Bacterial silage inoculant and levels of *Moringa oleifera* on *in vitro* degradability of maize silage

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Introduction The maize is a standard culture for silage, however it contain low levels of protein. Inclusion of protein additives could improve nutritive value of silage. *Moringa oleifera* shows potential as forage and additive according to its high yield and high protein content, beside its low levels of antinutritional factors. Bacterial silage inoculants are favorable to fermentative process and conservation of silage, consequently it can reduce losses and improve nutritional quality, mainly to silages of adverse raw material, as well as substrates with inappropriate dry matter, high buffering, etc. Forage quality and high protein can improve food efficiency, thus addition of Moringa and bacterial silage inoculant proposes higher sustainability to production and use of silage. The aim of this study was to evaluate the organic matter degradability of maize silages using bacterial silage inoculant and levels of *Moringa oleifera* under *in vitro* degradability.

Materials and Methods The experimental design was in randomized blocks with treatments in factorial scheme 4 x 2 with three replicates. The treatments were comprised by maize silages with four addition levels of *Moringa oleifera*: 0, 10, 20 e 40% (m/m), with and without bacterial silage inoculant, evaluated on *in vitro* degradability assay in duplicate under three inoculums of sheep (CEUA- CENA No. 011/2016). Silages were ensiled in triplicate in experimental mini-silos. Opening was after 90 days to realize the partial samples, consequently the composite sample. The samples were characterized (Table 1) and freeze-dried to an assay to determinate *in vitro* organic matter degradability. The statistical analysis was performed using SAS to analysis of variance using F test and in significance case among treatments of Moringa levels there was first and second grade regression study using GLM (General Linear Model) evaluating significance levels of 5%.

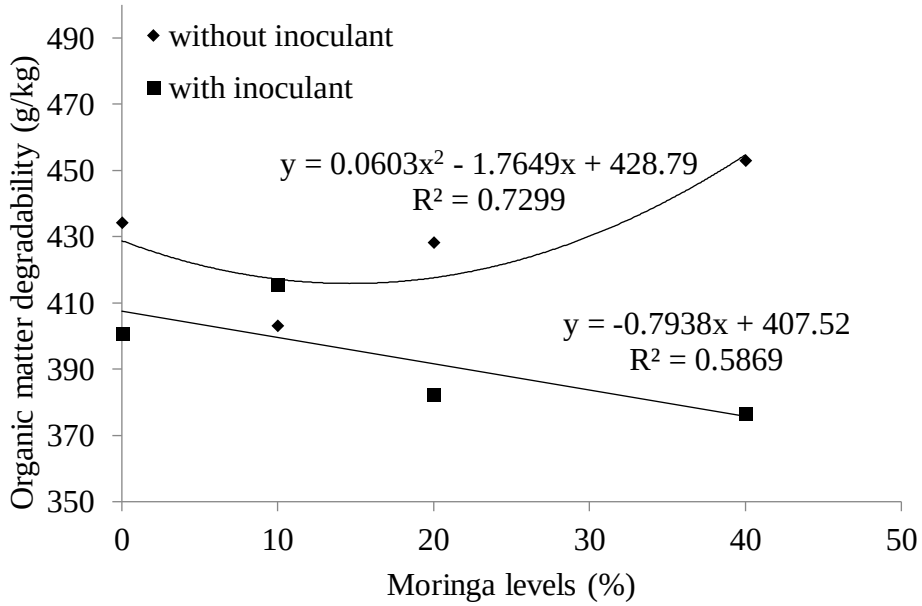
Results and Discussion Degraded organic matter increased in a quadratic curve along with Moringa levels in absence of bacterial silage inoculant (Figure 1). Rising of crude protein from Moringa can explain the better degradability of this food. The opposite was observed at silage with bacterial inoculant presence.

Table 1 Bromatological composition of silages of maize with levels of Moringa (MO) and bacterial silage inoculant (Inoc)

Treatments[1]		Bromatological composition[2]								
Inoc	MO (%)	DM	MM	CP	NDF	ADF	HEM	LIG	CEL	pH
		%								
With		25.52	5.68	6.01	53.62	29.76	23.86	4.75	25.00	4.00
	10	24.30	5.70	7.53	49.54	27.16	22.38	4.08	23.08	4.00
	20	23.53	5.59	6.02	47.81	27.16	20.65	3.98	23.18	4.00
	40	23.02	6.71	6.35	47.74	28.10	19.64	4.30	23.8	4.09
Without	0	24.99	7.41	6.21	48.23	26.70	21.53	4.80	21.9	4.06
	10	24.08	5.97	6.56	48.78	26.57	22.20	3.94	22.64	4.02
	20	23.28	5.69	7.01	48.61	27.14	21.47	4.38	22.77	3.95
	40	22.45	6.62	6.92	52.48	32.03	20.45	5.61	26.42	4.17

[1]MO = Moringa; Inoc = bacterial silage inoculant.
[2]DM = Contents of dry matter, MM = minerals, CP = crude protein; NDF = neutral detergent fiber; ADF = acid detergent fiber; HEM = hemicelulose; LIG = lignina.

Figure 1 Organic matter degradability of silages of maize with levels of *Moringa* and bacterial silage inoculant.



At bacterial silage inoculant treatments, the organic matter degradability decreased linearly with Moringa levels. Probably bacterias inoculated in silage were not favorable in this substrate and along with buffering effects of Moringa may have damaged the nutritional value of silages.

Conclusions The highest level of Moringa included in silage of maize improved organic matter degradability, however bacterial silage inoculant had no effect.