Determination of chicken meat contamination by porphyrin fluorescence

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Meat quality is normally defined by the combination of factors such as visual appearance, smell, firmness, succulence, tenderness, and flavor[1-3]. Contamination of poultry meat with pathogens remains an important public health issue, because it can lead to illness due to negligence in handling, cooking or post-cooking storage of the product. Conventionally, quality tests of meat are assessed by visual evaluation or chemical analysis, which has the disadvantages of being subjective and time-consuming. To improve the detection accuracy and production efficiency, it is proposed the evaluation of porphyrin [4] contents of meat by fluorescence spectroscopy, considering that most microorganisms and animal cells excrete porphyrins. For this purpose, chicken meat was cut in small pieces, and separated in three groups; the control group where the meat was conserved under refrigeration and experimental groups where the meat pieces were kept for 24 and 30 hs at room temperature. Porphyrin was extracted from the meat and the fluorescence was measured in the range 550–750 nm, exciting samples around 400 nm. Fluorescence lifetime was also studied. To ensure porphyrin synthesis, a concentration of 9.3 mM of δ-Aminolevulinic acid (ALA) was added to meat 2 hs before porphyrin extraction. The results have shown that the porphyrin fluorescence increased in meat kept at room temperature and incubated with ALA, due to the presence of microorganisms, indicating a new method to test meat quality.

Keywords: Meat, contamination, porphyrin, fluorescence.

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