Abstract

Factors associated with textural changes during post-harvest storage and processing of mushrooms (*Agaricus bisporus*) were evaluated. Fresh mushrooms were examined during 9 days storage at 12°C. Thermal processing included blanching (8 min at 100°C) and pasteurization (85°C) or retorting (121°C) for 25 min. Treatments with azodicarbonamide, cysteine, and calcium, and various pH levels (3.3 to 8.7) were applied to alter texture in processed mushrooms. Firmness was determined by puncturing test and toughness by compression in fresh or by shearing in processed mushrooms. Cell wall components--proteins, polysaccharides, and chitin--were analyzed in sequential fractions (water, 1N NaOH, 10N NaOH, HCl) of alcohol insoluble solids. Ultrastructure was observed by scanning and transmission electron microscopy. During post-harvest storage mushrooms simultaneously softened and toughened. Softening paralleled protein and polysaccharide losses, hyphae shrinkage, vacuoles disruption, and expansion of intercellular space at the pilei surface, and toughening was related to increased chitin content. Textural alternations in processed mushrooms occurred primarily from blanching. Higher puncture force was associated with reduced free intercellular space and consequent tighter organization of hyphae in fruit-body. Decrease in toughness coincided with increased solubility of proteins (water soluble fraction), polysaccharides (10N NaOH), and chitin (10N NaOH). Firmness of canned mushrooms remained unchanged during storage but toughness increased. Toughening appeared to be associated with reduced solubility of proteins and polysaccharides observed in shifting of water soluble proteins and 10N NaOH soluble polysaccharides into 1N NaOH and HCl fractions, respectively. Azodicarbonamide and cysteine were not effective in texture alteration. Addition of calcium to canned product increased both firmness and toughness, and reduced solubility of proteins, polysaccharides and chitin. Pasteurization of acidified mushrooms (pH 3.3 to 4.5) resulted in higher force for puncturing but in the similar shear force compared to conventionally processed product. Low pH (pH 3.3 and 4.0) and processing temperature of 121°C caused extensive softening which paralleled reduction of cell diameter and enlarged intercellular space within cap tissue. Alterations of shear force were associated to protein content and polysaccharides in HCl fraction. Chitin was not affected by pH and temperature and did not appear to be related to texture alterations in processed mushrooms.