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Preserving food quality is critical to limit the oxidation processes. The evolution of meat colour or the development of rancid taste in oils are two examples of oxidative processes degrading the food quality. The reaction of oxygen (or its derivatives) with metal ions naturally present in food (*eg.* iron) forms free radical reactive oxygen species (ROS). These ROS are the main factors of food oxidation. The aim of this work is to evaluate the intakes of quantitative *in situ* NMR to understand and characterize the oxidation mechanisms.

Our preliminary work focussed on the evaluation of some amino acid mixtures as models of protein oxidation. Due to NMR signal overlaps, recording 2D NMR spectra is indispensable to isolate NMR signals from targeted amino-acids. However, these experiments are time-consuming and not adapted to chemically evolving media. To address this limitation, we developed tailored hybrid methods based on ultrafast 2D NMR. The spectrum recording time decreased from ~30 min for a classical pulse sequence to a few minutes only with the ultrafast method. This approach allows the real-time monitoring of chemical evolutions in such complex mixtures. Using this quantitative approach, we observed a fast oxidation for the histidine while threonine and lysine oxidization kinetics were significantly slower. Our analytical approach offers a promising tool to monitor oxidation processes in food products.