RELATIONSHIPS BETWEEN THE CHEMICAL COMPOSITIONS OF WHEAT FLOURS AND THE QUALITY OF DUMPLING CRUSTS

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ABSTRACT

THE PROXIMATE COMPOSITIONS (MOISTURE, CRUDE PROTEIN, AND ASH) AND PROTEIN COMPOSITIONS OF FIVE DIFFERENT WHEAT FLOURS WERE TESTED IN THIS STUDY. THE COOKING PROPERTIES (MOISTURE ABSORPTION RATE, MAXIMAL MOISTURE ABSORPTION, COOKED WEIGHT GAIN, COOKED VOLUME GAIN, AND COOKING LOSS) AND QUALITY (SENSORY EVALUATION SCORES, TENSILE STRENGTH AND COLOR) OF DUMPLING CRUSTS PREPARED FROM FIVE DIFFERENT WHEAT FLOURS WERE ALSO MEASURED TO ELUCIDATE THE RELATIONSHIPS BETWEEN THE CHEMICAL COMPOSITIONS OF WHEAT FLOURS AND THE COOKING PROPERTIES AND QUALITY OF DUMPLING CRUSTS. THE EFFECT OF THE CHEMICAL COMPOSITIONS OF DIFFERENT WHEAT FLOURS ON THE COOKING PROPERTIES AND THE QUALITY OF DUMPLING CRUSTS WERE ALSO STUDIED. FIVE VARIETIES OF WHEAT, INCLUDING AMERICAN HARD RED SPRING (AHRS), AMERICAN HARD RED WINTER (AHRW), AMERICAN SOFT WHITE (ASW), AUSTRALIAN PRIME HARD (APW), AND CANADIAN WESTERN RED SPRING (CWRS) WERE MILLED INTO FLOURS, AND THESE FIVE WHEAT FLOURS WERE USED TO PREPARE DUMPLING CRUSTS. THE OPTIMAL PREPARATION CONDITIONS OF DUMPLING CRUSTS WERE OBTAINED FROM THE RESULTS OF THE ANALYSIS OF THE COLOR, TEXTURE, AND ENSORY EVALUATION SCORES OF DUMPLING CRUSTS. THE RESULTS SHOWED THE OPTIMAL ADDED WATER WAS 45% OF FLOURS WEIGHT FOR ALL FLOURS. THE OPTIMAL MIXING TIME WAS 10 MIN FOR ALL FLOURS. IN THE ASPECTS OF RELATIONSHIP BETWEEN FLOUR PROXIMATE COMPOSITIONS OF FIVE DIFFERENT WHEAT FLOURS AND COOKING PROPERTIES OF DUMPLING CRUSTS, THE RESULTS SHOWED THE CRUDE PROTEIN CONTENTS OF FLOURS WERE NEGATIVELY CORRELATED WITH THE COOKED WEIGHT GAIN AND COOKING LOSS OF DUMPLING CRUSTS; THE RELATION BETWEEN THE MOISTURE CONTENTS OF FLOURS AND THE COOKED WEIGHT GAIN AND COOKING LOSS OF DUMPLING CRUSTS WERE THE SAME AS THE CRUDE PROTEIN CONTENTS OF FLOURS. IN THE ASPECTS OF RELATIONSHIP BETWEEN THE FLOUR PROXIMATE COMPOSITIONS AND THE QUALITY OF DUMPLING CRUSTS, THE CRUDE PROTEIN CONTENT OF FLOUR WERE POSITIVELY CORRELATED WITH THE TENSILE STRENGTH AND HUNTER COLOR B VALUES OF UNCOOKED DUMPLING CRUSTS. THE RELATION BETWEEN THE MOISTURE CONTENTS OF FLOURS AND THE TENSILE STRENGTH AND HUNTER COLOR B VALUES OF UNCOOKED DUMPLING CRUSTS WERE THE SAME AS THE CRUDE PROTEIN CONTENTS OF FLOURS. THE PROTEINS OF THE FLOURS USED IN THIS STUDY WERE GROUPED INTO SIX FRACTIONS ACCORDING TO THE RESULTS OF PROTEIN ELECTROPHORESIS. THE MOLECULAR WEIGHT OF THE PROTEINS IN THESE SIX FRACTIONS WAS AS FOLLOWS, I: 116~97.4, II: 66.2, III: 45.0, IV: 36.0~24.0, V: 24.0~19.7, AND VI: 19.7~6.5 KDA. IN THE ASPECTS OF RELATIONSHIP BETWEEN THE CONTENTS OF PROTEIN FRACTIONS AND THE COOKING PROPERTIES OF DUMPLING CRUSTS, THE RESULTS SHOWED THE CONTENTS OF PROTEIN FRACTIONS OF I, III, V, AND VI WERE NEGATIVELY CORRELATED WITH THE COOKED WEIGHT GAIN OF DUMPLING CRUSTS. THE CONTENTS OF PROTEIN FRACTIONS OF I WAS NEGATIVELY CORRELATED WITH THE COOKED VOLUME GAIN OF DUMPLING CRUSTS. THE CONTENTS OF PROTEIN FRACTIONS OF I, III, V, AND VI WERE NEGATIVELY CORRELATED WITH THE COOKING LOSS OF DUMPLING CRUSTS. THE RESULTS OF THE RELATIONSHIP BETWEEN THE CONTENTS OF PROTEIN FRACTIONS AND THE QUALITY OF DUMPLING CRUSTS SHOWED THE CONTENTS OF PROTEIN FRACTIONS OF I, II, III, IV, AND V WERE POSITIVELY CORRELATED WITH THE TENSILE STRENGTH OF UNCOOKED DUMPLING CRUSTS. THE CONTENTS OF PROTEIN FRACTIONS OF II, III, AND IV WERE POSITIVELY CORRELATED WITH THE TENSILE STRENGTH OF COOKED DUMPLING CRUSTS. THE CONTENTS OF PROTEIN FRACTIONS OF I AND V WAS POSITIVELY CORRELATED WITH THE HUNTER COLOR B VALUE OF DUMPLING CRUSTS. THE CONTENTS OF PROTEIN FRACTIONS OF VI WAS NEGATIVELY CORRELATED WITH THE WI (WHITE INDEX) OF DUMPLING CRUSTS.

Keywords : DUMPLING, DUMPLING CRUST, CHEMICAL COMPOSITION, PROTEIN , WHEAT FLOUR

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