APPLICATION OF LASER FOR FOOD QUALITY

Cristian Villegas
Zahra Aghashti

13356 Eldridge Ave, Sylmar, CA 91342

LOS ANGELES MISSION COLLEGE

Introduction

The spoilage and poisoning of food products by microorganisms are crucial issues in food safety and human health. The growth and activity of various types of microorganisms, including bacteria, yeast, and mold in food deteriorate food quality and cause food intoxication.

Solution

We decided to experimentally demonstrate a simple, non-destructive and rapid optical method for measuring the quality of meat products using laser speckle imaging in stead of uv light and x rays which have harmful effects.

Materials

. Bacterial samples: Two bacterial species, Escherichia coli and Bacillus cereus
. Laser (wavelength = 633 nm)
. CCD camera (Lt365R, Lumenera)
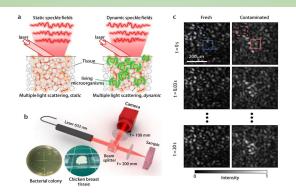. Chicken breast
. Beam splitter

Figure 1 is a diagram of a blueprint of exactly how the procedure works and the difference between both contaminated and fresh chicken breast

Figure 2 is an example of an actual laser product being used to measure the quality of a meat product.

Procedure

.Align the laser to the spectrum cube with the sample in a straight line
.Place the CCD camera on the right of the cube or where the light released on either side
. The camera take images with a 10 second time frame and add data to a graph to visually distinguish the difference from fresh and contaminated sample
. When a coherent laser beam impinges, reflected light from tissues without living microorganisms exhibit static speckle patterns. Thus, by measuring and analyzing the dynamic speckle intensity patterns from meat products, one can detect the presence of living microorganisms

Reference:
Figure 1 & Content -Yoon, Jonghee, et al. "A Simple and Rapid Method for Detecting Living Microorganisms in Food Using Laser Speckle Decorrelation." *Arxiv.org*, 18 Mar. 2016, arxiv.org/abs/1603.07343
Figure 2 -Smith, Shannon . "Laser technology can ID any meat type horse or otherwise." *Http://Www.zdnet.com/Article/Laser-Technology-Can-Id-Any-Meat-Type-Horse-or-Otherwise/*, Smartplanet.com, 27 Mar. 2013.