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Influence of sample preparation and processing on the assay of phenolic phytochemicals in foods

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Phenolic phytochemicals are ubiquitously distributed throughout the plant kingdom and have been well studied for their bioactivities. Phenolic phytochemicals exist in multiple forms (free, conjugated, and bound insoluble), hence accurate quantification is challenging. This presentation will discuss the significance of sample preparation and processing on the assay of phenolic phytochemicals in different food matrices. Systematic analysis of sequential pearled fractions of grains, potato peels and onion layers showed that phenolic compounds are not uniformly distributed in foods. The concentration of phenolic phytochemicals in the outermost layers was significantly higher than the inner edible portion. Similarly, sequential pearling of grains showed gradual decrease in phenolic compound concentration with an increase in the degree of pearling. Evaluation of optimization of different sample preparation parameters showed that particle size, solvent composition, solid-to-solvent ratio, and temperature have significant influence on the yield of phenolic compounds extracted from grains, vegetables, and dietary supplements. The results also showed that most phenolic acids existed in the bound insoluble form in grains. Around 50% of the phenolic acids were recovered in the initial three pearling fine fractions (within ~ 20% surface removal). Thus, understanding of the distribution of phytochemicals and optimization of sample preparation procedures are important for accurate analysis and evaluation of their bioactivities.

Biography

Devanand Luthria (Dave) is a Research Chemist in Food Composition and Methods Development Lab of the United States Department of Agriculture (USDA) Agricultural Research Service.

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