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Differences in Physical and Structural Properties of Heat-Induced Gels from Glycinins among Soybean Cultivars

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Heat-induced gels were prepared from glycinins of various soybean cultivars at protein concentrations of 18 to 20%. Textural properties of the gels measured by a compression-decompression test were evaluated by the three-dimensional representation of the gels through factor analysis of the instrumental data and calculation of factor scores for each gel. Differences in gel texture were clearly observed among the soybean cultivars,with Shirotsurunoko gel being the most fracturable and Yamabe-A3 gel the most unfracturable. The most elastic was the gel from Hill and Matsuura gel exhibited the lowest elasticity. The existence of A4 polypeptide also contributed to the textural features of the gels. The gels of A4-containing cultivars were more unfracturable and less elastic compared to those of A4-lacking cultivars. Physical properties of the gels, gel network structure, and polypeptide composition of the glycinin were related each other to some extent. The compressibility which corresponded to the textural attribute of fracturability was related to regularity and/or pore size of network structure of the gels. The acidic polypeptide of A4 seemed to be responsible for whether the gel network was aggregate or strand type, thereby relating to the physical properties of compressibility and resiliency of the gels. The results obtained here suggest that polypeptide composition of the glycinin affects the properties of gel networks and thereby contributes to different physical and textural properties of the gels.

Keywords: heat-induced gels, microstructure, glycinin, acidic polypeptides, basic polypeptides, gelation

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