OMICS International
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J Food Process Technol 2015, 6:8
http://dx.doi.org/10.4172/2157-7110.S1.024

4th International Conference and Exhibition on

Food Processing & Technology

August 10-12, 2015 London, UK

Quality of cakes formulated with different legume flours and baked in different ovens

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The objective of this study was to compare the quality of legume cakes baked in microwave-infrared combination (MW-IR) oven with conventional oven. As legume flour types, lentil, chickpea and pea were used. Cakes were formulated by replacing 10% of wheat flour with legume flours. Cakes were baked in the MW-IR oven for 4 min. Conventional baking was performed at 175°C for 24 min. As a control, wheat cakes were used. Weight loss, specific volume, porosity, texture, color and gelatinization degree of cakes were investigated. MW-IR baked cakes had higher specific volume, porosity, weight loss and crust color change and lower hardness values than conventionally baked cakes. Cakes baked in MW-IR oven gelatinized less than those baked in conventional oven. Pea flour giving the hardest structure, lowest specific volume and porosity and gelatinization degree was determined to be the least acceptable legume flour. On the other hand, lentil and chickpea cakes had the softest structure and the highest specific volume and porosity.

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The *in vitro* development of Maillard (MRP) reaction products in high protein, high carbohydrate systems; proposed relevance to potentially carcinogenic MRP formation during simulated food digest

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Research has allowed the identification of reaction products generated via the Maillard reaction between naturally-occurring amino acids and common dietary sugars including the monosaccharides glucose, galactose, fructose and the disaccharides sucrose, lactose and maltose. Reaction conditions are designed to model endogenous conditions present within the stomach and small intestine with respect to pH and temperature via simulated digestion of common foodstuffs. This research has allowed the initial identification of common Maillard reaction products (MRPs) formed under such reaction conditions and serves as a foundation for the further investigation of more complex systems involving the reaction of digestive products of both dietary carbohydrate and protein. Results have relevance across several research fields including oncology, glycomics and the investigation of advanced glycation end-products. Various *in vitro* studies of single Maillard reaction systems have identified MRPs which have non-favorable pharmacological properties. This includes the identification of potentially genotoxic compounds such as the formation of 5-(hydroxymethyl) furfural following reaction of dietary L-lysine with D-glucose for example. The overall scope of this research is to identify potential MRPs which may provide a basis for the correlation of consumption of high lysine content foodstuffs (example red meat) with an increased incidence of bowel related cancers.

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Notes: