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Effects of increasing concentrations of sodium sulfite on deoxynivalenol concentrations of maize meal and maize kernels preserved with propionic acid at various moisture contents

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The mycotoxin deoxynivalenol (DON) formed by field fungi of the genus *Fusarium* might affect animal health by the consumption of contaminated feeds. Under European climatic conditions DON contamination occurs frequently on cereals, including maize. Detoxification measures are required if critical DON concentrations are exceeded in order to avoid adverse effects on farm animals. It was reviewed recently that a wet treatment of DON contaminated cereal grains with sodium metabisulfite results in a reduction of the DON concentration and a concomitant increase in DON sulfonate which is regarded as a detoxified derivative of DON. However, it was not investigated so far if the alternative substance sodium sulfite also leads to such DON decreasing effects.
Hence, the present study aimed to investigate the kinetics of DON concentration in maize kernels and maize meal, contaminated with 46.389 mg DON per kg dry matter, during wet preservation with sodium sulfite (Na_2SO_3) and propionic acid. To find the optimum Na_2SO_3 - dose for maximum DON reduction and to examine the interaction between dose and moisture content in dependence on the preservation duration, increasing Na_2SO_3 dosages (0, 1.25, 2.5, 5 and 10 g per kg) were tested at total moisture contents of 14% and 30% for up to 79 days. Propionic acid was included in all treatment variants at a constant dose of 15 g per kg to avoid microbial spoilage.
In general, DON concentration decreased with increasing amounts of supplemented Na_2SO_3 and with increasing duration of the preservation period in a bi-exponential fashion when Na_2SO_3 addition was ≥ 2.5 g/kg. At lower additions of Na_2SO_3 only minor and inconsistent DON reduction rates were observed. All variants preserved at 30% moisture led to high DON reduction rates after 79 days. The measured DON concentration in variants supplemented with 10 g Na_2SO_3 per kg amounted at 30% moisture to 4 and 3% of the initial concentration for kernels and meal, respectively while the corresponding recovery for the variants preserved at 14% amounted to 15 and 42%, respectively. Thus, after 79 days, a slight reduction rate of DON in maize meal at 14% was visible. This observation could be explained by the greater surface texture of the feed and the predisposing factor to the higher moisture content. In conclusion, the overall results and statistical analysis clarified that the highest Na_2SO_3 addition of 10 g per kg of maize at a moisture content of 30% for 79 days might be necessary to obtain a maximum DON reduction. Here, the feed structure and moisture content had a significant influence on the decontaminating effect of sodium sulfite.