



## Utilizing Spectrophotometer to analyze meat

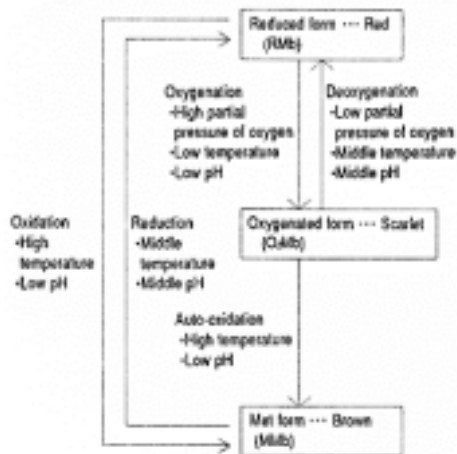
Analysis of spectral characteristics resolves three pigments in meat.

### Background

Meat color and color change have been researched widely using tristimulus colorimeters. However, a lot of information is required to clarify the cause of color change. It is generally accepted that the major factors in the color change of meat is the content of heme protein and the proportions of three derivatives of the heme protein in the muscle. Each of these derivatives has specific spectral absorption characteristics. Presently, the extracted liquid is chemically analyzed to determine the quantity of heme protein. However, this analysis requires a lot of time and the results were not the same as those of evaluation by eye, since the optical characteristics of the background were not evaluated. A laboratory of the university has been researching meat and measuring its spectral reflectance.

### Outline of the measurement process

Figure 1 shows the changes of the heme protein, which is the major factor in the color of meat; figure 2 shows the reflectivity spectra of meat. First, the meat is measured using the

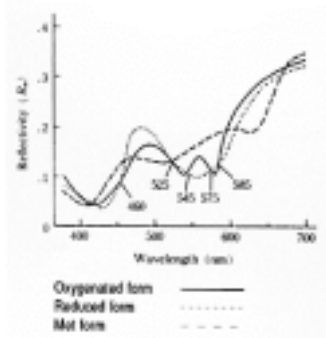


Spectrophotometer, and the spectral reflectance is sent to a computer. The computer then calculates the proportions of the three derivatives using the K/S values calculated based on the Kubelka and Munk colorant layer theory used for CCM in the field of paints. Using these data, the color can be evaluated with the influence of the background included and whether or not an artificial additive is present can be determined. In addition, the difference of the color change according to the storage conditions of the meat can be analyzed and the color change over time can be predicted.

[ Fig.1 The color change of meat and the major factors involved ]

### Results

- Lots of data can be obtained because measurements can be performed instantly.
- Practical experimental data can be obtained because the Spectrophotometer can be used on the spot.



[ Fig.2 Reflectivity spectra of meat ]