



Effect of heat treatment on *in vitro* gastric digestion of quinoa protein

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Background

With a growing world population, the production of sufficient protein represents a serious problem for the future. In this sense, proteins of plant origins emerge as an excellent alternative. Among plant proteins, quinoa (*Chenopodium quinoa* Willd.) has been recognized as a complete food due to its protein quality. However, its digestibility needs to be studied because these are usually much more difficult to digest than animals' proteins. Heat treatment could be a good alternative to improve the protein digestibility.

Objective

The objective of the project is evaluate the effect of heat treatment prior to *in vitro* gastric digestion of quinoa protein fractions obtained by dry and wet fractionation methods.

Methods

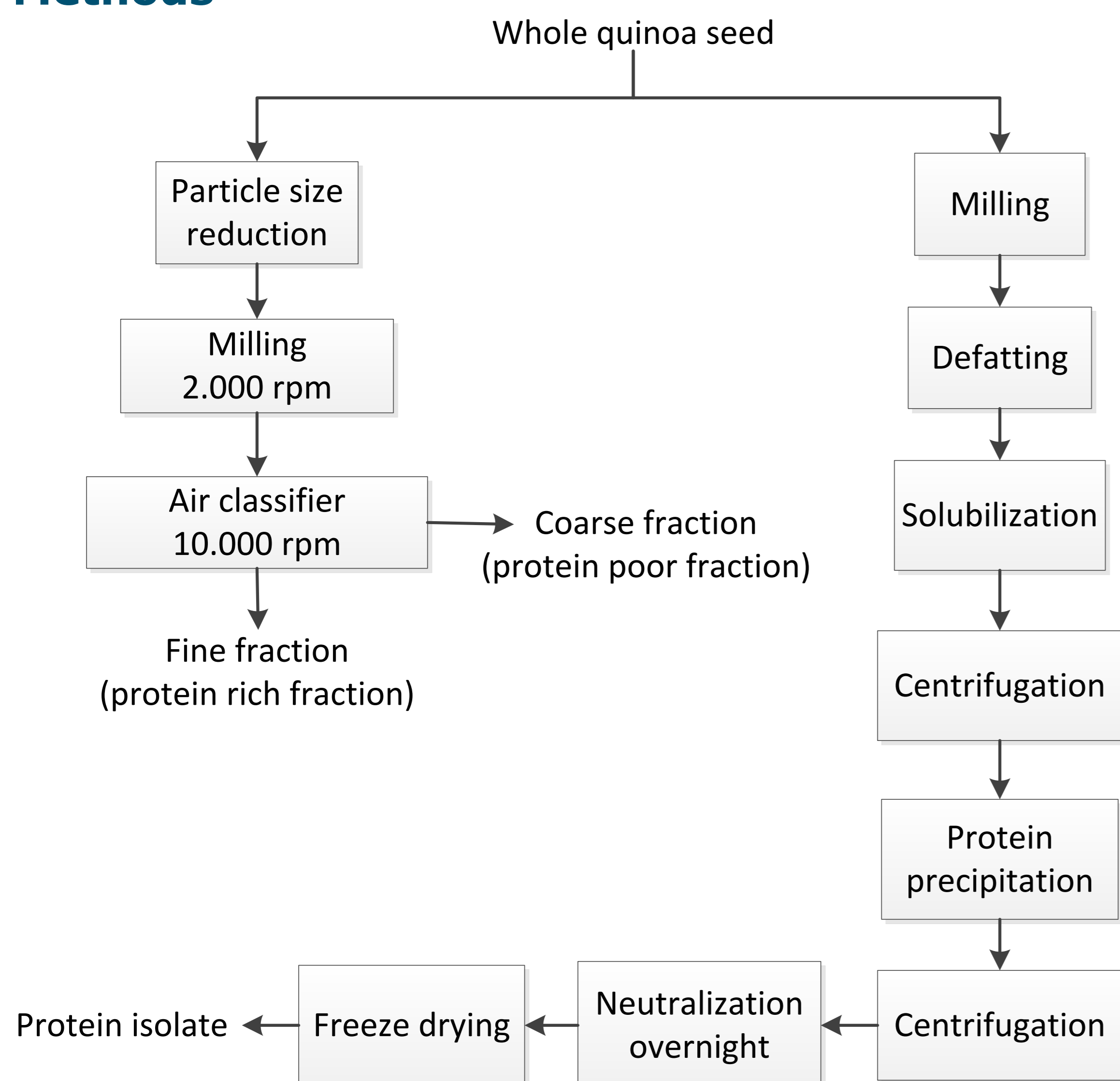


Figure 1. Dry and wet fractionation processes.

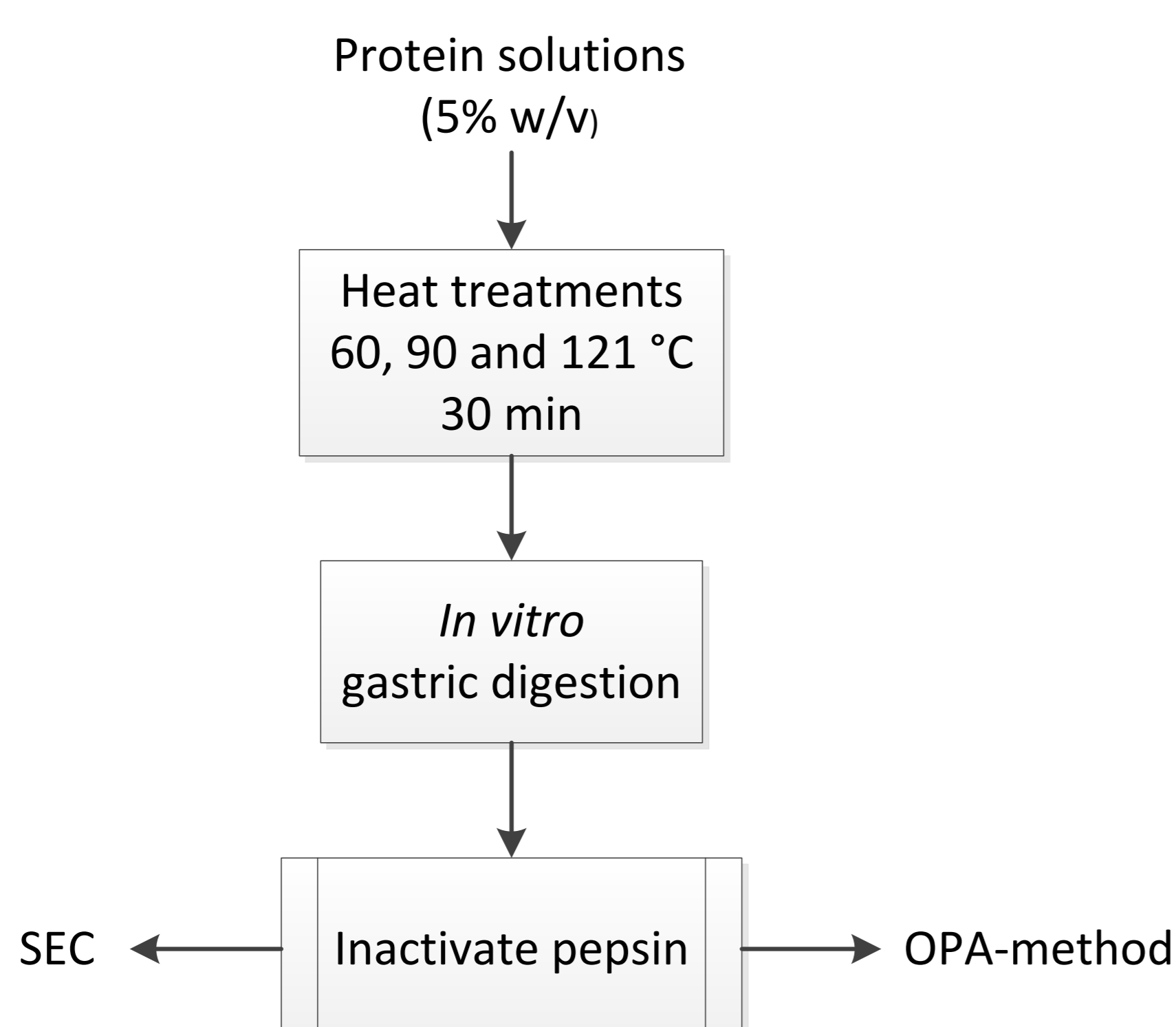


Figure 2. Digestion of quinoa protein.

Results

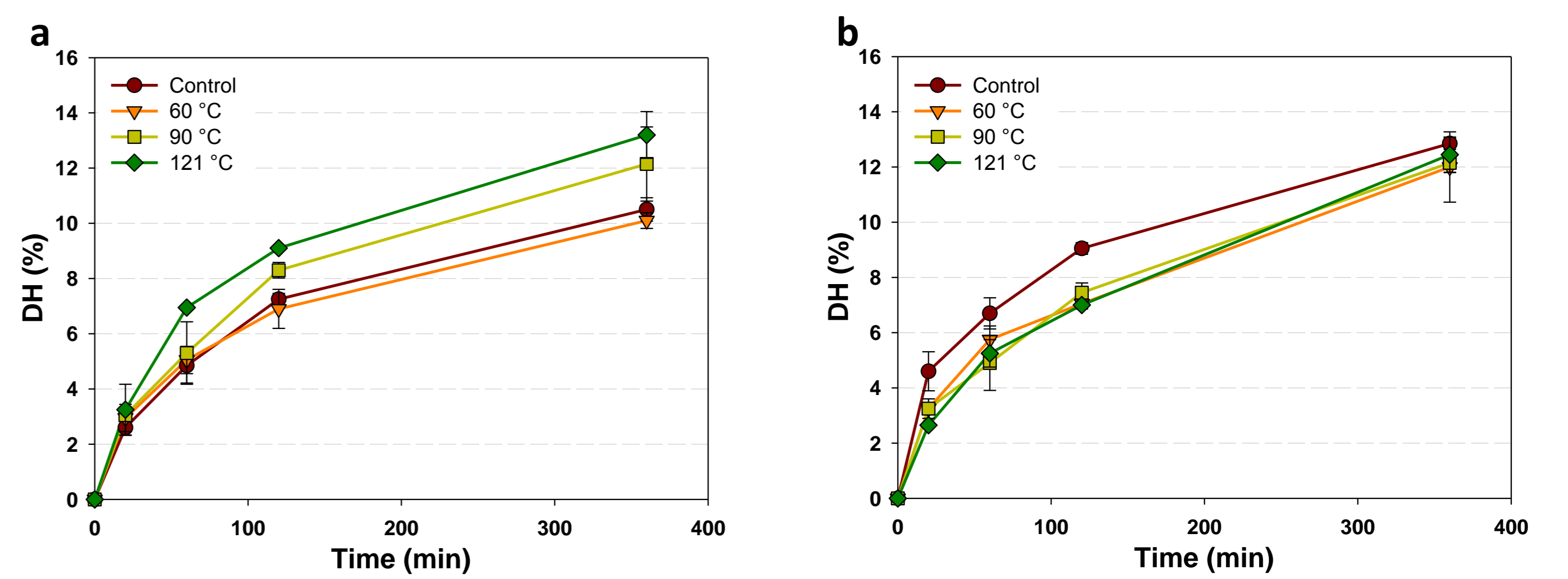


Figure 3. Degree of hydrolysis (DH) versus time during *in vitro* gastric digestion for protein fractions obtained by a) wet fractionation (protein content 76%), b) dry fractionation (protein content 20%).

- For samples obtained by wet fractionation, heat treatment at 121 °C increased the protein digestibility over that of raw quinoa samples (see Figure 3a). In addition, the Size-Exclusion Chromatography (SEC) showed that the amount of peptides between 3-1.5 kDa increases with temperature (see Figure 4).
- For samples obtained by dry fractionation, preheating reduced the protein digestibility at all levels of temperature (see Figure 3b). Furthermore, SEC showed that the amount of peptides smaller than 3 kDa are smaller in the samples treated with temperature (see Figure 5).

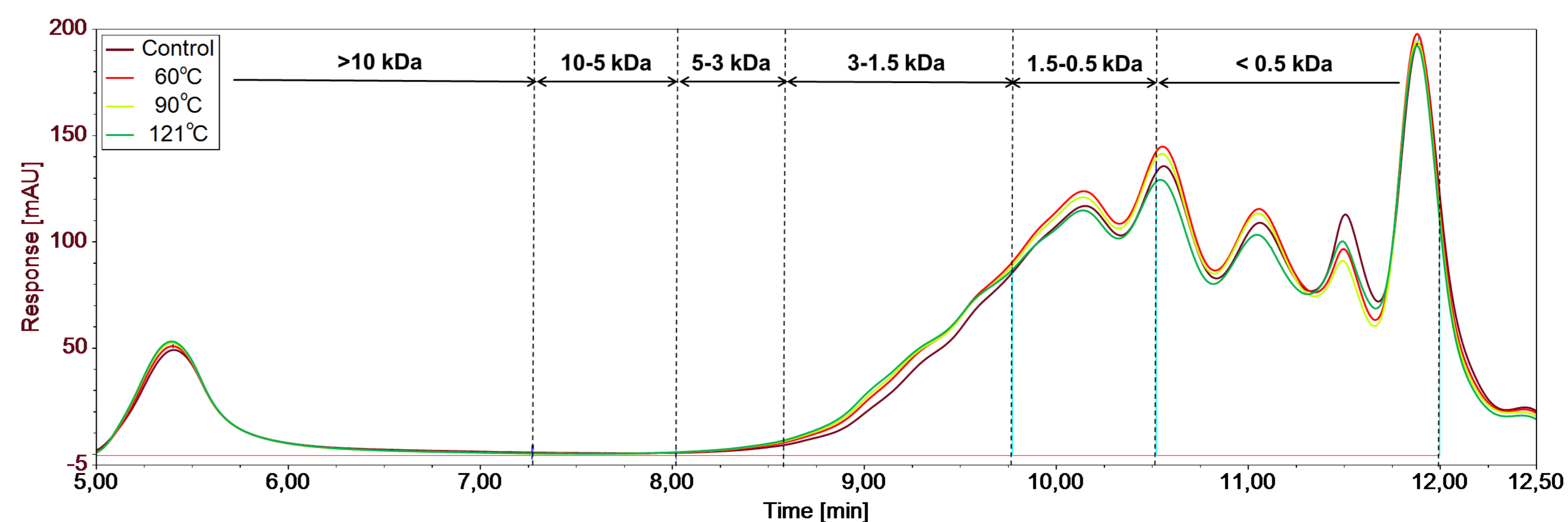


Figure 4. SEC of quinoa protein obtained by wet fractionation process incubated for 2 hr at 37 °C in simulated gastric juice.

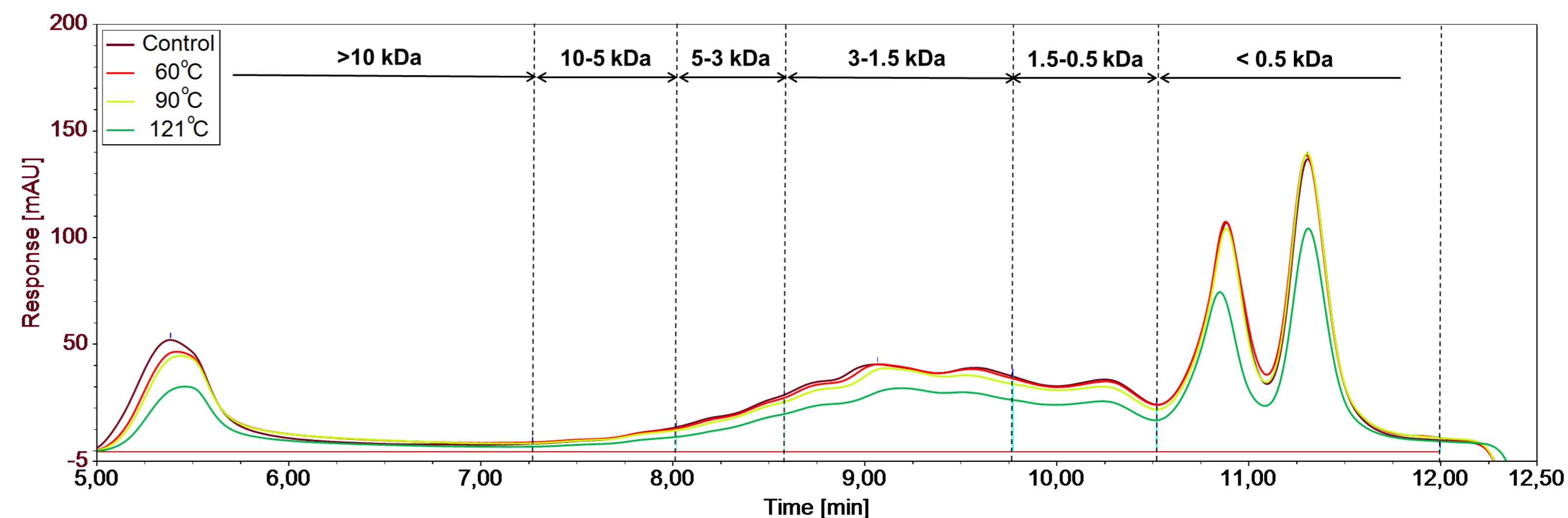


Figure 5. SEC of quinoa protein obtained by dry fractionation process incubated for 2 hr at 37 °C in simulated gastric juice.

Conclusions

- Our results indicate that the effect of heat treatment on protein digestion is affected by the other ingredients in the protein sample.

Acknowledgements

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