

3rd International Conference and Exhibition on **Food Processing & Technology**

July 21-23, 2014 Hampton Inn Tropicana, Las Vegas, USA

Effect of various bread-making processes on phytochemical content and antioxidant capacity of whole grain breads

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Whole grain breads are good sources of dietary fiber and phytochemical antioxidants. This study aimed to investigate the effect of different bread-making processes (straight dough, sponge dough and sourdough at different levels, 15, 25 & 35%) on the content of free and bound phenolic acids, total flavonoids, total carotenoids and antioxidant capacity. Three antioxidant assays, ABTS, DPPH and ORAC were used to investigate antioxidant properties of breads. Free ferulic acid content in all the three breads investigated significantly ($P < 0.05$) increased by about 385, 441, 288, 294 and 210% for straight dough, sponge dough and 15, 25, 35% sourdough, respectively. Slight increases were also observed in bound ferulic acid (16 – 25%) in all the bread types with no significant differences among breads. Total flavonoids content influenced differently by the baking processes, with the straight dough method having the lowest impact. Significant increases in total carotenoids were found in all breads with sourdough breads having the highest content. Analysis of antioxidants data is underway to probe effect of baking processes. In general, the study showed that phytochemicals in whole grain bread could be manipulated via baking process in particular ferulic acid, the predominant antioxidant in wheat, to increase its freeform which could improve its bioavailability.

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