

Supplementary materials

Table S1. CCD design factors and levels of response surface in the extraction process

Factors	Levels		
A. Extraction temperature (°C)	80	85	90
B. Liquid-solid ratio (g mL ⁻¹)	10	12.5	15
C. Ethanol precipitation concentration (%)	50	65	75

Table S2. Three-factor, three-level CCD design for crude TPS extraction method optimisation and the investigated response for experimental results

No.	A	B	C	Polysaccharide yield (%)
1	80	10	50	8.56
2	90	10	50	8.32
3	80	15	50	9.29
4	90	15	50	9.18
5	80	10	75	9.1
6	90	10	75	8.62
7	80	15	75	9.98
8	90	15	75	9.22
9	76.6	12.5	62.5	9.38
10	93.4	12.5	62.5	8.37
11	85	8.3	62.5	7.89
12	85	16.7	62.5	10.05
13	85	12.5	41.5	9.68
14	85	12.5	83.5	10.73
15	85	12.5	62.5	10.75
16	85	12.5	62.5	10.48
17	85	12.5	62.5	10.35

Table S3. Primers used for RT-qPCR

Name	Sequence
SGLT1	Forward-CCATGGACAGTAGCACCTGG, Reverse-AAACATAGCCCACAGTCCGA
GLUT2	Forward-GCTGCGAATAAACAGGCAGG, Reverse-AGGGTCCCAGTGACCTTATCT
β -Actin	Forward-TAGTTGCGTTACACCCTTTCTTG, Reverse- TCACCTTCACCGTTCCAGTTT

Table S4. ANOVA for response surface quadratic model

Source	Sun of Squares	df	Mean Square	F value	P value	Significance ^a
Model	15.57794	9	1.730882	22.51862	< 0.0001	**
A	0.791907	1	0.791907	10.30264	0.0093	
B	3.289617	1	3.289617	42.79763	< 0.0001	
C	0.814837	1	0.814837	10.60096	0.0086	
AB	0.002812	1	0.002812	0.03659	0.8521	
AC	0.099012	1	0.099012	1.288144	0.2829	
BC	0.001512	1	0.001512	0.019677	0.8912	
A ²	6.085483	1	6.085483	79.17161	< 0.0001	
B ²	5.472658	1	5.472658	71.19881	< 0.0001	
C ²	0.464845	1	0.464845	6.047595	0.0337	
Residual	0.768645	10	0.076864			
Lack of Fit	0.508561	5	0.101712	1.955378	0.2397	
Pure Error	0.260083	5	0.052017			
Cor Total	16.34658	19				
Adj R-Squared	0.9530					
Quadratic regression equation	Y=10.58-0.24A+0.49B+0.24C-0.019AB-0.11AC-0.014BC-0.65A ² -0.62B ² -0.18C ²					

^aSignificance: *: $P < 0.05$; **: $P < 0.01$.

Table S5. Preliminary chemical composition of purified TPS

Sample	Total sugar (%)	Uronic acid (%)	Proteins (%)	Yield (%)
Purified TPS	93.17±0.45	29.98±0.37	0.95±0.08	2.06±0.11