Bing Li et al., J Glycomics Lipidomics 2015, 5:4
http://dx.doi.org/10.4172/2153-0637.C1.003

OMICS International
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International Conference on
Lipid Science & Technology
November 30 - December 02, 2015 San Francisco, USA

Formation of Nε-carboxymethyl lysine in lipid-rich food during Maillard reaction

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Advanced glycation end products (AGEs), products of Maillard reaction are related to the diabetic microvascular complications of retinopathy, neuropathy and nephropathy. Clinical evidences have shown that long chronic take-up food-AGEs would aggravate the complication of diabetics. Therefore, understanding the formation of Nε-carboxymethyl lysine (CML), a marker of AGEs, in foods rich of lipids is of importance. It was proved that hydroxyl radical (OH•) induced by Fenton reagent could promote CML formation in Lysine (Lys)+Glucose (Glu)+Fenton model system and Lys+Glyoxal (GO)+Fenton model system. The effect of Linoleic acid (Lin), Oleic acid (Ole), Trioleate (Tri) and Glycerol (Gly) on OH•, CML, Fructose lysine (FL), GO and Glu content in Lys+Glu+Lipid model system and the effect of Lin, Ole, Tri and Gly on CML and glyoxalic acid (GOA) content in Lys+GO+Lipid model system were determined. It was shown that OH• induced by Fenton reagent could promote three pathways for CML formation in Maillard reaction. Lin, Ole and Tri could induce more OH• in Maillard reaction model system which promoted FL and GO conversion to CML. However, Gly could reduce CML content in model system for its scavenging OH• ability. The promoting CML formation abilities of lipids on modeling system were in the order of Lys+Glu+Ole>Lys+Glu+Lin>Lys+Glu+Tri>Lys+Glu>Lys+Glu+Gly. The effect of five oilson OH•, CML, FL and GO content in Lys+Glu+Oil model system was studied. It was shown that vegetable oils including Soybean oil, Corn oil, Olive oil, Palm oil and Rape oil could induce more OH• in Maillard reaction model system which promoted FL and GO conversion to CML. The promotion effect of five oils on CML formation was in the order of Soybean oil>Corn oil>Olive oil>Palm oil>Rape oil.

Biography

Bing Li is a professor of Saccharide Engineering at the South China University of Technology where she has been a faculty member since 1997. Li's research is focused on a variety of issues related to functional foods. These include functional lipid, saccharide and peptide. She has published over 90 papers in peer-reviewed journals ranging from Food and Bioprocess Technology to Food and Chemical Toxicology, Food Research International, European Journal of Lipid Science and Technology etc. Her research interests include the functional lipid manufactory and its structure and functional evaluation, formation and inhibition of the hazardous food-derived glycation products, the separation and purification of bioactive substance (such as peptide or saccharides with lowing blood sugar activity) from Chinese herbs, etc.

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