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Different strategies to improve barrier properties of starch-based materials for functional applications

The use of synthetic polymers is a major threat to the environment and global ecosystem, simply because these plastics are neither biodegradable nor sustainable in the long term. Thus, alternative sustainable and biodegradable materials are in great demand. Starch is one of the most promising candidates that is widely considered as a green material because of its abundance, renewability, and low cost. However, the use of starch in the food industry is limited due to its poor moisture and water properties. Thus, different strategies were suggested and deployed, such as the assembly of a multilayer film system or the emulsion blend with another hydrophobic material, to improve the barrier properties of starch in various usages such as food packaging and fruit coating applications.