

Effect of fermentation processes and starters on phenolic compounds in legume protein cream

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INTRODUCTION & AIM

With trends driven by consumer health, vegetarianism, and other considerations, people are seeking healthier and more sustainable alternatives to animal-based nutrition. Legumes are excellent raw materials for such products, as they are important sources of dietary protein and bioactive compounds (such as phenolic compounds). Legume protein cream has a broad range of applications, attracting more consumers. This study aimed to evaluate the effects of fermentation temperature, protein concentrate, and starter culture on the phenolic compound content of legume cream.



METHOD

Protein concentrates, including yellow peas, gray peas, and fava beans, were used as the main raw materials.

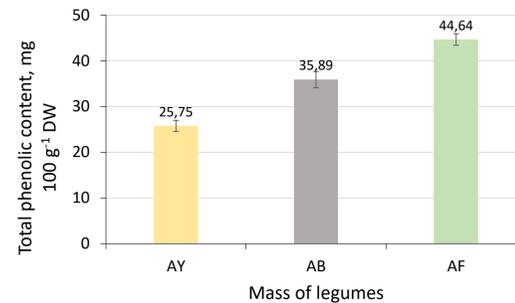
The cream mixture was prepared and heat-treated at 70°C for 30 seconds, then cooled to working temperature. F-DVS CHN-22 starter (fermented at 22°C, 26°C, and 30°C) and DANISCO® VEGE033 starter (fermented at 37°C, 40°C, and 43°C) were added to the prepared cream mixture.



Designation	Description of the designation
YP	Yellow pea concentrate
BP	Gray pea concentrate
FB	Faba bean concentrate
AL	ALOMIX concentrate
AY	Alomix + yellow pea concentrate
AB	Alomix + gray pea concentrate
AF	Alomix + faba bean concentrate
AY/70	Alomix + yellow pea concentrate processed at 70°C
AB/70	Alomix + gray pea concentrate processed at 70°C
AF/70	Alomix + faba bean concentrate processed at 70°C
AY CHN22/ 22; 26; 30	Alomix + yellow pea concentrate fermented (starter culture F-DVS CHN22) 22°C; 26°C; 30°C (fermentation temperatures)
AB CHN22/ 22; 26; 30	Alomix + gray pea concentrate fermented (starter culture F-DVS CHN22) 22°C; 26°C; 30°C (fermentation temperatures)
AF CHN22/ 22; 26; 30	Alomix + faba bean concentrate fermented (starter culture F-DVS CHN22) 22°C; 26°C; 30°C (fermentation temperatures)
AY VEGE033/ 37; 40; 43	Alomix + yellow pea concentrate fermented (starter culture DANISCO® VEGE033) 37°C; 40°C; 43°C (fermentation temperatures)
AB VEGE033/ 37; 40; 43	Alomix + gray pea concentrate fermented (starter culture DANISCO® VEGE033) 37°C; 40°C; 43°C (fermentation temperatures)
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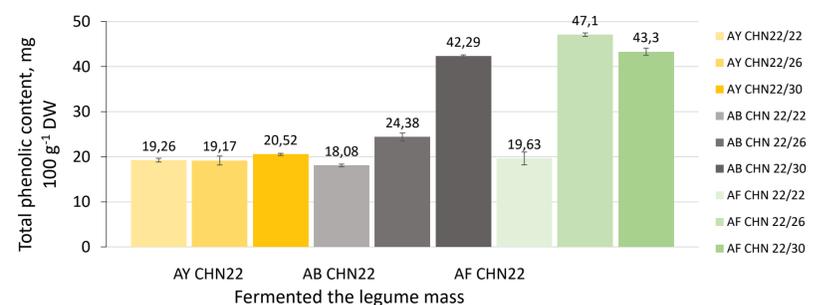
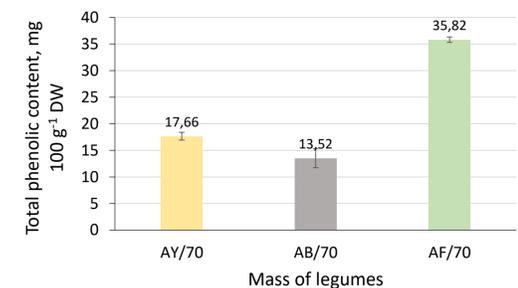
The Folin–Ciocalteu reagent method (Singleton et al., 1999) determined the total phenolic content (TPC). Analysis of variance (ANOVA) and the Tukey test ($p < 0.05$) were both used. Heat-treated protein concentrates from these legumes were used as controls.

RESULTS & DISCUSSION

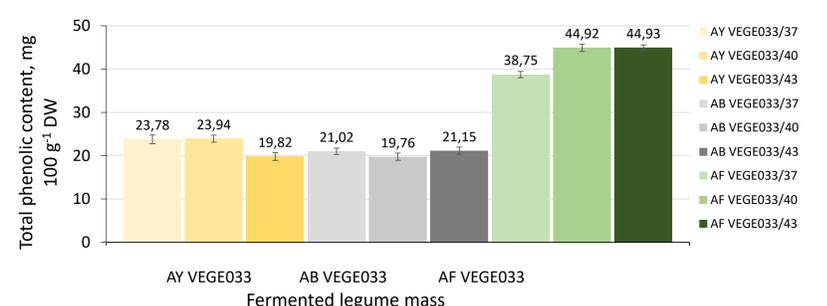
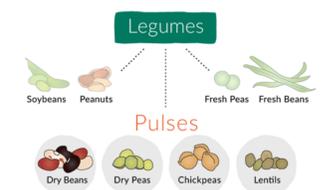


Results showed no statistically significant differences between the starters used.

However, fermentation with F-DVS CHN-22 resulted in an average TPC increase of 20%, and with DANISCO® VEGE033, an increase of 33%.



Generally, samples with fava bean concentrate had higher TPC after fermentation, regardless of the starter.



The fava bean concentrate sample with F-DVS CHN-22 fermented at 26°C exhibited the highest TPC.

CONCLUSION

The study demonstrated that both the type of protein concentrate and fermentation temperature significantly affected TPC in the analyzed samples.

FUTURE WORK / REFERENCES

Future studies are planned to investigate the changes in specific phenolic compounds under these conditions.

Singleton, doi: 10.1016/S0076-6879(99)99017-1

Acknowledgment: This study was supported by project no. 22-00-A01612-000016 "Potential for the application of pulses for alternative dairy products", supported by the Ministry of Agriculture and Rural Support Service of the Republic of Latvia.