

Effects of Temperature and Cysteine Addition on Formation of Flavor from Maillard Reaction Using Xylose and Rapeseed Meal Peptide

Authors : Zuoyong Zhang, Min Yu, Jinlong Zhao, Shudong He

Abstract : The Maillard reaction can produce the flavor enhancing substance through the chemical crosslinking between free amino group of the protein or polypeptide with the carbonyl of the reducing sugar. In this research, solutions of rapeseed meal peptide and D-xylose with or without L-cysteine (RXC or RX) were heated over a range of temperatures (80-140 °C) for 2 h. It was observed that RXs had a severe browning, while RXCs accompanied by more pH decrement with the temperature increasing. Then the correlation among data of quantitative sensory descriptive analysis, free amino acid (FAA) and GC-MS of RXCs and RXs were analyzed using the partial least square regression method. Results suggested that the Maillard reaction product (MRPs) with cysteine formed at 120 °C (RXC-120) had greater sensory properties especially meat-like flavor compared to other MRPs. Meanwhile, it revealed that glutamic and glycine not only had a positive contribution to meaty aroma but also showed a significant and positive influence on umami taste of RXs based on the FAA data. Moreover, the sulfur-containing compounds showed a significant positive correlation with the meat-like flavor of RXCs, while RXs depended on furans and nitrogenous-containing compounds with more caramel-like flavor. Therefore, a MRP with strong meaty flavor could be obtained at 120 °C by addition of cysteine.

Keywords : rapeseed meal, Maillard reaction, sensory characteristics, FAA, GC-MS, partial least square regression

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