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The Impact of Corn Grain Consolidation on the Emission of Volatile Organic Compounds

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Abstract : The aim of the research was to determine the emission of volatile organic compounds (VOCs) from corn grain depending on the degree of consolidation of the bulk material, imitating the processes occurring in silos during material storage. An electronic nose and a gas chromatograph were used for VOC analysis. Corn grain was densified under pressure of 40 and 80 kPa. Control samples of corn grain were not compacted and had bulk density. The analyzes were carried out at 14% and 17% humidity (w.b. – wet basis). The measurement system enabled quantitative and qualitative analyzes of volatile compounds and their emission intensity during the 10-day storage period. The study determined the profile of volatile compounds as a function of storage time and grain density level. The test results showed that the highest emission of volatile compounds was recorded in the first four days of storage of corn grain. VOC emissions, as well as grain moisture and volume, can be helpful in determining the quality of material stored in silos and its subsequent suitability for consumption.

Keywords : maize, consolidation, storage, VOCs, GC-MS, chemometrics
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