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Development of a realistic *in vitro* digestion model (RGM) coupled UV-VIS-SWNIR fibre optics spectroscopy

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Background: The development of realistic gastric models unlocked the possibility of studying important digestion phenomena occurring during the digestion of food (e.g., retropulsion). Understanding the dynamics of food digestion in real-time, without sample manipulation, is still a challenge, but brings a huge potential in providing important insights regarding the dynamic process of food digestion (e.g., real time nutrient release kinetics)
This study presents a realistic 3D printed *in vitro* gastric model coupled with ultraviolet-visible-short-wave-near-infrared (UV-VIS-SWNIR) spectroscope that can be used for real time quantification of nutrients/bioactive compounds.
Methods: The INFOGEST semi-dynamic *in vitro* protocol was used to simulate the digestion of rice (model food). The spectroscope was calibrated for glucose analysis, and the spectra were pre-processed and both chemometric and machine learning techniques were used for glucose quantification using the correlation coefficient as assessment metric.
Results: The machine learning algorithms showed to be more accurate at predicting glucose release during the *in vitro* gastric digestion.
Conclusions: The gastric compartment development techniques provide the opportunity to develop a potential standard dynamic *in vitro* gastric model. Furthermore, it was possible to accurately measure and quantify glucose release during the *in vitro* digestion process, in real time, using UV-VIS-SWNIR fibre optics spectroscopic.