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Entitled

*HYPER SPECTRAL IMAGING EVALUATION OF THE FRESHNESS OF MUSHROOMS (Agaricus
bisporus)*

by

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Abstract

Hyperspectral imaging (HSI) is a nondestructive analytical tool that can be used for sensing of multiple qualities attributes of foods. This thesis evaluated the application of HSI for the evaluation of the freshness of mushroom *Agaricus bisporus* (*A. bisporus*) in comparison with traditionally-used methods. Three separate experiments were performed with 135 mushroom samples stored either in packed or unpacked condition for 11 days. The overall results suggested that HSI the spectral region between 400 and 1000 nm is suitable for inspection of mushroom freshness. Two distinguishing feature variables that were aligned with physicochemical and microbiological analysis were recognized. The first region [530-700 nm] was used to calculate the Shelf-Life Index 1 that is associated with moisture content, color, and texture changes while the second region [750 – 900 nm] was used to calculate the Shelf-Life Index 2 (or Slimy Index) associated with the slime secretion by microorganisms. The first index decreased faster until day 4 and reached plateau afterword's while the slimy Index peaked at day 4-5 and then decreased. This study could be helpful for real time monitoring of the quality of *A. bisporus* using spectral imaging technique.

Keywords: Hyperspectral imaging, mushroom, *Agaricus bisporus* , freshness, polyphenol oxidase, *Pseudomonas tolaasii*.