Maize Grain Drying Using Diatomaceous Earth

Ferenc PÁL-FÁM, Sándor KESZTHELYI

Kaposvár University, Faculty of Animal Sciences, Department of Botany and Plant Production, Hungary. pff3@hotmail.com, ostrinia@gmail.com

SUMMARY

The costs of maize production became higher in the recent years, growing up with 25% in the case of monoculture in Hungary. Therefore it must be emphasised the investigation and utilisation of alternative ways for grain drying. One of these alternative technologies is the utilisation of diatomaceous earth. An incontestable advantage of this technology is the low material cost. A presumable advantage is the pesticide feature of the diatomaceous earth, too, published in several papers in the international literature (Athanassiou et al. 2007).

Three different moisture contents of maize have been used for the investigations: 19.8%; 21.0%; 28.7% grains. The samples were 5-5 kg each. Three treatments have been used in four repetitions: control=without treatment; 1‰=1 t grain + 1 kg diatomaceous earth; 2‰=1 t grain + 2 kg diatomaceous earth. For the examination of the effect of 'extreme' quantity of diatomaceous earth two higher doses were also investigated: 4‰ and 8‰ in the case of the 19.8% humidity maize grain, too. The moisture and dry matter content of the 0.5 kg homogenate samples were determined in every two days, up to two weeks in accordance to the Hungarian Standard (MSZ 6830/3-77). The moisture content of the treated grains showed an unambiguous decrease, comparing with the control samples. The absolute moisture decrease was between 2.3-4.4%, depending on treatment. This means 1.5-1.6X higher moisture loss than the control. The higher moisture loss was observable in the case of the 2‰ samples (around 4,5% moisture decrease).

Parallel with the moisture content decrease of the grains the intensity of moisture loss is decreasing, too. This phenomenon can be explained with the clumsy mobilisation of the vegetation water, in the lack of surface water. The utilisation of the 'extreme’ doses caused higher moisture loss, but the efficiency is decreasing exponentially. The utilisation of higher doses of diatomaceous earth doesn’t caused linear increase of moisture loss.

Summarising, the utilisation of diatomaceous earth for maize grain drying doesn’t replace the heat transmission grain drying because it isn’t possible to get the wanted 13-14% moisture content exclusively in this way. This technology can be used for partial drying of higher moisture content grains, as well as for replacing the two-step drying by heat transmission with one-step drying.

Keywords: maize, diatomaceous earth, grain drying

REFERENCES
