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A. BOUSSARD, J.-P. AKA, F. GIRAUD, J. POTUS et J. NICOLAS **Oxydation de la trilinoléine par les LOX végétales de soja, blé et fève en milieu modèle aux pH 6.8 et pH 9: mise au point d'une méthode de quantification de la trilinoléine et de ses produits de dégradation.** Poster présenté aux 58es Journées Techniques des Industries Céréalières - 18-19 Oct. 2007

L. RAKOTOZAFY, R. GARCIA, J. POTUS et J. NICOLAS **Tentative de mise en évidence de la formation de liaisons protéines-protéines ou protéines-arabinoxylanes au cours du pétrissage.**Poster présenté aux 58es Journées Techniques des Industries Céréalières - 18-19 Oct. 2007

MICHON C., KOUASSI-KOFFI J.D., LAUNAY B., DAVIDOU S. **Caractérisation des propriétés d'écoulement d'une pâte de farine de blé par compression en conditions lubrifiées : effet du mode de pilotage de la vitesse de traverse mobile.** Poster présenté au 42 ème colloque du Groupement Français de Rhéologie sur "La rhéologie des systèmes évolutifs". - 10 au 12 Octobre 2007- Clermont Ferrand.
S. Davidou, C. Michon , P. Roussel, A.M. Riquet **Suivi de l'évolution de la structuration des pâtes au cours du pétrissage et du repos par rhéologie et résonance paramagnétique électronique** Communication orale présentée au 42 ème colloque du Groupement Français de Rhéologie sur "La rhéologie des systèmes évolutifs". - 10 au 12 Octobre 2007- Clermont Ferrand. **Résumé** : Des pâtes de qualité boulangère ont été étudiées par une méthode de rhéologie en régime dynamique d'une part, et par spectroscopie de Résonance Paramagnétique Electronique (RPE), d'autre part. Les effets du pétrissage et du temps de repos après pétrissage ont été suivis. Après avoir déterminé sensoriellement la zone de temps de pétrissage optimal (5 à 6 minutes), nous avons constaté que les pâtes sous - pétries, correctement pétries et sur - pétries peuvent être discriminées tant par leur niveau de G' et tan d juste après le pétrissage, que par leurs évolutions au cours du repos. L'utilisation d'une sonde paramagnétique 2,2,6,6-tétraméthylpiperdin-1-oxyl (tempo) capable de se répartir dans des milieux de polarités différentes a permis de mettre en évidence la formation d'un environnement hydrophobe au cours des 3 premières minutes de pétrissage. Aucun changement de viscosité de l'environnement de cette sonde au cours du pétrissage n'a pu être observé. Cette sonde, généralement utilisée pour sa stabilité, s'est avérée être un marqueur de la réactivité du milieu : cette dernière est maximale aux alentours de 5 minutes de pétrissage. **Mots-clé :**pâte de farine, pétrissage, viscoélasticité, RPE
NICOLAS J. **Oxidoreductases and related enzymes in breadmaking.**Conférence invitée, 2007 AACC International Annual Meeting, October 7-10, Henry B. Gonzalez Concention Center, San Antonio, Texas. diaporama (fichier pdf. 358 Ko) CHERIOT S., BILLAUD C., POCHTRAGER S., WAGNER K.-H., NICOLAS J **Antioxidant effects of Maillard reaction products from cysteine/glucose as compared with neoformed products from cysteine and hydroxymethylfurfural** Poster, 9th International Symposium on the Maillard Reaction, Munich, 1-5 september 2007. **Abstract** : In previous works, Maillard reaction products (MRP) made from cysteine and glucose were proved to be very powerful inhibitors of enzymatic browning detrimental to the quality of fresh and minimally processed fruits and vegetables. Because Maillard reaction is a complex whole of reactions between amino and aldehydic or ketonic compounds, we decided on a strategic simplification of the model reaction. We showed by **determination of the inhibitory constants**and**colorimetric measurements** **(L^*, a^*, b^*)**that neoformed products from heated cysteine or ammonium sulphide mixed with 5-hydroxymethylfurfural (HMF) elicited a stronger inhibitory potency toward enzymatic browning of potato, eggplant, apple and mushroom than former MRP. This strong inhibitory potency was linked to an inactivation of the enzyme. A comparison of the **antioxidant**(determined by AAPH and DPPH tests) and **copper-chelating**properties between the MRP and the neoformed products was drawn. Before considering the potential application of such anti-browning model mixtures, their toxicological effects were studied in **Ames test**to determine the best process conditions to produce safe antioxidant compounds.

L. Levavasseur, S. Davidou, L. Rakotozafy, J. Potus et J. Nicolas **Mesure de la prise de force de la pâte au cours du pétrissage : comparaison des données obtenues par 2 pétrins.**Poster, *Chimiométrie 2006*, 30 novembre - 1 décembre, ENSCP, Paris

Loïc Levavasseur , Lalatiana Rakotozafy , Alain Sommier , Gabrielle Moulin , Sarah Lanchas , Jocelyn Rouillé , Jacques Georis , Jacques Potus et Jacques Nicolas. **Comparaison de la consommation d'oxygène de pâte de farine de blé tendre mesurée par deux pétrins instrumentés par la méthode de l'analyse statistique multivariée.**Poster présenté aux *57èmes Journées Techniques des Industries Céréalières*, 20 et 21 novembre 2006, Paris.

Lalatiana RAKOTOZAFY, Molobaly SIDIBE, Loïc LEVAVASSEUR, Jacques POTUS et Jacques NICOLAS **Mise en évidence par CLHP-PDA de produits conjugués thiol-phénol au cours de l'oxydation de mélanges contenant de la tyrosine, de l'acide férulique, de la cystéine et du glutathion par la laccase.**Poster présenté aux *57èmes Journées Techniques des Industries Céréalières*, 20 et 21 novembre 2006, Paris**.**

Lalatiana Rakotozafy, Loïc Louarme, Jacques Potus et Jacques Nicolas.**Comparaison de deux méthodes d'analyse des composés thiols hydrosolubles de bas poids moléculaires. Application aux levures désactivées.** Poster présenté aux *57èmes Journées Techniques des Industries Céréalières*, 20 et 21 novembre 2006, Paris

ROMAN GUTIERREZ Alma-Delia, DOMENEK Sandra et DAVIDOU Sylvie. **Evaluation of rheological properties of bread dough made with several varieties of barley flours**. Poster présenté à*International Congress of Food Science and Technology*, 15-17th November 2006, Cordoba, Argentine.

DAVIDOU Sylvie, MICHON Camille, RIQUET Anne-Marie **Electron Spin Resonance Characterisation of Wheat Dough During Mixing: Effect of Glucose Oxidase**13th World Congress of Food Science and Technology, Food is Life, IUFOST 2006, 17-21 septembre 2006, Nantes, France, Poster. (Poster : fichier pdf) **Abstract :**Wheat dough development during mixing involves low energy and/or covalent bounds between macromolecules, i.e protein and arabinoxylans. The structuration of macromolecules would modify their mobility and flexibility and leads to changes of their aqueous environment. The objective of this work was to show the influence of formulation (here, the addition of glucose oxidase (GOX)) onto biopolymers organisation during mixing and resting, by studying modifications of the aqueous environment (viscosity, polarity). These changes have been followed by Electron Spin Resonance (ESR). Because dough is not naturally paramagnetic, a small and stable spin probe (Tempo (2,2,6,6-tetramethylpiperidinooxyl)) was added during or after dough mixing. This probe showed the ability to partition between phases of different hydrophobicity. In this study, it was used as an indicator of structural evolutions and as a probe of medium reactivity. *As an indicator of structural evolution :* Tempo was introduced after mixing (mixing time varying from 1 to 9 min) without resting: its partition within dough indicates the existence of a more hydrophobic environment that was builded up into 3 minutes of mixing in absence of GOX and into1.5 minutes in presence of GOX. No significant change of the local viscosity was observed during mixing. But addition of GOX have lead to a decrease of the viscosity of the aqueous polar medium, indicating a change in water repartition that could be due to a network reorganisation. *As a probe of medium reactivity:* When Tempo was introduced at the beginning of mixing, radial shearing measurements performed after 5 min of mixing and a resting period of 20 minutes revealed a decrease in G' and an increase in tan delta. In parallel, ESR signal was lost. It appeared that probe behaved as a reducing agent (i.e. cystein or glutathion) probably interacting with species which normally act as oxidant.When tempo was introduced after mixing, a decrease of ESR signal was observed whatever was the formulation (+/- GOX) and mixing time. It was attributed to the reaction of probe with some reactive species present into the aqueous phase. A higher rate of decrease was associated to a higher reactivity of the liquid phase. Whatever the mixing time, an increase of the reactivity was observed in presence of GOX indicating that this enzyme catalyzes new reactions or activates other enzymes, for example wheat peroxidase. **Key words**: ESR, dough, mixing, glucose oxidase.

L. Levavasseur, L.Rakotozafy, A. Sommier, G.Moulin, S.Lanchas, J. Rouillé, J. Georis, J. Potus and J. Nicolas (2006). **Comparison of the oxygen consumption of wheat flour dough recorded by two instrumented kneaders using multivariate statistical analysis.** 13th World Congress of Food Science and Technology, Food is Life, *IUFOST 2006*, 17-21 septembre 2006, Nantes, France, Poster. (Poster : fichier pdf 1,36 Mo)

CHERIOT S, BILLAUD C, NICOLAS J (2006) **Antioxidant effect of neoformed products from mix of heated cysteine and carbonyl compounds on polyphenoloxidase activity**, *Cost-Imars congress on the Maillard Reaction In Food and Medicine*, 24-27may 2006. Napoli, Italy, Communication orale. **Abstract**: In previous works, the soluble part of Maillard reaction products (MRP)made from thiol compounds and glucose were proved to be very powerful inhibitors of enzymatic browning detrimental to the quality of fresh and minimally processed fruits and vegetables. Because Maillard reaction is a complex whole of reactions between amino and aldehydic or ketonic compounds to produce a wide range of intermediate products, we decided to simplified the model reaction and showed that neoformed products from heated sulfur compounds (cysteine) with some pure aldehydic components (5-hydroxymethylfurfural (HMF), furfural and benzaldehyde) elicited a stronger inhibitory potency toward enzymatic browning of potato, eggplant, apple and mushroom than former MRP. The first part of our research focused on the optimization of the antioxidant activity (AOA) of selected mixtures. The effects of the nature and the ratio of the components in the mixture, the pH of cysteine before heating and the heating treatment (duration and temperature combination) were optimized. In a second part, the stability of the AOA for the neoformed products was investigated. AOA was kept during storage at 4 °C, 25 °C and 37 °C but lost when exposed to UV radiation. The acidification of the mixtures (e.g heated cysteine / 5-HMF) during storage

was favorable to the stability of their antioxidant properties in contrast with alkalinization. In order to investigate the structure of the compound(s) involved in the AA, preliminary fractionation and analyses were carried out using HPLC-DAD on the soluble part and CG-MS on dicholoromethane extract of the heated cysteine / aldehyde mixtures.
Keywords: Maillard products ; antioxidant ; neoformed ; cysteine ; 5-HMF, polyphenoloxidase, inhibition

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