Effects of maturity and length of cut on *in situ* degradability of corn silage starch

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Introduction Starch digestibility is influenced by harvester type and theoretical cutting size. In addition, plant maturity at harvest time is another factor that influences starch digestibility (Johnson et al., 1999; Shinners et al., 2000). This study evaluated the *in situ* starch degradability of silages produced from different hybrids harvested at different maturity stages. Mechanically processing under different theoretical length of cut (TLOC) was also evaluated.

Material and Methods The trial was conducted at the Animal Science Department of the Luiz de Queiroz College of Agriculture, University of Sao Paulo (USP/ESALQ). Corn silage ensiling was performed in experimental silos (20 L). The hybrids were harvested with the JF AT 1600 harvester (without grain processor). The treatments constituted of 2 maturity stages (300 and 370 g/kg DM), different hybrids (LG 6030, LG 6036 and AG1051) and 3 TLOC according to the harvester adjustment (3, 5 and 7 mm). Forages from 4 replicates per treatment were stored for 90 days. The following parameters were evaluated: chemical composition, *in situ* degradability of starch (12 hours of incubation), and percentage of degradable starch. Data were analyzed with the mixed procedure of SAS.

Results and Discussion There was an interaction between hybrid, maturity and TLOC. These factors affected the nutritive value and *in situ* degradability of starch (DEG-Starch). The content of DM and starch in the silage increased with the advancement of maturity (Figure 1A). As a result of this increase, NDF and ADF concentration decreased, due to starch deposition in the grain that cause the dilution of the effect on the other nutrients. As expected, corn silages harvested at a lower TLOC (3 mm) had fewer particles larger than 19 mm, more particles between 1.18 - 8 mm, and lower TMP compared to corn silages harvested at 5 and 7 mm. The DEG-Starch was mainly affected by hybrid type and maturity (Figure 1B). The disappearance of starch was higher for the AG 1051 hybrid, and this may be related to the low vitreousness of the corn grain, characterized by the company as a dent type. In the wetter silage, with TTC reduction from 7 to 5 mm, there was an average increase of 4% in rumen starch degradation and from 5 to 3 mm, an average increase of 5% in rumen starch degradation. However, for drier silage, reducing TTC did not affect ruminal degradation of starch. The hybrids AG 1051 and LG 6036 showed higher degradable starch content at 370 g/kg DM, whereas hybrid LG 6030 showed higher degradable starch content at 300 g/kg DM (Figure 1C).

Conclusion The LG 6030 hybrid proved to have hardest grains and to mature faster. When it was harvest with 300 g/kg DM and TTC to 3 or 5 mm it was more efficient and had better use of degradable starch. The hybrids AG 1051 and LG 6036 were mature slower, as 370 g/kg DM were more efficient. However, at this maturity (370g/kg DM), the reduction of TTC did not affect the degradable starch utilization. The TLOC and maturity are effective strategies for refining the recommendations for ensilage of different corn hybrids.

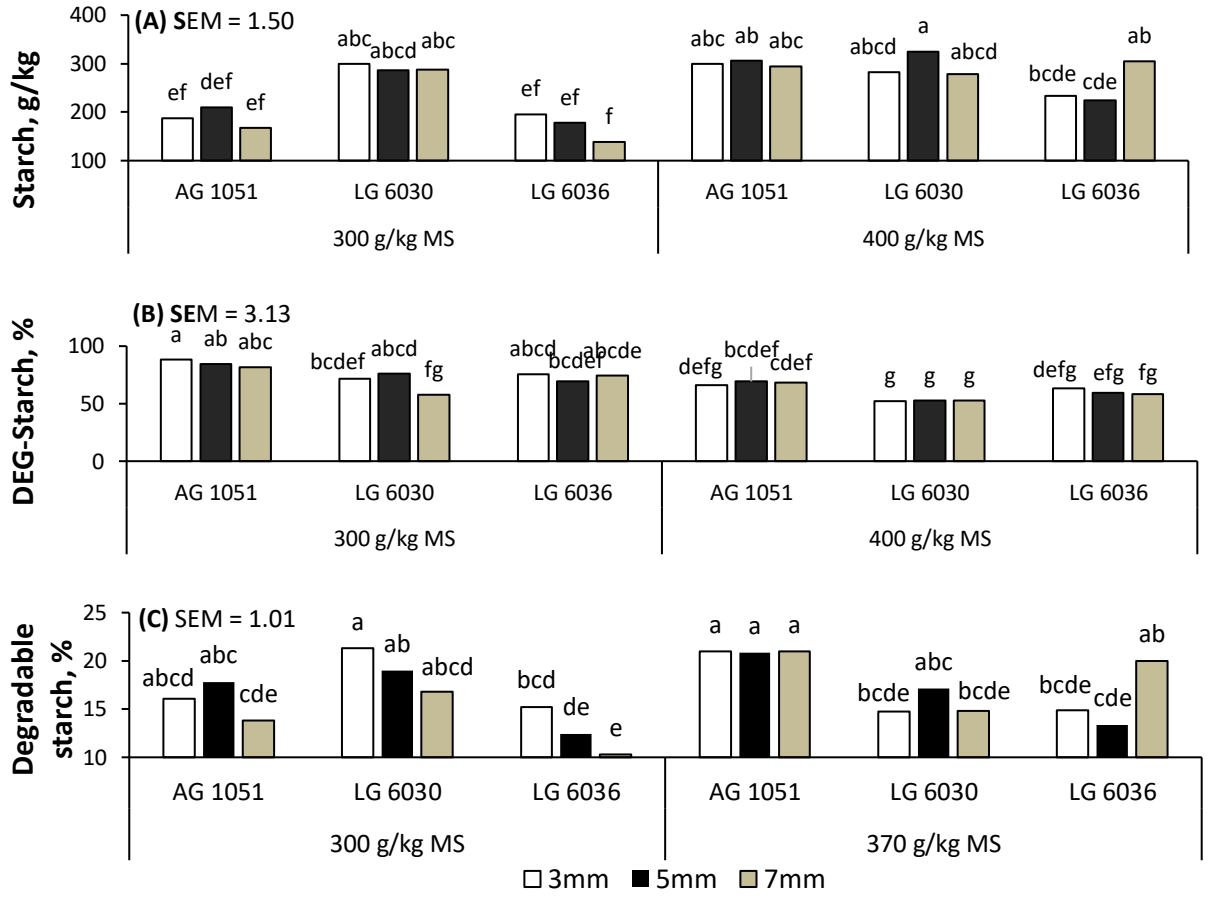

Figure 1. Interaction between hybrid, maturity and TLOC for starch content (P = 0.01), DEG12-Starch (P = 0.01) and degradable starch (P = 0.01) of silages. AG 1051, LG 6030, LG 6036 (Hybrids); 300 and 370 g / kg (MS content); 3 mm, 5 mm and 7 mm (TLOC); SEM: standard error of the mean. Means followed by the same letter do not differ by the 5% Tukey test.

References

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