

Chemistry and value-added utilization of oats through innovative processing

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As an ancient crop, oat is a top world cereal, with an annual production of 23 million metric tons in 2016. Oat protein is of high quality and can be tolerated by most celiac individuals. Oat is also among very few grains that contain mixed linkage (1-4, 1-3) beta-D-glucan (BG), a soluble fiber having health benefits. Yet, despite of its healthy image and historical food use, the current use of oat as food has been limited to only 20-25% of annual world production. One major reason is that, unlike rice and wheat, oat is less easy to make into palatable and versatile food. For expanding food utilization and reaping health benefits of oats, one effective way is to process them into different fractions as value-added food ingredients. Over the years, various methods have been developed, which can be grouped into dry and wet methods in general. However, one key issue is that most available methods focus on enrichment for only one or two key components while disregarding others in oats. For improving production efficiency and fully capturing oat values, at U.S. Department of Agriculture, Agricultural Research Service, we have developed improved methods that can fractionate oats into several value-added ingredients simultaneously. Each fraction is enriched for protein, beta-glucan, starch, or other carbohydrates, respectively. Thus, all valuable components are fully recovered. In this presentation, a general overview of oat chemistry, utilization, and various methods for oat processing is provided. This is followed by description and discussion of the USDA improved methods for oat processing.