

THE EFFECTS OF MICROBIAL INOCULANTS AND FORAGE SPECIES ON IN VITRO GAS PRODUCTION OF SOME HAYS AND THEIR SILAGES



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Introduction

This study was conducted to determine the effects of forage species (legumes and grasses), storage types (drying and ensiling) and microbial inoculants (Maize-All) on in vitro gas productions and gas production kinetics of some forages used in ruminant feeding.

Conclusion

In conclusion, silage making and Maize All supplementation lowered the in vitro gas production for all the forages used in the experiment.

Material and Methods

In this study, corn hay-CH, corn silage-CS, grass hay-GH, grass silage-GS, alfalfa hay-AH, alfalfa silage-AS, vetch hay-VH, vetch silage-VS were used. In vitro gas productions and gas production kinetics were determined in in vitro gas production technique (Menke and Steingass,1988).

Data were evaluated in nested factorial design.

Rumen fluid was obtained from the two SakizxKarayaka rams aged 2 with ruminal cannulas (average live weight 40 kg) which fed twice daily (08.30-16.30) with a diet containing grass hay and concentrates. All of the feedstuffs were incubated for 3, 6, 9, 12, 24 and 48 hours. In vitro gas production kinetics were described using the equation $y = a+b(1-\exp^{-ct})$.

Results and Discussion

The results were given in Table 1, 2, 3 and 4. While the leguminous forages have higher in vitro gas production values compared to the graminious forages for incubations up to 24 hours ($P<0.01$), this difference was found insignificant for 24 and 48 hours incubation. GH and GS had lowest in vitro gas production values for all incubation periods ($P<0.01$). The highest in vitro gas production values were found for CH and AH ($P<0.01$). Leguminous forages had higher gas production rates (c values) compared to the graminious forages either or not in the presence of microbial inoculants ($P<0.05$). Silage making and Maize All supplementation lowered the in vitro gas production for all the forages used in the experiment ($P<0.01$).

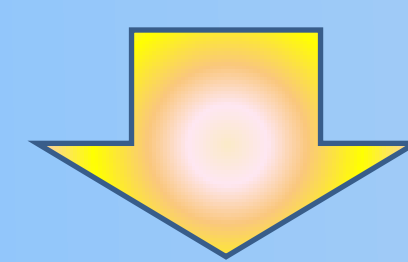


Table 1. The effects of grasses and legumes on *in vitro* gas production

Samples	3 h *	6 h **	9 h **	12 h **	24 h	48 h
Grasses	9.47 ± 0.66 b	14.32 ± 0.96b	19.11 ± 1.19b	23.80 ± 1.35b	36.67 ± 1.67	46.97 ± 1.86
Legumes	11.43 ± 0.55a	18.00 ± 0.77a	23.99 ± 0.89a	28.86 ± 0.95a	38.78 ± 1.11	45.06 ± 1.26

* = $P<0.05$; ** = $P<0.01$, h: incubation time, hour

Table 2. The effects of forages on *in vitro* gas production

Samples	3 h **	6 h **	9 h **	12 h **	24 h **	48 h **
Corn	10.89 ± 0.92a	16.70 ± 1.31a	22.25 ± 1.74a	27.84 ± 1.74a	42.38 ± 2.01a	52.78 ± 2.35a
Grass	7.43 ± 0.71b	10.87 ± 0.99b	14.55 ± 1.18b	17.93 ± 1.31b	28.39 ± 1.61b	38.54 ± 1.84c
Alfalfa	11.12 ± 1.73a	17.94 ± 1.69a	23.75 ± 1.85a	29.05 ± 1.88a	38.87 ± 2.03a	44.81 ± 2.21b
Vetch	11.61 ± 0.56a	18.04 ± 0.76a	24.13 ± 0.96a	28.75 ± 1.06a	38.74 ± 1.34a	45.21 ± 1.55b

Table 3. The effects of hay and silages on *in vitro* gas production

Samples	3 h **	6 h **	9 h **	12 h **	24 h **	48 h **
Hay	12.22 ± 0.86a	18.73 ± 1.22a	24.99 ± 1.46a	30.34 ± 1.59	42.76 ± 1.83a	52.57 ± 2.04a
Silage	9.45 ± 0.38b	14.79 ± 0.59b	19.69 ± 0.70b	24.12 ± 0.76	34.56 ± 0.85b	41.78 ± 0.84b

Table 4. The effects of Maize-All microbial inoculation on *in vitro* gas production of forages

Treatment	3 h**	6 h**	9 h **	12 h **	24 h **	48 h**
Maize (-)	11.61 ± 0.40a	17.87 ± 0.59a	23.50 ± 0.74a	28.35 ± 0.81a	39.62 ± 0.99a	47.66 ± 1.14a
Maize (+)	4.40 ± 0.59b	7.52 ± 0.93b	11.91 ± 1.19b	16.38 ± 1.43b	27.37 ± 1.62b	35.66 ± 1.71b