UTILIZATION OF SOY HULL FOR PRODUCTION OF PECTIC FIBER

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Abstract
Soy hull, a by-product of soybean processing, was investigated as a source of pectic fiber. Pectic fiber was obtained with yield of 5.72 g/100 g_{DW}. Soy hull pectic fiber demonstrated good solubility (83.49%) and high molecular weight with Mw of dominant fraction 3192.6 kDa. These favorable characteristics could indicate a great potential for application in food industry.

Introduction
Pectins are a group of complex structural heteropolysaccharides with α-(1–4)-D-galacturonic acid as the main chain [1]. Pectin is widely used in food industry as stabilizing, thickening and gelling agent, and it keeps gaining more interest in applications such as functional foods, prebiotics, edible packaging, active substance carrier, etc. [2]. Commercial pectin is commonly extracted from citrus peels, apple pomace and sugar beet [3] but as the demand for pectin continually grows, it is necessary to identify and utilize new pectin sources [4]. Soy hull is a by-product of the soybean industry and it's available in large quantities. This raw material could be an alternative source of pectin rich fiber. Furthermore, soy hull can be easily transported and stored, simplifying its handling while avoiding deterioration of the material [1]. The objective of this research was to evaluate soy hull as a potential source of pectin rich fiber. The solubility of obtained fiber was determined as well as its molecular weight.

Experimental
Soy hull was a kind gift from Sojaprotein, Bečej (Serbia). Pectic fiber was extracted in conventional hot-acid extraction, precipitated with ethanol and freeze-dried [3]. Solubility of extracted pectin fiber was determined according to Bouaziz et al. [5]. Molecular weight was determined by HPSEC on Waters HPLC system (1515 isocratic pump and 2414 RI detector) and a PL Aquagel-OH mixed M column (Agilent Technologies) according to Milošević et al. [6].

Results and discussion
Pectic fiber was extracted from soy hull and its yield is given in Table 1. The obtained yield was 5.72 g from 100 g of soy hull dry weight.

Soy hull pectic fiber showed good solubility in water; 83.49% of pectin was dissolved as presented in Table 1.

Table 1. Soy pectic fiber extraction yield and solubility

Pectic fiber yield (g/100 g_{DW})	Solubility (%)
7.72 ± 0.07	83.49 ± 1.97

Figure 1 shows HPSEC profile of soy hull pectic fiber and in Table 2, molecular weights, surface areas and polydispersity indices of different molecular weight fractions of soy hull pectic fiber are given. Soy hull pectic fiber had two distinct peaks (fractions 2 and 3) as well as one smaller peak (fraction 1) corresponding to high molecular weight aggregates. Molecular weight of the dominant fraction was 3192.6 kDa.

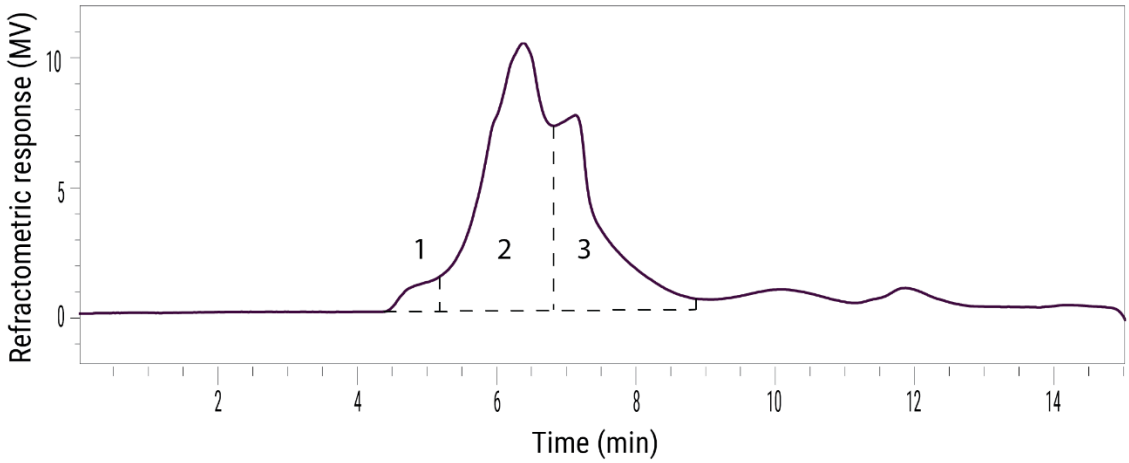

Figure 1. HPSEC profile of soy hull pecic fiber

Table 2. Molecular weights, fraction surface areas and polydispersity indices of soy hull pectic fiber

Fraction	Fraction area (%)	M_p (kDa)	M_w (kDa)	M_n (kDa)	PDI
1	3.5	12885.2	-	-	-
2	61.5	2029.7	3192.6	2266.6	1.4
3	35.0	665.6	543.6	32.6	1.7

M_p - molecular weight of the highest peak; M_w – weight average molecular weight; M_n – number average molecular weight; PDI = M_w/M_n – polydispersity index.

Conclusion

Highly valuable pectic fiber was obtained from soy hull, a by-product of soybean industry. This fiber has exhibited good solubility and high molecular weight. Therefore, pectic fiber from soy hull with these favorable characteristics could be suitable for application in different food products.

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