

July 23-24, 2018
Rome, Italy

J Food Nutr Popul Health 2018, Volume 2
DOI: 10.21767/2577-0586-C2-006

DISAGGREGATION AND RE-FORMATION OF FIBRILS FROM SOY PROTEIN ISOLATE: EFFECTS OF P^H

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Soy protein isolate (SPI) is an important source for preparing fibrillar protein aggregates, which could be used in foods to modify viscosity, flow behavior, and so on. Food processing often involves pH adjustment and heat treatment, which would affect the structure of fibrils, thus damaging their functional properties. In this study, the structural changes of SPI fibrils with increasing pH were monitored, and the method to improve the stability of SPI fibrils was explored. In addition, the thermal aggregation behaviors of the disaggregated SPI fibrils at different pH were investigated. Thioflavin T fluorescence and circular dichroism spectrum were used to characterize the content of cross β -sheet in protein. The morphologies of SPI aggregates were observed by TEM. The results showed that as the pH increased from 2 to higher values, the flocculation appeared in SPI fibrils solution and

clusters of fibrils were observed (pH 3-6). Then the fibrils started to disaggregate and finally disappeared (pH 7-10). The cross β -sheet content of SPI fibrils started to decrease at pH higher than 6, and showed huge losses at pH higher than 8. The addition of cationic polymer could help stabilize SPI fibrils under pH ranging from 3 to 7. When the disaggregated SPI fibrils were heated, the peptides from the original fibrils would generate small amorphous particles (pH 7-10), large irregular agglomerates (pH 6), short and curved worm-like aggregates (pH 3-5), and new fibrils (pH 2), respectively. Both the worm-like aggregates and new fibrils had a lot of cross β -sheet structure. This study would deepen our understanding of self-assembly mechanisms for SPI and facilitate scientific design of protein fibril-based food ingredients.

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