



HAL
open science

Optimizing the development of an antihypertensive whey hydrolysate in semi-pilot scale

Luisa Ozorio, Nariana Regina Pereira, José Eduardo Silva-Santos, Ana Iraidy Santa-Brígida, Caroline Mellinger-Silva, Lourdes Maria Correa Cabral

► To cite this version:

Luisa Ozorio, Nariana Regina Pereira, José Eduardo Silva-Santos, Ana Iraidy Santa-Brígida, Caroline Mellinger-Silva, et al.. Optimizing the development of an antihypertensive whey hydrolysate in semi-pilot scale. 32. EFFoST International Conference, Nov 2018, Nantes, France. , 2018. hal-01948617

HAL Id: hal-01948617

<https://hal.science/hal-01948617>

Submitted on 7 Dec 2018

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



OPTIMIZING THE DEVELOPMENT OF AN ANTHYPERTENSIVE WHEY HYDROLYSATE IN SEMI-PILOT SCALE

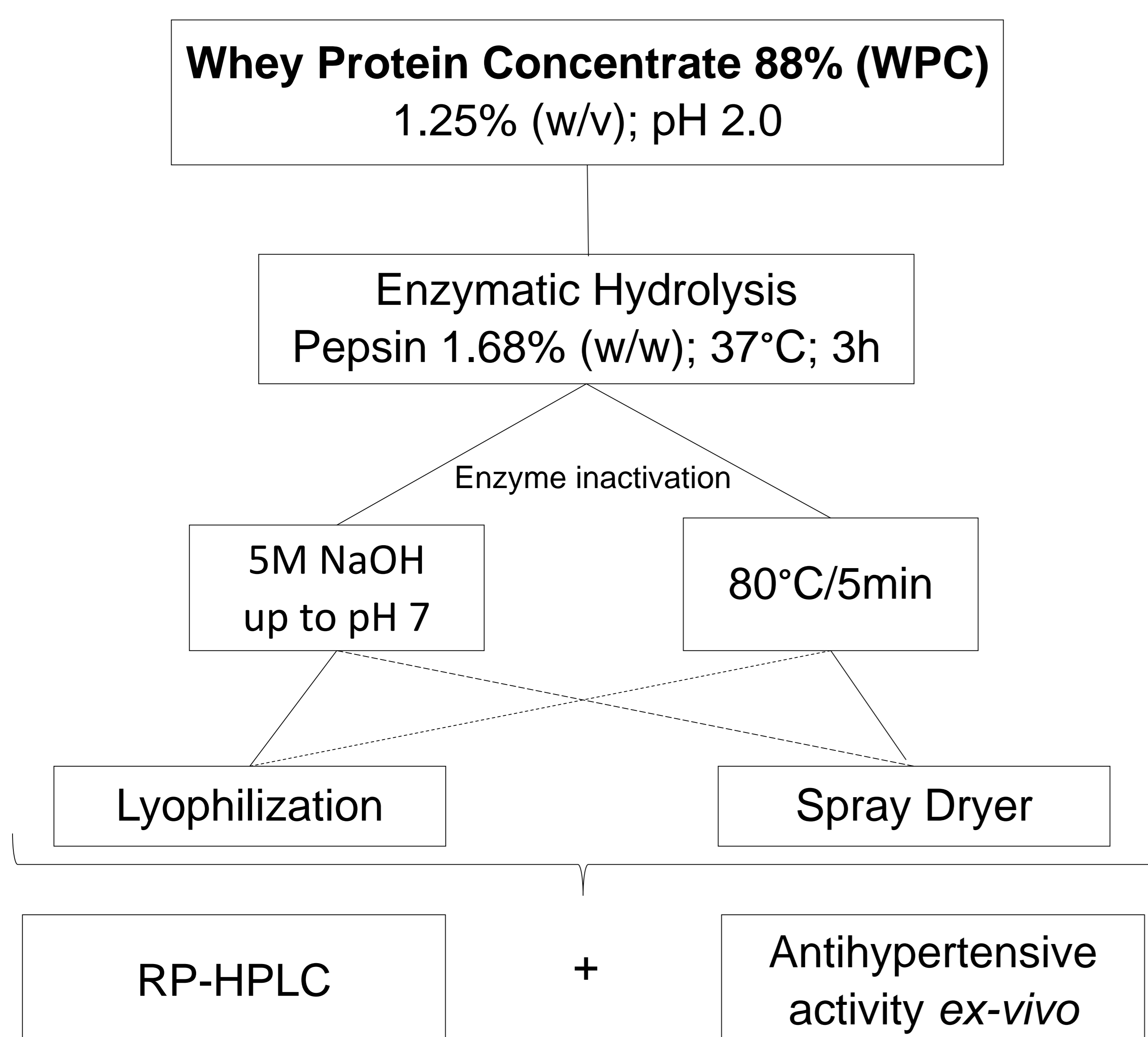
Luísa Ozorio^{1,2}; Nariana Regina Pereira³; José Eduardo Silva-Santos³; Ana Iraidy Santa-Brígida⁴; Caroline Mellinger-Silva⁴; Lourdes Maria Correa Cabral⁴

¹Federal University of Rio de Janeiro, Chemistry Institute, Rio de Janeiro, Brazil; ²INRA, Agrocampus Ouest, STLO, 35000, Rennes, France; ³Federal University of Santa Catarina, Laboratory of Cardiovascular Biology, Santa Catarina, Brazil; ⁴Embrapa Food Technology, Rio de Janeiro, Brazil

INTRODUCTION

- Large quantities of whey are generated annually by the cheesemaking industries and concerns about the environment have made them seek new alternatives for their effluents;
- Whey proteins and peptides are one of these byproducts which is recognized for reducing risk factors of numerous diseases, including hypertension;
- Despite the need of better use of this agroindustrial residue and the high prevalence of hypertension worldwide, whey based-products that are able to modulate blood pressure are very scarce in food and nutraceutical markets, emphasizing the need of more research regarding this theme. The development of new products requires several stages in which scaling-up the production is comprised.
- The present study proposed to optimize the process of development of a new antihypertensive whey hydrolysate in semi-pilot scale, assessing the influence of drying technologies and enzyme inactivation conditions on its biofunctionality.

MATERIALS AND METHODS



Acknowledgements: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Coordenação de Aperfeiçoamento de Pessoal de nível Superior (CAPES), Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA) and Institut National de la Recherche Agronomique (INRA) for the financial support and winery Vinícola Rio Sol for supplying the Alicante Bouschet grape pomace

RESULTS

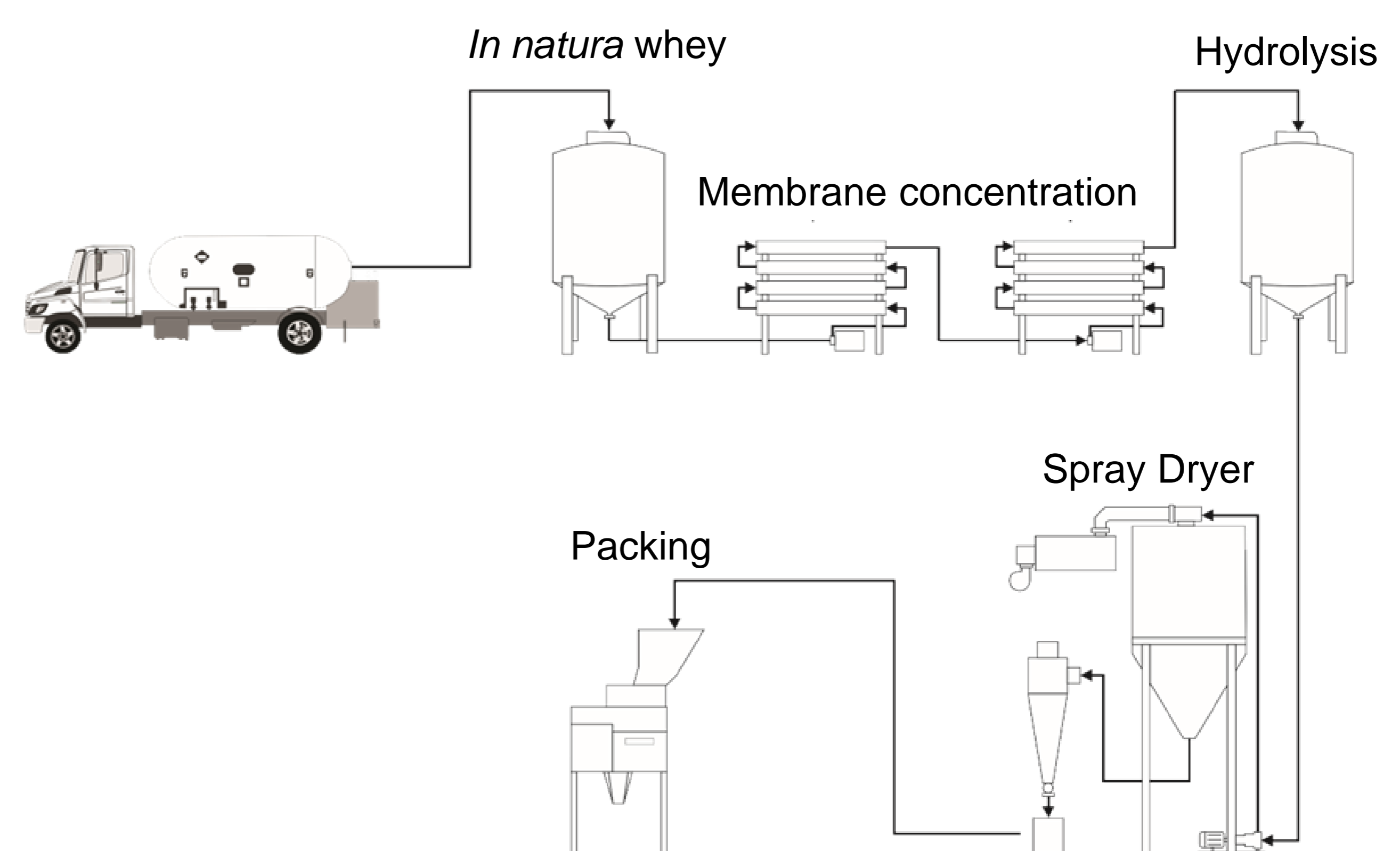


Figure 1: Design of an industrial plant for whey protein hydrolysate production.

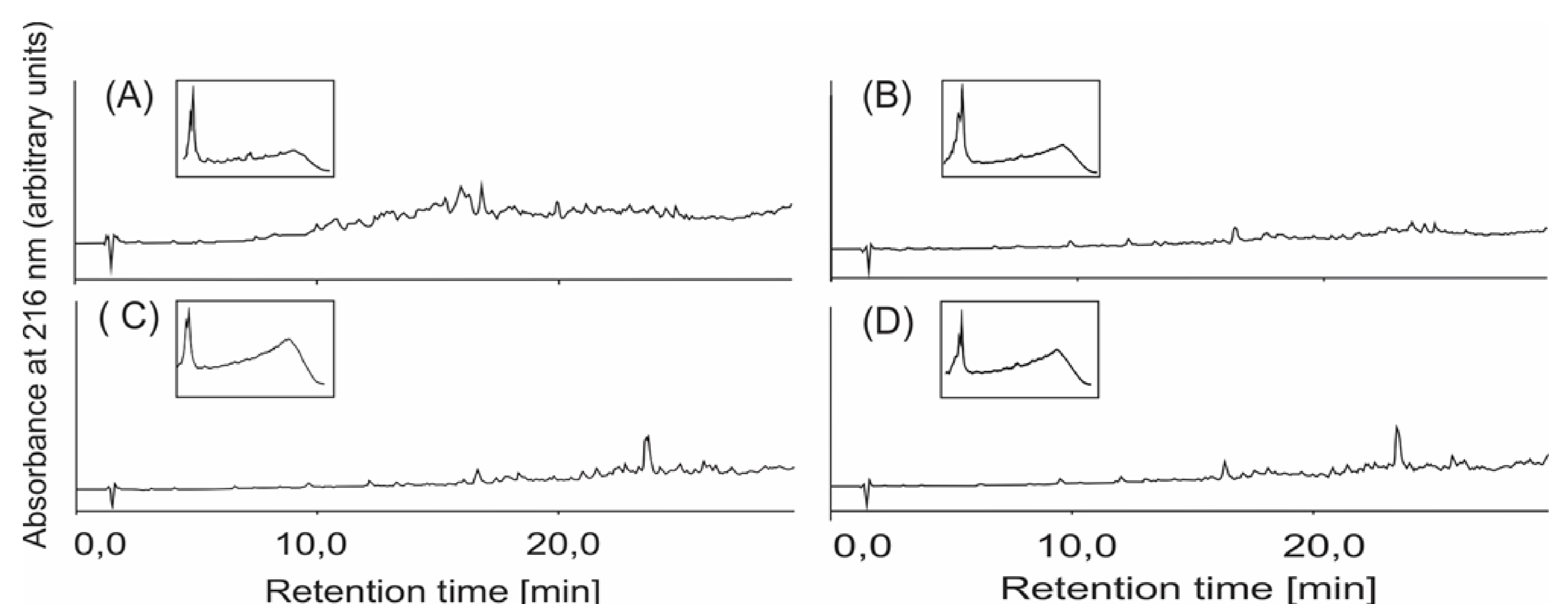


Figure 2: Peptide profiles of whey hydrolysates. (A) chemically inactivated and freeze-dried; (B) chemically inactivated and spray-dried; (C) thermally inactivated and freeze-dried; (D) thermally inactivated and spray-dried. Upper windows show β -lactoglobulin.

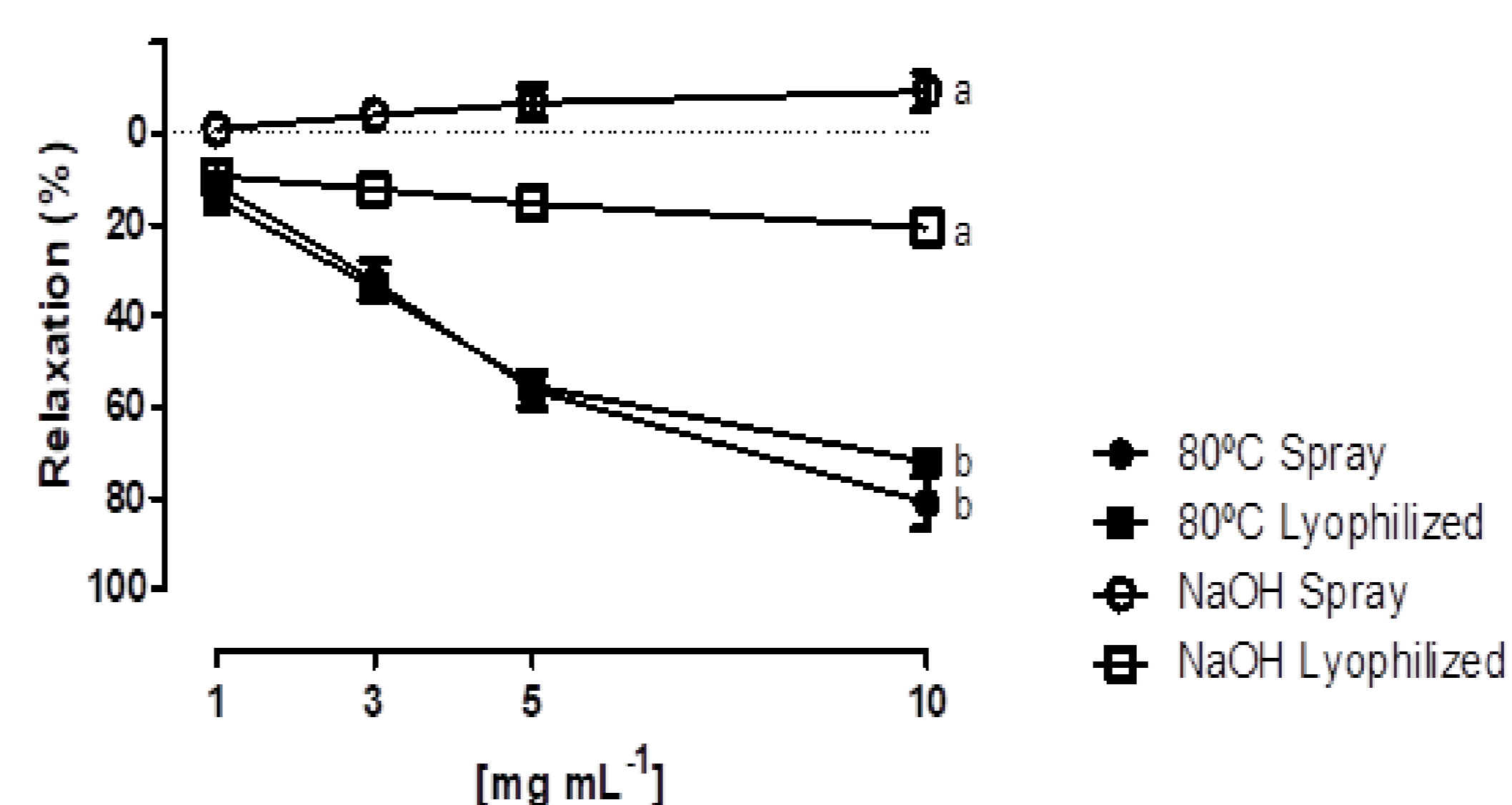


Figure 3: Vascular relaxations induced by cumulative concentration of 1, 3, 5, 10 mg.mL⁻¹ of whey hydrolysates. Letters a and b indicate significant difference ($p < 0.05$).

CONCLUSIONS

The present study revealed that the spray-dry technology was effective in maintaining the antihypertensive potential of the hydrolysate, besides being more affordable to food industries. Moreover, the enzyme inactivation seemed to be an important step in the process for the obtainment of a biofunctional ingredient, since thermally inactivated samples achieved vascular relaxations above 70%. In this manner, thermic inactivation of the enzyme and spray-drying the hydrolyzed solution were the best alternatives for the development of antihypertensive whey hydrolysate in a semi-pilot scale.