Preparation of Peanut Flavor Using Defatted Peanut Hydrolysate

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ABSTRACT

Roasted peanut flavor is preferred by consumers. More than 300 volatile compounds have been identified from roasted peanut. Among the main components in peanut, amino acid, proteins, peptides, sugars and lipids were reported to be the important flavor precursors. The preparation of peanut oil in Western countries and in Taiwan is quit different. In Taiwan peanut oil is prepared from peanut by roasting first, and then cooking and pressing. In foreign, the preparation of peanut oil is without the roasting process. Therefore the residue of defatted peanut is rich in peanut flavor precursors, including sugars and nitrogen-containing compounds (especially proteins). The volatile compounds of peanut are reported to be generated from the Maillard reaction of sugars and amino compounds. In this thesis, proteases were used to break down the peanut protein and to release amino acids or peptides to be used as flavor precursors. In this study, defatted peanut was hydrolyzed using commercial available proteolytic enzymes Protease, Neutrase, Papain, Bromelain, Flavourzyme, and Corolase S-50. The best conditions for the defatted peanut hydrolysate preparation were determined. The defatted peanut hydrolysate with higher hydrolysis degree and less bitterness was then used to react with xylose at different pH and in different time to prepare a roasted peanut flavor. The best addition amounts of xylose, the optimum pH and reaction time were determined using a response surface methodology and the sensory evaluation method. After reaction using a formula consisting of the best amount of defatted hydrolysate, and xylose, the optimum pH and reaction time, volatile compounds in the reaction mixture were analyzed. The best composition of the mixture of defatted peanut hydrolysate and xylose was then used to react with some peanut flavor precursors, i.e., phenyalanine, arginine and histidine, to prepare a peanut flavor. The best addition amounts of these precursors were determined using a response surface methodology and the sensory evaluation method. Volatile compounds in each reaction mixture consisting of defatted peanut hydrolysate, xylose, phenyalanine, arginine and histidine were analyzed using GC-MS. The defatted peanut hydrolysate by Protease treatment was found to have the highest hydrolysis degree and the best total sensory acceptance. The pork hydrolysate by Corolase S-50 or Flavourzyme treatment was found to have the highest bitterness and less sensory acceptance. Two stage enzyme hydrolysate of defatted peanut by Protease-Neytrase (P-N) treatment was found to have higher hydrolysis degree and total sensory acceptance than those of using the individual enzyme. The main volatile compounds found in the heated defatted peanut hydrolysate by P-N two stage treatment were found to be sulfur-containing compounds, pyrazines, pyridines, furans, aldehydes, ketones, alcohols, esters, and acids. By using response surface methodology combined with a sensory evaluation methodology analysis, the optimal or best hydrolysis parameters were found to be: xylose 1.14 g, pH 7.24, hydrolysis time 2.49 hr, phenyalanine 0.88 g, arginine 0.57 g, and histidine 0.94 g, when the amount of P-N defatted peanut hydrolysate was fixed at 200 g. When comparing the volatile compounds in the heated solution using the best addition amount of xylose (X) and the heated solution containing xylose, phenylalanine, arginine and histidine (XPAH), it was found that X have higher amount of acids, aldehydes, alcohols, phenols, esters, furans, pyrans, hydrocarbons, ketones, pyrazines, pyrroles, pyridines, sulfides, thiophenes and thiazoles than those in XPAH.

Keywords: defatted peanut; protease; hydrolysis; thermal reaction; peanut flavor; volatile compounds; amino acid; Maillard reaction; xylose

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