Making whole wheat bread taste and smell more appetizing

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The key to giving whole wheat bread a more appetizing aroma and taste may lie in controlling the amounts of a single chemical compound that appears in the bread, which nutritionists regard as more healthful than its refined white counterpart. That's the finding of a new study in ACS' *Journal of Agricultural and Food Chemistry*, which opens the door to making whole wheat bakery products more appealing to millions of people.

Devin G. Peterson and colleagues explain that whole wheat flour includes all three layers of the grain—bran, germ and endosperm—while refined flour is mostly endosperm. Whole wheat flour contains more fiber and compounds called phytochemicals, both of which can help reduce the risk of cancer, heart disease, diabetes and obesity. Despite

wheat bread's benefits, many consumers choose white bread because they prefer its taste and aroma. Peterson wanted to find out how one specific compound prevalent in whole wheat flour impacts its taste and aroma.

They focused on ferulic acid (FA), found mainly in bran. Scientists already knew that FA suppresses one of the critical components of baked bread's aroma. When Peterson's team added FA to white flour dough, the bread tasted and smelled like wheat bread. They linked those changes to reduced amounts of a number of compounds that help shape bread's aroma. Understanding these chemical reactions could help bakers make healthier bread more appetizing, the study suggests.

More information: "Influence of Endogenous Ferulic Acid in Whole Wheat Flour on Bread Crust Aroma" *J. Agric. Food Chem.*, 2012, 60 (45), pp 11245–11252. DOI: 10.1021/jf303750y

Abstract
The influence of wheat flour type (refined (RWF)/whole (WWF)) on bread crust aroma was investigated. Differences were characterized by aroma extract dilution analysis and quantified utilizing stable isotope surrogate standards. For RWF breads, five aroma compounds were higher in concentration, 2-acetyl-1-pyrroline, 4-hydroxy-2,5-dimethyl-3(2H)-furanone, 2-phenylethanol, 2-acetyl-2-thiazoline, and 2,4-dihyroxy-2,5-dimethyl-3(2H)-furanone, by 4.0-, 3.0-, 2.1-, 1.7-, and 1.5-fold, respectively, whereas three compounds were lower, 2-ethyl-3,5-dimethylpyrazine, (E,E)-2,4-decadienal, and (E)-2-nonenal by 6.1-, 2.1-, and 1.8-fold, respectively. A trained sensory panel reported the perceived aroma intensity of characteristic fresh refined bread crust aroma was significantly higher in RWF compared to WWF crust samples. Addition of 2-acetyl-1-pyrroline, 4-hydroxy-2,5-dimethyl-3(2H)-furanone, 2-phenylethanol, 2-acetyl-2-thiazoline, and

2,4-dihyroxy-2,5-dimethyl-3(2H)-furanone to the WWF crust (at concentrations equivalent to those in the RWF crust) increased the intensity of the fresh refined bread crust aroma attribute; no significant difference was reported when compared to RWF crust. The liberation of ferulic acid from WWF during baking was related to the observed reduction in these five aroma compounds and provides novel insight into the mechanisms of flavor development in WWF bread.

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