# Dans les revues à comité de lecture en 1997

KAID N., RAKOTOZAFY L., POTUS J., NICOLAS J. (1997). **Studies on the glutathione-dehydroascorbate oxidoreductase (EC 1.8.5.1) from wheat flour**. *Cereal Chem.*, **74**, 605-611. **Abstract** : Glutathione (GSH) dehydrogenase was partially purified from wheat flour after extraction, ammonium sulfate precipitation, and ionic-exchange chromatography on diethylaminoethyl (DEAE) Sepharose CL6B. Kinetic studies showed that the optimum pH was close to 7.5. The Km values varied between 0.15 and 0.28 mM for dehydroascorbic acid (DHA) and between 1.8 and 0.62 mM for GSH when pH was varied from 5.5 to 7.5. The kinetic pattern was consistent with a sequential mechanism for the binding of GSH and DHA. NaCl is a competitive inhibitor with respect to GSH and is uncompetitive with respect to DHA, which suggests that the enzyme combines with DHA before it does with GSH. IsoDHA can replace DHA as hydrogen acceptor but with a Km of 1.2 mM. **g**-Glu-Cys was enzymically oxidized but much less efficiently than GSH (Vm = 47 nkat/mL and Km = 5.5 mM compared to Vm = 362 nkat/mL and Km = 1.8 mM for GSH), whereas cysteine and Cys-Gly to small amounts of GSH causes a large activation of the enzymic formation of ascorbic acid suggesting coupled oxidation of these thiols.

FONTANET I., DAVIDOU S., DACREMONT C., LE MESTE M. (1997). **Effect of water on mechanical behaviour of extruded flat bread**. *J. Cereal Sci.*, **25**, 303-311. **Abstract** : The effect of water on the mechanical properties of extruded breads was studied, at room temperature. As the moisture content was increased from 6 to 9 % moisture, the resistance to fracture (compression tests) or rupture (tensile tests) was improved. Above this moisture range, plasticisation by water was the dominant phenomenon. The brittle to ductile transition was observed to occur within a moisture content range from 9 to 13.7 % (w/w). The influence of water on the crispness of extruded bread, evaluated with sensory evaluation, is also described.

DAVIDOU, S.; MESTE, M. LE.; DEBEVER, E.; BEKAERT, D., (1996),**A contribution to the study of staling of white bread: effect of water and hydrocolloid.** *Food Hydrocolloids*, **10**(4), 375-383. **Abstract** : Staling of white bread at ambient temperature was studied using differential scanning calorimetry and dynamic mechanical thermal analysis. During storage, sample hydration varied slightly, from 0 to 0.4% per day, depending on packaging conditions. An increase in rigidity was observed, which was attributed both to starch retrogradation and to changes in the organization of the amorphous part of crumb. The glass transition temperature of crumb was not significantly modified by these structural change. Hydrocolloids did not affect the overall shape of the viscoelastic behavior of crumb in the temperature range from -40**°C** to 80**°C**, and had a limited influence on the kinetics of starch retrogradation during storage. They decreased significantly the rate of increase in rigidity, compared to control bread. Hydrocolloids were expected to play an important role on the plasticity of the amorphous regions of crumb, either through water retention (as locust bean gum), or by inhibiting gluten-starch interactions (xanthan and alginate). Complexes between the native lipids of flour and amylose were formed during the first two days of storage. They appeared to reduce the maximum level of starch retrogradation.

LE MESTE, M.; ROUDAUT, G.; DAVIDOU, S., (1996)**Thermomechanical properties of glassy cereal foods.** *Journal of Thermal Analysis* , **47**(5), 1361-1375. **Abstract** : The main objective of this paper is to discuss the relationship between physical. state, fracture mechanism, and texture for low moisture cereal-based foods. Experiments. were also carried out to get a better understanding of the role of water. At room temperature, extruded bread and white bread (previously) dehydrated, then rehydrated in atmospheres with controlled humidities exhibited a brittle behavior up to around 9% moisture. At 13.7% moisture, they were ductile. A significant loss in the crispness of extruded bread was observed between 8.5 and 10% moisture. The glass transition temperature (Tg) was measured, using dynamic mechanical thermal analysis (DMTA), for samples with up to 40% moisture. The resulting Tg curve showed that the important changes in fracture mechanisms and crispness occurred while the samples were still in the glassy state. The viscoelastic behavior of both extruded and white breads suggested that a secondary relaxation occurred around 10°. Another event was observed around 70° for low moisture sample, using DMTA. This event was attributed to disruption of low energy interactions.

FAYAD N., MARCHAL L., BILLAUD C., NICOLAS J. (1997). **Comparison of b -cyclodextrin effect on polyphenol oxidation catalyzed by purified polyphenol oxidase from different origins**. *J. Agric. Food Chem.*, **45**(7), 2442-2446. **Abstract** :The effects of **b**-cyclodextrin (**b**-CD) on polyphenol oxidation. catalyzed by apple polyphenol oxidase (PPO), endive PPO, or mushroom tyrosinase have been compared. **b**-CD forms a complex with phenolic substrates of PPO by inclusion. Assuming a 1:1 **b**-CD/phenol stoichiometry, and assuming that PPO is inactive on the complex **b**-CD/phenol, KD values were similar when determinated. kinetically by inhibition of apple PPO or endive PPO. However, the experimental. velocities found during inhibition of mushroom tyrosinase by **b**-CD were higher than the values predicted by this model. In this latter case, it was assumed that mushroom tyrosinase is able to act on the complex **b**-CD/phenol. A new model based on this assumption allows experimental and calculated velocities to be fit in presence of **b**-CD.

BILLAUD C., LECORNU D., NICOLAS J., (1996) **Substrates and Carboxylic Acid Inhibitors of a Partially Purified Polyphenol Oxidase from Gum Arabic,***J. Agric. Food Chem*., 44(7), 1668-1675 **Abstract:**Polyphenol oxidase (PPO) was extracted from gum arabic, and two isoenzymes were partially purified by ammonium sulfate treatment and hydrophobic and ion-exchange chromatographys. Both fractions displayed an optimum at pH 5.3. PPOs showed activity toward o-diphenolic substrates but not towards monophenols or p-diphenols. Activity was maximum with 4-methylcatechol (4MC) followed by the two catechins. Both enzymes showed apparent Km of 0.8 mM for (+)-catechin and 2.4 mM for (-)-epicatechin and 4MC. Aromatic acids of the benzoic, cinnamic, and phenylalkanoic series and sorbic acid were mixed-type inhibitors. Benzoic acid was the most effective one (KI = 0.44 mM and K'I = 1.3 mM). Inhibition efficiency increased when pH was lowered indicating that both neutral (AH) and dissociated. ($A^-$) forms are responsible for inhibition. For all compounds. tested, AH forms were more potent inhibitors than $A^-$ forms, and their affinity was higher for free enzyme than for the enzyme-substrate complex.

POTUS, J., (1995) , **Role of enzymes in breadmaking.** C. R. Acad. Agric. Fr., 81(2), 27-36. **Abstract** : A review with 16 refrences. Enzyme systems in raw materials, as well as in baking additives used for specific purposes - amylases, arabinoxylanases, lipoxygenase from soy or horsebean flour - play essential roles at all stages of the breadmaking process. Enzymic activities are affected by physicochemical effectors; water activity and mixing conditions are very important. Mixing to a homogeneous mixture of the dough components promotes molecular interactions and increases the enzyme-substrate contacts and the product diffusion. Mixing conditions affect amylolytic activities: increase of maltose content is dependent upon time and speed. Main enzymes involved in dough-making are reviewed with special focus on amylases and lipoxygenases which have been widely studied. This article describes enzymic reactions and highlights their role in order to increase the quality of the product and to reduce production costs.

GALEY C., POTUS J., DRAPRON R., POIFFAIT A., BAR C., FISCHER J., GIAMPOLI P., (1994) ,**Bread crumb flavor: influence of wheat variety and breadmaking process.** *Fr. Sci. Aliments* (1994), 14(5), 643-653. **Abstract** : The influence of wheat varieties and fermentation conditions (i.e. durations of initial and final fermentation, storage of the dough at +1° for 18 h) on the volatile compunds content and on the odor of bread crumb were studied in an experiment involving breads made according to 3 ref. methods with the flours from two varieties of wheat (Recital and Soissons). Volatile compounds were analyzed by gas chromatography and the odor of bread crumbs was rated by 30 subjects. Correlations were found between the compounds and the results of the sensory evaluation. The content in volatile compounds of the bread crumb and the strength of the olfactory flavor called "spicy" were affected by the refrigeration of doughs under controlled growth. Bread crumb made from flour of Recital variety was richer in volatile compounds than those made with the flour from Soissons variety. Hypotheses are proposed which might explain these differences.

NICOLAS J., POTUS J., (1994) , **Enzymic oxidation phenomena and coupled oxidations. Effects of lipoxygenase in breadmaking and of polyphenol oxidase in fruit technology.** *Sci. Aliments* , 14(5), 627-642. **Abstract** : A review with 59 references. The importance of coupled oxidation reactions in food technology is recalled using two examples showing the primary intervention of an enzyme in a first phase, leading to the formation of unstable products. In a second phase, mainly nonenzymic, these products are able to cooxidize a wide range of other compounds. Lipoxygenase catalyzes the oxidation of polyunsaturated fatty acids (PUFA) by molecular oxygen with the formation of hydroperoxides. This enzyme is at the very center of numerous reactions where other oxidoreducing systems interfere and which can explain its effects in breadmaking: degradation of PUFA and carotenoid pigments, oxidation of thiol groups, release of bound lipids and modification of bread aroma. In apple enzymic browning, polyphenol oxidase catalyzes the oxidation of polyphenols into unstable o-quinones by molecular oxygen. The reactivity of o-quinone with phenolic compounds leads to the formation of brown pigments. Reactions of o-quinones with nonphenolic compounds, i.e. ascorbic acid, sulfites, thiols, primary and secondary amines (either free or present in proteins) and water, also leads to the formation of pigments. In both cases, the hue and intensity of the resulting color are highly dependent on the kind of phenolic compounds. involved in the oxidation and cooxidation reactions.

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