less expensive. The aim of this work was to study the effects on the efficiency of urea treatment of palisade grass (*Brachiaria brizantha* cv. Marandu) hay of the moisture level, and the urease source.

Materials and methods The experiment was conducted at UNESP Jaboticabal-Brazil with palisade grass hay. The treatments were hays with 15 or 30% moisture either untreated, treated with urea (5% of dry matter) or treated with the combination of urea (5% of dry matter) and three urease sources. The urease sources were: signal grass (*Brachiaria decumbens)* hay, elephant grass (*Pennisetum purpureum*e)*, and* leucaena (*Leucaena leucocephala*) green forage. The palisade grass hays were analysed for crude protein (CP), protein fractions (A, B1, B2, B3, and C), neutral detergent fiber (NDF), acid detergent fiber (ADF) (AOAC, 1984), and *in vitro* dry matter digestibility (IVDMD) (Tilley & Terry, 1963). The data were analysed as a completely randomised design with three replications using the Tukey test.

Results Urea application increased CP, and A fractions (P< .05), but did not affect the B1 and B2 fractions (Table 1). However, the B3 and C fractions decreased in urea treated hays (P < .05). Urea treatments decreased NDF value (P< .05. The treatments did not affect the ADF values. The urease source in combination with the highest moisture content increased the IVDMD of the hays.

Table 1 Neutral detergent fiber, acid detergent fiber, IVDMD, crude protein (in dry matter %), and protein fractions (in CP%) in palisade grass hay

Treatments	NDF	ADF	IVDMD	CP	A	B1	B2	B3	C
Hay 15% moisture + signal grass hay + urea	$73,3^{CDE}$	$40,6^{AB}$	$52,28^{B}$	$15,1^{AB}$	$86,2^{A}$	$0,08^{C}$	$6,4^{E}$	$2,5^{B}$	$4,7^{B}$
Hay 15% moisture + elephant grass + urea	$75,0^{BCD}$	$40,9^{AB}$	$59,27^{AB}$	$12,6^{ABC}$	$82,3^{AB}$	$0,19^{BC}$	$8,7^{DE}$	$2,7^{B}$	$6,1^{B}$
Hay 15% moisture + leuacena + urea	$76,6^{ABC}$	$41,1^{A}$	$59,62^{AB}$	$12,4^{ABC}$	$76,2^{BC}$	$0,16^{BC}$	$15,4^{ABC}$	$1,5^{B}$	$6,7^{B}$
Hay 15% moisture + urea	$69,8^{F}$	$37,7^{B}$	$65,08^{A}$	$16,3^{A}$	$85,7^{AB}$	$0,05^{B}$	$8,7^{CDE}$	$0,9^{B}$	$4,4^{B}$
Hay 15% moisture without urea	$77,5^{AB}$	$42,2^{A}$	$53,55^{B}$	$3,1^{D}$	$49,1^{E}$	$0,15^{BC}$	$19,2^{A}$	$5,8^{A}$	$25,7^{A}$
Hay 30% moisture + signal grass hay + urea	$74,9^{BCD}$	$41,7^{A}$	$66,44^{A}$	$10,6^{BC}$	$76,2^{BC}$	$0,14^{BC}$	$14,1^{ABCD}$	$1,0^{B}$	$8,5^{B}$
Hay 30% moisture + elephant grass + urea	$71,1^{EF}$	$42,3^{A}$	$64,47^{A}$	$8,7^{C}$	$71,2^{CD}$	$0,35^{A}$	$15,7^{AB}$	$2,4^{B}$	$10,3^{B}$
Hay 30% moisture + leucaena + urea	$70,7^{EF}$	$40,4^{AB}$	$66,99^{A}$	$11,0^{BC}$	$77,8^{ABC}$	$0,37^{B}$	$12,1^{BCDE}$	$1,1^{B}$	$8,5^{B}$
Hay 30% moisture + urea	$72,0^{DEF}$	$40,0^{AB}$	$66,52^{A}$	$12,5^{ABC}$	$80,6^{ABC}$	$0,29^{BC}$	$10,3^{BCDE}$	$1,0^{B}$	$7,7^{B}$
Hay 30% moisture without urea	$78,7^{A}$	$42,6^{A}$	$56,33^{A}$	$3,4^{D}$	$65,1^{D}$	$0,63^{A}$	$6,8^{E}$	$3,0^{AB}$	$26,9^{A}$
CV (%)	1,6	2,8	11,2	14,8	4,4	35,9	19,3	46,7	18,1

Means with different superscripts are significantly different (P< .05)

Conclusion Urea application, in association with a urease source, increased the nutritive value of palisade grass hay.

References

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