

THE EFFECT OF WHEAT (TRITICUM AESTIVUM L.) BRAN ON STARCH GELATINIZATION

Wheat bran is an undervalued side stream from the production of white flour. It is rich in dietary fiber and is a good source of minerals, vitamins and bioactive compounds. Currently, only 10% of the produced wheat bran is used in the food industry while 90% is sold as animal feed or is wasted. This is in part due to multiple techno-functional issues related to the incorporation of bran in food systems. To bridge the gap between bran's health promoting properties and its techno-functional impact, we need to gain insight in the effect of wheat bran on food systems. Starch is the most prominent constituent in cereal-based foods and starch gelatinization plays an important role in determining textural properties of cereal-based foods. Therefore, the objective of this study was to investigate the effect of wheat bran on starch gelatinization.

The onset, peak and end temperature of gelatinization of different starch-bran-water mixtures were determined with differential scanning calorimetry. The moisture content of the mixtures varied between 45% and 75% to make it relevant for different food systems. The influence of the starch-bran-water ratio on the gelatinization temperatures was modelled and is presented in ternary diagrams. Wheat bran increases the onset gelatinization temperature of starch but has no influence on the end temperature. On the contrary, the water content had no influence on the onset temperature but determines the end temperature. This showed that the effect of wheat bran on starch gelatinization is not (only) an effect of the high water retention capacity of wheat bran. Therefore, the effect of the water extractable components of wheat bran was investigated. This showed that the onset temperature of gelatinization is predominantly determined by the extractable components of wheat bran and the end temperature by the water content of the system. These insights can help to increase the incorporation of wheat bran in different food systems.