

Production of hybrid microparticulated proteins based on whey protein and pea protein at different pH values

LIMA DE PAULA I. (1), M. P. DE MATOS VITRAL J. (1), TEIXEIRA CONTIN L. (1), WOLFSCHOON-POMBO A. (2), TULER PERRONE (1), STEPHANI R. (1), CAPPA DE OLIVEIRA L. (1)

1 Universidade Federal de Juiz de Fora, Juiz de Fora, Brazil
2 INOVALEITE, Munich, Germany

OBJECTIVE

The aim of this work is to manufacture hybrid microparticulate proteins based on whey protein concentrate (WPC80%) and pea protein at three different pH values.

METHODS

For the study, three different treatments were produced in which the pH of the microparticulation process was modified: T1 (pH=4.0); T2 (pH=5.5); T3 (pH=6.7). The microparticulation process was carried out by mixing 36.80 g WPC80%, 58.03 g pea protein, 25.17 g whey permeate. Then the powders were added in 852.22 g of water by stirring for 1 hour and stored at 8 ± 2 °C for 24 hours. After this time the sample was homogenized and added 27.77 g of a 40% (m.v-1) CaCl₂ solution and the pH was adjusted for each treatment using lactic acid and 50% (m.v-1) sodium hydroxide. After pH adjustment each sample was heated to 95 °C for 10 minutes and stirred at 3100 rpm. Finally, the heating was turned off and the stirring was raised to 10000 rpm, the pH was adjusted to 6.5 at the end of the process. To verify the microparticulation process of the product, particle size analysis was performed.

RESULTS

After the homogenization process, the treatment T1 presented a particle size of 10.09 ± 0.05 µm, T2 of 9.81 ± 0.08 µm and T3 of 9.57 ± 0.04 µm. With the addition of CaCl₂, pH adjustment and heating to 95°C the particle sizes changed to: 21.75 ± 0.33 µm for T1, 14.67 ± 0.03 µm for T2 and 23.9 ± 0.08 µm for T3, demonstrating that the pH of the solution modifies the denaturation of proteins present in the mixture. After shearing and final pH adjustment the particle sizes observed were 9.06 ± 0.03 µm for T1, 8.10 ± 0.08 µm for T2, and 7.90 ± 0.07 µm for T3.

CONCLUSIONS

It was possible to develop microparticulated proteins from whey and pea proteins, in addition the study also demonstrated that the pH of the microparticulation process has a relationship with the particle size at the end of the process, and in the lower pH studied showed larger particle size.