Title	Improving bioavailability of phytochemicals and functionality of whole grain foods
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Abstract

Despite the strong scientific, policy and regulatory support to increase whole grain intake, only eight percent of the US population aged 2 and over is estimated to consume at least 3 daily servings of whole grain. Among the many possible factors affecting the acceptance of whole grain foods, dislike of taste, color, and texture of whole grain food products and lack of experience in preparing and incorporating whole grain foods into daily dietary patterns are believed to be important barriers to the increase in whole grain food consumption. Another importance piece of this whole grain puzzle is the bioavailability of phytochemicals and dietary fibers in whole grain foods, which is directly related to the health benefits of consuming whole grain foods. Research is being conducted at the University of Minnesota to develop and promote whole grain-based foods with enhanced health benefits and acceptable sensory quality and shelf stability. One approach the researchers are taking is to process whole grain components so that both the functionality of and bioavailability of phytochemicals in the components are improved. Grain bran including aleurone layers is a major source of bioactive compounds such as dietary fiber, antioxidants, vitamins, minerals (potassium and magnesium), and phytochemicals (phytic acid and phenolic acids). These bioactive compounds supposedly provide a major portion of the health benefits associated with whole grain intake. However, as in other foods of plant-origin, the bioaccessibility/bioavailability of these nutrients and phytochemicals in grain bran are limited by the cellular structure matrix. In addition to its limited bioavailability of phytochemicals, bran is also a major contributor to the undesirable sensory attributes of whole grain products. The paper will give an overview of physical, thermomechanical, and enzymatic processes to improve bioavailability and functionality of grain bran. Some previous research on improving the performance of plant dietary fibers will be discussed. Some new processes and experimental data by the authors will be presented.