Study of a Complex Peanut-Based Matrix Structuration Through Gelation Processes

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The peanut (Arachis Hypogaea) is a legume widely consumed in developing countries across Africa, Asia and South America. Peanut are rich in fat protein and carbohydrate and may be a good raw materiel for food formulation through functional properties of proteins.
Objective : The general aim of this study is to determine gelation ability and physical structuration of raw peanut suspensions taken into consideration the contribution of the different phases (soluble protein and oil and insoluble dispersed phases).
Methods : Suspensions composed of grinded white peanut mixed with salted water were prepared and characterized. The peanut proteins were then extracted to assess their gelation properties under different physical and biochemical processes. Heat treatments were performed on protein extract with or without previous enzymatic treatment with transglutaminase. The gels' structural properties were assessed by rheology and confocal microscopy.
Results : Different gel structures could be obtained depending on the protein extraction conditions and gelation process, i.e gels are more structured, yet weaker with a prior enzymatic treatment. Their viscoelastic properties are also dependent on the ionic strength during extraction and gelation. Dispersed fat tends to reinforced gel properties in the case of enzymatic pretreatment. Insoluble fractions allow to increase the viscoelastic properties of the gels in both conditions.
Conclusion : This study demonstrate the ability of peanut protein to gel, and the impact of insoluble part, and the capability to tailor the gel properties of raw peanut suspension through the gelation conditions.