Biosystems Engineering

Research from University of Manitoba broadens understanding of biosystems engineering

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According to recent research published in the journal *Biosystems Engineering*, "A carbon dioxide sensor was developed using polyaniline boronic acid conducting polymer as the electrically conductive region of the sensor and was demonstrated for use in detecting incipient or ongoing spoilage in stored grain. The developed sensor measured gaseous CO2 levels in the range of 380-2400 ppm of CO2 concentration levels."

"The sensor was evaluated for the influence of temperature (at - 25 degrees C to simulate storage and for the operating temperature range of +10 degrees C to +55 degrees C) as well as relative humidity (from 20 to 70%). The variation in the resistance with humidity was curvilinear and repeatable, and had a less pronounced effect on the sensor's performance compared to temperature. The sensor was able to respond to changes in CO2 concentration at various humidity and temperature levels. The response of the PABA film to CO2 concentration was not affected by the presence of alcohols and ketones at 1% of vapour pressure, proving that the developed sensor is not cross-sensitive to these compounds which may be present in spoiling grain. The sensor packaging components were selected and built in such a way as to avoid contamination of the sensing material and the substrate by undesirable components including grain dust and chaff," wrote S. **Neethirajan** and colleagues, University of Manitoba.

The researchers concluded: "The developed conducting polymer carbon dioxide sensor exhibited effective response, recovery time, sensitivity, selectivity, stability and response slope when exposed to various carbon dioxide levels inside simulated grain bulk conditions."

Neethirajan and colleagues published their study in *Biosystems Engineering* (Development of carbon dioxide (CO2) sensor for grain quality monitoring. *Biosystems Engineering*, 2010;106(4):395-404).

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