

## WPC-80 hydrolysates as a promising functional ingredient for diabetes control via DPP-IV inhibition

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### INTRODUCTION & AIM



Nowadays, type 2 diabetes has become a pathology with a high incidence worldwide, causing 4.2 million deaths, especially in middle-income countries.<sup>[1]</sup>



As the dairy industry grows yearly, an alternative way to mitigate whey contamination is to produce whey protein concentrates or whey hydrolysates, which are an adequate source of bioactive compounds and contain better-digestible proteins.<sup>[2]</sup>

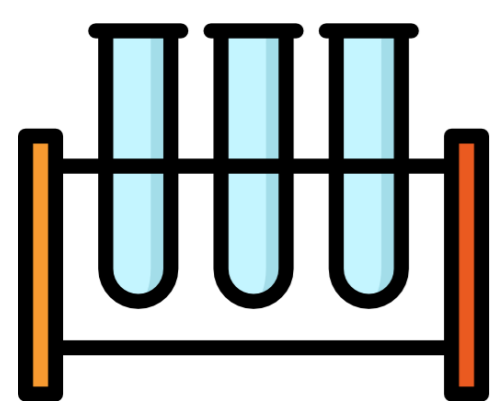


This work tested the *in vitro* anti-diabetic capacity, achieved via DPP-IV enzyme inhibition, of WPC-80 hydrolysates obtained with alcalase and flavourzyme.



### METHOD

#### WPC-80 dispersions



- Commercial whey protein concentrate at 10%.
- Sterilized phosphate buffer at 0.01 M and pH=7.5.
- Thermal treatment at 90°C for 10 min.
- Enzyme addition at mass ratio 100:2.5 (soluble protein:enzyme).

#### Hydrolysis conditions and analysis

- Hydrolysis at 60°C and 130 rpm for 6 h.
- Enzyme inactivation in boiling water bath for 10 min.
- Supernatant obtention at 10,000 rpm and 4°C for 10 min.
- Free amino groups and DPP-IV inhibition by spectrophotometric methods.<sup>[3]</sup>



### RESULTS & DISCUSSION

**Table 1.** Free amino groups released in each enzymatic hydrolysis.

Enzyme	[Free amino groups] (mg/L)	
	0 h	6 h
Alcalase	1198.04 ± 24.21	2283.26 ± 96.07
Flavourzyme	735.00 ± 0.00	1585.44 ± 110.68

**Alcalase produced the highest free amino groups concentration due to its capacity to hydrolyze a broad gamma of amino acid sequences. This behavior has been previously found in another study.<sup>[3]</sup>**

**Table 2.** DPP-IV inhibition produced by each hydrolysates

Enzyme	Inhibition (%)	
	0 h	6 h
Alcalase	22.03 ± 1.92	52.14 ± 0.78
Flavourzyme	27.75 ± 1.85	43.26 ± 1.42

**According to the statistical analysis, at 0 h, both systems showed the same DPP-IV inhibition. Also, anti-diabetic activity was found in WPC because it's a product with protein partial hydrolysis, which could contain peptides with potential bioactivity.<sup>[4]</sup>**

**Both systems showed increased DPP-IV inhibition at the end of hydrolysis, whereas alcalase showed slightly better bioactivity. Results are very similar to those obtained in the specific hydrolysis of  $\alpha$ -lactalbumin.<sup>[5]</sup>**

### CONCLUSION

Both WPC-80 hydrolysates showed a high potential for incorporation into novel functional food formulations. However, sensory testing of those formulations must be performed to evaluate consumer acceptance.

### REFERENCES

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