

# Identification of DPP-IV inhibitory peptides from chicken blood hydrolysates

Gisela Carrera Alvarado, Leticia Mora Soler, Fidel Toldrá Vilardell

*Instituto de Agroquímica y Tecnología de Alimentos (IATA-CSIC), Spain*

**Introduction:** The study of dipeptidyl peptidase IV (DPP-IV) inhibitory peptides is an important strategy for the effective treatment of diabetes (Elam et al., 2021). Therefore, it is necessary to identify new inhibitors of DPP-IV from natural sources. The mechanism of action of DPP-IV inhibitors is to prolong the half-life of the incretin hormones GLP-1 and GIP and, consequently, increase their plasma concentrations with the aim of improving glucose-dependent insulin secretion and reducing the production of glucagon and hepatic glucose (Duez et al., 2012).

**Objective:** The objective of this work was to evaluate the DPP-IV inhibitory activity of different chicken blood hydrolysates and to determine the sequences of the peptides responsible for such biological activity.

**Materials and Methods:** Different chicken blood hydrolysates were prepared using four commercial enzymes and their combinations. The DPP-IV inhibitory activity of each hydrolysate was assayed (Gallego et al., 2014). Subsequently, the hydrolysates with greater inhibitory activity of DPP-IV were analysed to calculate their content in free amino acids (Aristoy & Toldrá, 1991) and a peptide profile using reversed phase HPLC of these hydrolysates was also performed. The peptide fractions responsible for the inhibitory activity of DPP-IV were analyzed by liquid chromatography coupled to mass spectrometry in tandem. From the obtained list of peptide sequences, *in silico* bioinformatics were used to simulate gastrointestinal digestion and determine those sequences with potential DPP-IV inhibitory activity. Finally, the most interesting peptides were synthesized and DPP-IV inhibitory activity was confirmed.

**Results and Discussion:** Chicken blood hydrolysis resulted in the generation of small peptides that significantly influenced the DPP-IV inhibitory activity. The samples using a combination of enzymes showed the highest inhibition rate, 60.55%. The amino acid profile of this hydrolysate showed Lys, Leu, Ala, Val and Glu as the most abundant amino acids in the sample. After *in silico* analysis, nine potential DPP-IV inhibitory peptides were selected. The GPF, GGGW and IGL sequences showed the highest inhibitory activity with values of 39.28, 19.29 and 17.90%.

**Conclusions:** Chicken blood hydrolysates could serve as a source of peptides with DPP-IV inhibitory effects. The peptides GPF, GGGW and IGL were identified as DPP-IV inhibitory peptides. However, further *in vivo* studies are needed to validate the *in vitro* DPP-IV inhibitory activity and to confirm the efficacy of these peptides.

## References:

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**Key words:** Chicken blood, Bioactive peptides, Dipeptidylpeptidase (DPP-IV) inhibitors, Hydrolysates