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Publication date:
2019

Document Version
Publisher's PDF, also known as Version of record

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Citation (APA):

Gültekin Suba, B., Casanova, F., Çapanolu Güven, E., & Mohammadifar, M. A. (2019). *Effect of removing phenolic compounds on interfacial behavior of protein isolated from de-oiled sunflower cake*. Poster session presented at 8th International Symposium on Food Rheology and Structure - ISFRS , Zürich, Switzerland.

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Effect of removing phenolic compounds on interfacial behavior of protein isolated from de-oiled sunflower cake

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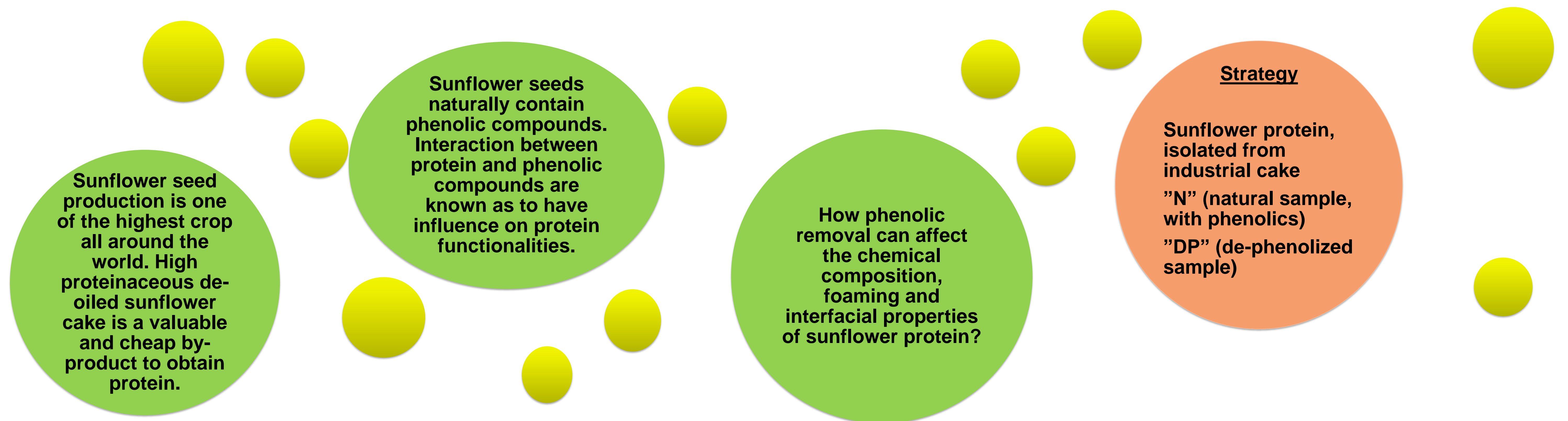


Table 1. Chemical composition of natural (N) and de-phenolized (DP) protein isolates

Sample	Moisture(%)	Ash	Protein (%)	Carbohydrate (%)	Total phenolics (†)
N	3.16 ± 0.11	1.52 ± 0.45	88.18 ± 1.21	1.82 ± 0.21	5.05 ± 0.60
DP	5.12 ± 0.18	0.64 ± 0.14	95.46 ± 0.42	0.42 ± 0.07	0.09 ± 0.04

Total phenolic content is defined as mg gallic acid acid equivalent (GAE) / 100g dry weight

Table 2. Amino acid composition of natural (N) and de-phenolized (DP) protein isolates

Amino acid	Natural SPI (g / 100 g)	De-phenolized SPI (g / 100 g)
Arg	12.43	12.56
Ser	4.65	4.81
Hyp	0	0.05
Gly	4.48	4.52
Thr	3.78	4.06
Ala	3.46	3.68
Pro	3.93	4.38
Met	1.05	1.79
Asp	10.27	11.65
Val	10.87	12.03
His	2.53	2.86
Lys	2.92	3.14
Glu	31.54	30.25
Leu	6.16	6.81
Phe	5.44	5.83
Ile	6.23	7.53
C-C	0.80	0.93
Tyr	2.23	2.65

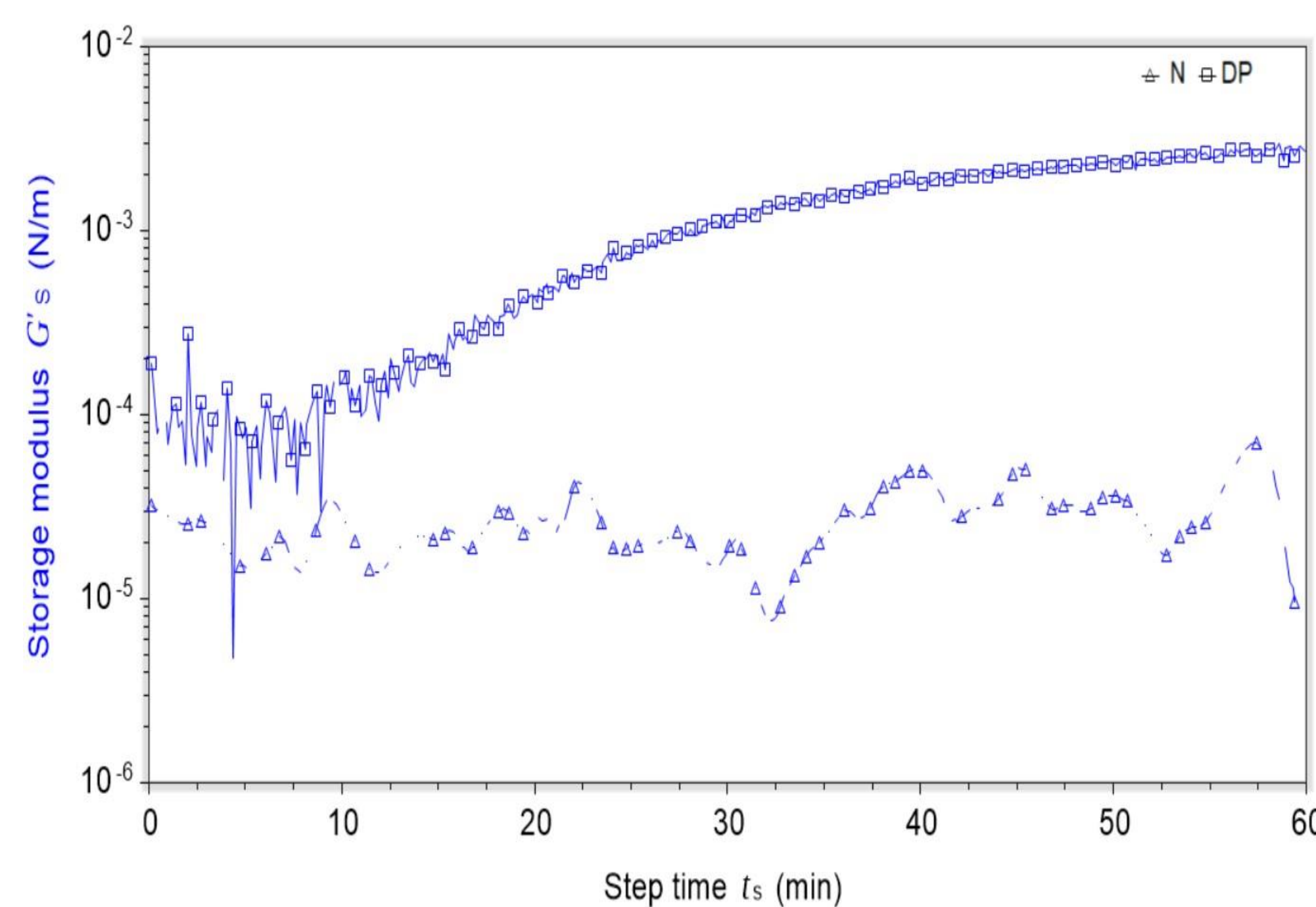


Figure 1. Storage modulus at the air / water interface of sunflower protein isolates

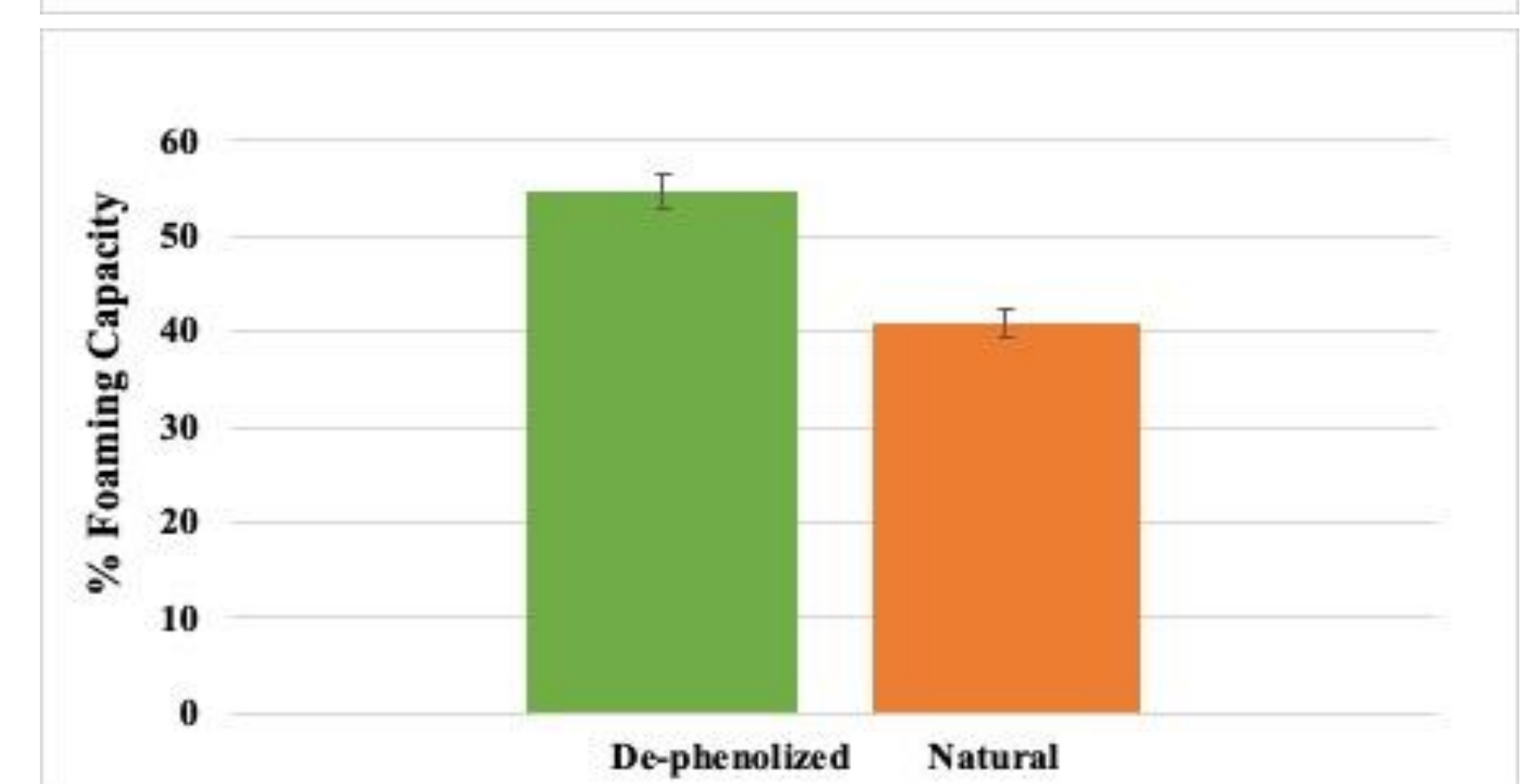
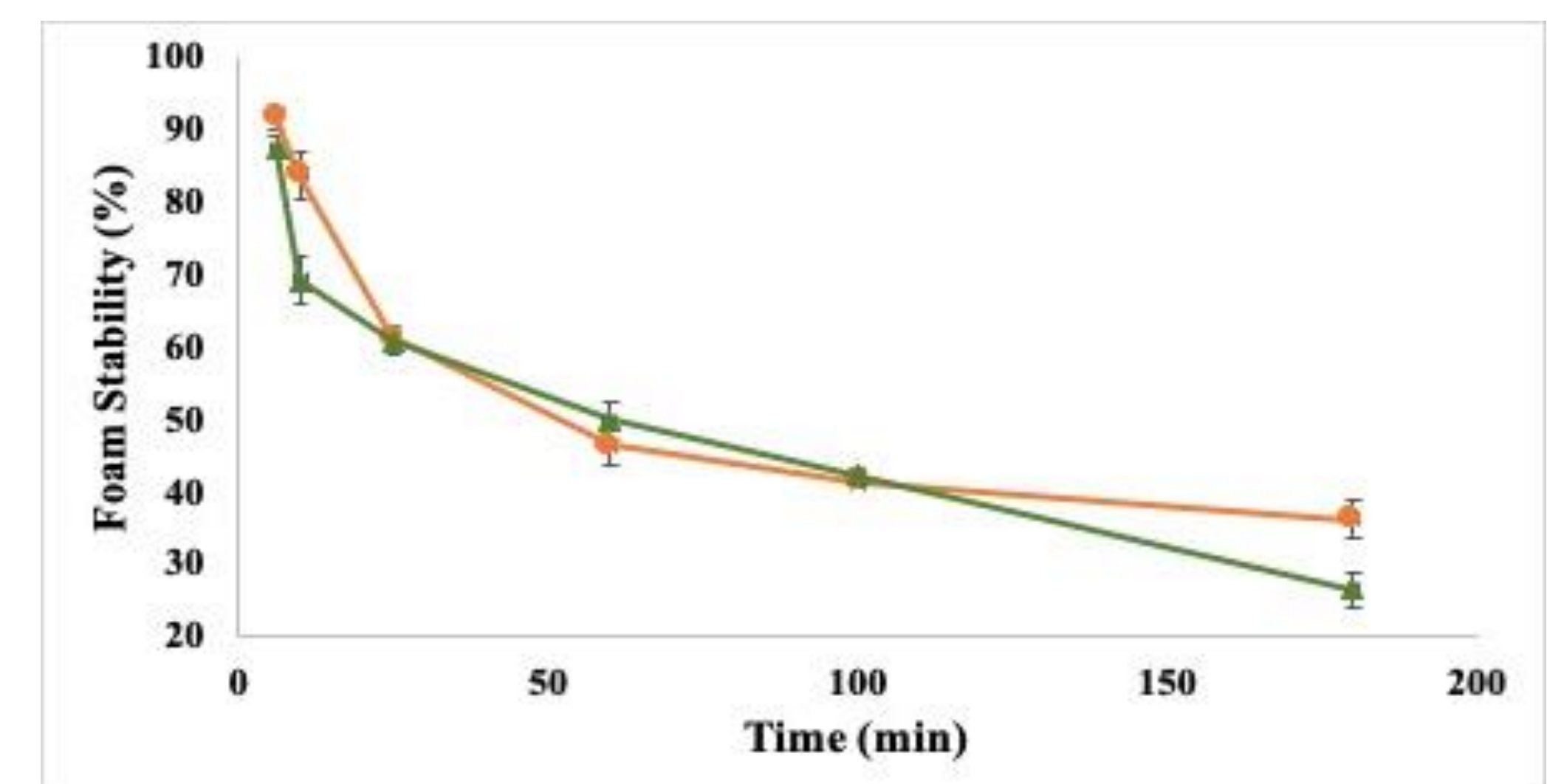


Figure 2. Foaming capacity and stability of sunflower protein isolates

Results

Table 1. Indicates that removing phenol content results in significant change in ash, protein, carbohydrate content and amino acid. Low influence in amino acid profile was observed (Table 2). Stronger viscoelastic structure, interfacial layer was observed for dephenolized samples (Figure 1) which was associated with less foam capacity (Figure 2)

Conclusion

Presence of phenolic compounds negatively affects foaming and interfacial properties.

Future directions

For more clear statements and better understanding about the foam ability of DP sunflower protein, other analytical approaches are planned: dynamic interfacial tension, ellipsometry as well as film pressure balance.