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Off-flavor precursors in soy protein isolate and novel strategies for their removal

Off-flavors remain a major hurdle in expanding the use of soy proteins (SPI) in mainstream food applications. The complexity in solving this problem arises from presence of protein-bound precursors in SPI. Among the most predominant sources of off-flavors in SPI is residual amount of phospholipids containing polyunsaturated fatty acids (PUFA). Autoxidation of PUFA generates several classes of volatile compounds that contribute to beany, grassy or green odor to SPI. In addition, several polyphenolic compounds such as isoflavones, saponins, phenolic acids, etc. impart bitter and astringent taste to SPI. Thus, removal of phospholipids from SPI is a crucial first step to improve its flavor stability and enhanced utilization of SPI in food products. We describe a β-cyclodextrin-based (βCD) process to remove protein-bound phospholipids and free fatty acids in SPI. Treating SPI solution (8%) with 10 mM βCD alone at pH 8.0 decreased the phospholipid content of SPI by about 36%. A greater than 99% removal of phospholipids and free fatty acids was achieved by using a combination of treatments involving sonication of the SPI solution for 5 min at 50 oC followed by treatment with phospholipase A2 and βCD. SPI prepared by this method was white in color. The results presented here offer a process for removing residual off-flavor-causing phospholipids an other phytochemicals from soy protein.

Biography

Srinivasan Damodaran earned his PhD in Food Science from Cornell University in 1981 and currently he is a Professor of Food Chemistry at the University of Wisconsin-Madison. He has published more than 150 papers in reputed journals and has 11 patents to his credit. He is the lead editor of "Fennema's Food Chemistry", a textbook that has been translated into Russian, Spanish, and Portuguese, and being used widely throughout the World.

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