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Importância do estudo das interações intermoleculares na ciência de alimentos: desenvolvimento de nanosensores

The importance of the study of intermolecular interactions in food science: development of nanosensors

In recent years, many food frauds and outbreaks have been reported, increasing consumer concern about food quality. Therefore, monitoring food quality efficiently is important. Traditional methods used to detect chemical and/or microbiological agents are sensible and selective, but often time consuming and costly. The development of sensors to detect contaminants in food matrixes in real time has attracted interest of researchers. Polydiacetylene (PDA)-based sensors are able to respond to different stimuli undergoing colorimetric transition from blue to red color. This colorimetric change can be detected by UV-visible absorption and fluorescence spectra, or even visually. Due to the real-time detection, PDA-based sensors would allow monitoring and detecting undesirable agents in food before commercialization, thus preventing food outbreaks and intoxications. However, the complexity of the food matrix may difficult the use of these sensors due to the interference of food constituents in sensor specificity. Thus, for efficiently applying PDA-based sensors in foods it is necessary to know the behavior of PDAs in the presence of different food constituents. To achieve this knowledge, the thermodynamic binding parameters between PDA and food molecules, in different conditions, must be determined. For this, several sensitive experimental techniques are often used such as isothermal titration nanocalorimetry, differential scanning nanocalorimetry, UV-vis and fluorescence spectroscopies. In addition to the above-discussed reason, some food constituents, like milk proteins, are also interest to detect in small concentration in foods because they can be allergenic for some people, and thus it is essential to understand the mechanism of molecule-PDA binding and PDA colorimetric transition in the presence of these molecules. Therefore, the study of intermolecular interaction between PDA and different food molecules is fundamental for developing efficient PDA-based sensors which could be applied directly in food systems for many purposes.

References

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