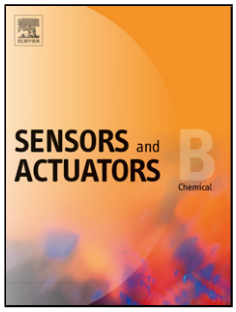

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Water based-ionic liquid carbon dioxide sensor for applications in the food industry

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Highlights

- A water-based sensor for carbon dioxide containing an ionic liquid has been developed
- The inclusion of an ionic liquid in the matrix improves the dynamic response
- A study related to the correlation between the gas generated by pork meat over time versus the total bacteria count identified 20% of CO_2 as the threshold for indicating pork meat spoilage
- The feasibility of this new sensor has been studied under different conditions of light, temperature and humidity

Abstract

A new water-based sensor for carbon dioxide containing an ionic liquid is presented. The sensor is based on the acidity of the CO_2 molecule. The sensor incorporates an ionic liquid in the matrix, which enhances CO_2 solubility, and minimising the response and recovery times of the sensor. The entire concentration range (0-100%) of CO_2 in water has been studied. The sensor is more sensitive at low CO_2 concentrations as is usual in this kind of optical sensor. As the sensor is intended for smart food packaging, one of the most important characteristics is stability, and this has been studied under different conditions of light, temperature and relative humidity. The sensor was found to be stablef or more than 14 days, which is the period of use for the intended application Pork chops were packed at 4ºC and the production of CO_2 studied in conjunction with total bacterial counts over a period of 14 days. The results show that the concentration of CO_2 dioxide increases in time, in correlation with bacterial counts. As the threshold