

## Extraction Methods for Pectin from Fruit Wastes – A Review

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### Abstract

Pectin is a light brown powder which is widely used as a food additive in the food industry and a good source of dietary fiber. Further, it is a heteropolysaccharide which can be found in many fruit wastes such as peels, seeds, pulp, and pomace. The aim of this review is to assess the use of different extraction techniques for pectin extraction from fruit wastes. Recent studies involving pectin extraction from fruit wastes were reviewed to find out the efficiency, feasibility, advantages and the drawbacks of different extraction techniques. Both conventional and novel extraction techniques are used in pectin extraction from fruit wastes. Conventional extraction techniques which are mostly used in the industry involve use of acids with heating. Hydrochloric, nitric, citric, acetic, phosphoric, and sulphuric acids are commonly used in acid extraction. Acid strength, extraction time, and the temperature are leading factors for the yield of pectin. Major drawbacks of the conventional methods such as slowness, high cost, use of large amounts of chemicals, and adverse impact on the environment have led to more attention on the application of novel extraction techniques. Novel extraction techniques which include microwave assisted extraction, enzyme assisted extraction, ultrasound assisted extraction, high hydrostatic pressure extraction, dielectric barrier extraction, and use of subcritical fluids have shown promising advantages over conventional methods. Most importantly, these methods give a higher yield while taking less time for pectin extraction. Also, it has been shown that pectin extracted using these novel techniques has improved qualities in terms of structural features, functionality, sensory, and chemical characteristics. Further, those techniques are able to reduce the usage of chemicals in turn, minimizing the impact on the environment. However, methoxyl content, equivalent weight, degree of esterification, and the yield of extracted pectin are highly dependent on the type of fruit waste, maturity of the fruit, and the extraction conditions. To conclude, pectin is extensively used in the food industry as a thickening agent, gelling agent, and a stabilizer. Fruit wastes are good sources of pectin which can be used to extract pectin for commercial purposes. Quality and the yield of the pectin are two governing factors in selection of an extraction method. Novel extraction techniques are more advantageous compared to conventional methods. However, extraction conditions need to be optimized to preserve the quality and to increase the yield of pectin.

**Keywords:** *Extraction methods, fruit wastes, pectin*

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