Comparative physico-chemical, functional and structural characteristics of winged bean [Psophocarpus tetragonolobus DC] and soybean [Glycine max.] protein isolates

ABSTRACT

The physicochemical (colour, bulk density, thermal properties, molecular sizes), functional (water and oil absorption, solubility, emulsifying and gelation properties) and secondary structural properties of winged bean isolate (W-ISO) were studied and compared with those of soybean isolate(S-ISO) as reference. Results showed that W-ISO and S-ISO had extraction rates of 32.23 and 37.52 g/100 g, respectively, with corresponding protein content of 81.68 and 85.69% (dry weight basis). W-ISO and S-ISO had denaturation temperature and enthalpy of 105.53 & 111.61 °C, and 3.77 & 3.30 J g-1,respectively. Both isolates showed comparable functional properties, but W-ISO had higher foaming and oil absorption properties whereas S-ISO had higher water absorption and surface hydrophobicity. FTIR spectroscopy showed that W-ISO is composed of 15.38% α-helices, 37.46% β-sheets, 31.67% turns and 15.38% disordered secondary structures whereas S-ISO had 15.46% α-helices, 46.15% β-sheets, 30.78% turns and 7.69% unordered components. In addition to being a potential food ingredient comparable to soybean isolate, winged bean isolate can also be employed in foods where high foam volume is essential.

Keyword: Winged bean isolate; Winged bean seeds; FTIR; Soy isolate; Functional properties; Surface hydrophobicity