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Micro to Nano Scale Interactions between Proteins and Materials

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Description

Two categories of bioactive dietary components include polysaccharides and polyphenols. Both types of chemicals' functions are largely understood. Particularly food polysaccharides are utilised in food technology applications as food physical modifiers. They are renowned for their bioactivity and connection to lowered risks of non-communicable chronic illnesses in addition to their polyphenolic components. Additionally, polysaccharides and polyphenols are frequently found together in matrices, although little is known about their molecular interactions or the effects of these interactions date. While studies on the effects of these interactions on the bioavailability of polyphenols or the organoleptic qualities of the meals containing these compounds have been conducted. One class of bioactive dietary ingredients are polysaccharides, and the other is polyphenols. Both types of chemicals' functions are rather well understood. In food technology applications, food polysaccharides in particular are utilised to alter the physical properties of meals. They are renowned for their bioactivity and link to lowered risks of non-communicable chronic illnesses in addition to their polyphenolic components. Furthermore, whereas polysaccharides and polyphenols frequently coexist in the same matrices, little is known about their molecular interactions and the effects of such interactions date. While some research has been done to determine how these interactions may affect the foods' organoleptic qualities or the bioavailability of the polyphenols [1,2].

The central lamella of the cell walls of fruits and vegetables contain pectin, a substance that is present in the majority of flowering plants. D-galacturonic acid is the primary component of all pectic compounds, but due to the inclusion of other neutral sugar monomers like galactose, rhamnose, or arabinose as well as the esterification or acetylation of the monomers, their structures are diverse. Hemicelluloses are indigestible mixed glycans made up of the residues glucose, xylose, arabinose, galactose, mannose, and rhamnose. This structural variety makes it challenging to categorise hemicelluloses as a specific type of polysaccharides. The cell walls of several different plant sources include hemicelluloses, which, like cellulose, provide the structure of the plant rigidity. Most hemicelluloses lack solubility properties. Pectin, a chemical found in most flowering plants, is found in the central lamella of the cell walls of fruits and vegetables. All pectic compounds have d-galacturonic acid as their main ingredient, but their structures vary due to the addition of various neutral sugar monomers like galactose, rhamnose, or arabinose, as well as the esterification or acetylation of the monomers. The residues glucose, xylose, arabinose, galactose, mannose, and rhamnose are combined to form indigestible mixed glycans known as hemicelluloses. It is difficult to classify hemicelluloses as a single kind of polysaccharide due to their diverse structural makeup. Several diverse plant sources include hemicelluloses in their cell walls, which, like cellulose, give plants their stiffness. The majority of hemicelluloses lack solubility characteristics [3].

Another category of non-starch polysaccharides is gums, which are often obtained from the sap, beans, or roots of plants. Practically, "gum" refers to soluble, high-molar mass polysaccharides that are typically utilised as stabilisers or texture modifiers in the food or cosmetics industries. The heterogeneous structure of xanthan gum is made up of linked trisaccharide side chains and alternating glucose units on a cellulose chain backbone. Intestinal homeostasis is known to be influenced by a number of variables, including stress, antibiotic use, pathogenic bacteria, and food. In addition to promoting the integrity and functionality of the colonic epithelium, soluble non-digestible polysaccharides (NDPs), such as pectin, inulin, gums, resistant starch, and arabinoxylans, also help maintain a symbiotic colonic microbial community. They also modulate immune and inflammatory responses, which can help lower the risk. Gums are a different class of non-starch polysaccharides that are frequently derived from plant sap, beans, or roots. In the real world, "gum" is a term that describes soluble, high-molar mass polysaccharides that are frequently used as stabilisers or texture modifiers in the food or cosmetics industries. On a cellulose chain backbone, connected trisaccharide side chains and alternate glucose units make up the heterogeneous structure of xanthan gum. It is well recognised that a variety of factors, such as stress, the use of antibiotics, pathogenic microorganisms, and diet, can affect intestinal homeostasis. Soluble non-digestible polysaccharides (NDPs), such as pectin, inulin, gums, resistant starch, and arabinoxylans, aid in maintaining a symbiotic colonic microbial population in addition to supporting the health and functionality of the colonic epithelium. Additionally, they control inflammatory and immunological reactions [4,5].

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Conflict of Interest

The author reported no potential conflict of interest.

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