

Soluble carbohydrates content according to maize drying method

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Introduction Dry matter (DM) determination is the start point of feeds analysis, enabling to express the nutrients content in the same basis. The DM determination of forages, with more than 40% moisture, is predominantly performed by conventional oven drying. However, during heating, sample chemical composition can be altered (Deinum and Maassen, 1994). In order to prevent it, several methods have been proposed to cease enzymatic and microbial activities as soon as possible in the samples. The objective of this study was to compare drying methods in whole corn plant (fresh or frozen) in order to evaluate DM and alcohol soluble carbohydrates contents.

Material and methods Whole corn plants were harvested at 2/3 milk line and chopped in a stationary machine and conditioned. Fresh (day zero) or frozen (120 d storage period) samples. Were considered the following methods:

- a) Conventional oven-drying at 55°C for 48h;
- b) High-temperature pretreatment at 100°C for 1h followed by conventional oven-drying;
- c) Microwave pretreatment for 1 minute (1100W to achieve 70°C) followed by conventional oven-drying;
- d) Microwave-drying, until a constant sample weight.

Four replications of each treatment were done. The dried samples were grounded in a Wiley mill through a 1 mm sieve. Soluble carbohydrates (SC) were obtained in alcohol extracts (ethanol 80%) and determined by the phenol-sulfuric acid method, according to Hall (2000). Statistical analysis was performed by using the MIXED procedure of SAS considering a completely randomized design. The means were compared by Tukey test ($\alpha = 0.05$).

Results and Discussion The microwave treatment lead to the lowest DM content across the procedures in both fresh and frozen samples ($P < 0.05$) opposed to showed by Oetzel et al. (1993) in corn silage samples. More extensive DM oxidation during sample heating might be a possible explanation. Soluble carbohydrates content was similar ($P > 0.05$) across treatments. There was no interaction ($P > 0.05$) between drying methods and storage (fresh or frozen) samples. Although pretreatment have been recommended in forage samples to prevent soluble carbohydrates losses (Pelletier et al., 2010), in the current study it was not efficient.

Conclusion Drying methods did not result in significant changes of soluble carbohydrates fraction.

References

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Table 1. Effect of drying methods on dry matter (DM) and soluble carbohydrates (SC) contents

Treatment	% DM	% SC
Conventional-Oven Drying (55°C)	38.78 ^a	5.16 ^a
High temperature pretreatment	38.53 ^a	5.31 ^a
Microwave pretreatment	39.42 ^a	5.67 ^a
Microwave-drying	35.88 ^b	4.96 ^a
SEM	0.58	0.19
Effect	<0.01	0.19

Means in the same line with different superscript differ (P<0.05)