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## The hierarchical structure and properties of starches

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Starch is a polymeric carbohydrate, contained in large amounts in staple foods. In industry, it gets converted into sugars or used as a thickening, stiffening or gluing agent. The two major macromolecular components of starch are amylose and amylopectin. With a molecular weight ranging from  $50-500 \times 10^6$ , amylopectin is one of the largest natural polymers known. Like protein, starch is a hierarchical material and can be divided into four levels of structure: Molecule, blocklet, shell and granule. The molecule structure is related to the digestive and rheological properties of starch. The shell, especially the outer shell structure, is a key factor in determining the swelling and pasting properties during starch gelatinization. The granule structure is related to the crystalline and thermal properties of starch. The blocklet is the building block of the shell and the granule. However, little is known about its relationship with the properties of starch and there is an ongoing research on this.

### Biography

Junrong Huang is a professor working in School of Food and Biological Engineering, Shaanxi University of Science and Technology, China. She received her PhD degree from Jiangnan University (China) and Wageningen University (The Netherlands). Her research work is focused on the physical, chemical, and nutritional properties of starches; architecture of granules and molecular structure of starches and it is supported by grants from National Natural Science Foundation of China, and several food companies. A method for revealing and obtaining outer shells and inner blocklets of starch granules was established; and starch gelatinization (industrially important process) was described on the blocklet level by her group for the first time.

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