Gwangju Institute of Science and Technology

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Professor Jae Gwan Kim's research team suggests a new way to determine the freshness of red meat

☐ GIST (President Seung Hyeon Moon) – A research team led by Professor Jae Gwan Kim o the Department of Biomedical Science and Engineering has proposed a new method to measure myoglobin * and oxidation in red meats such as meat and pork to determine its freshness.

* Myoglobin: an iron- and oxygen-binding protein found in the muscle tissue of vertebrates in general and in almost all mammals

◦ The results of this study suggest a new method of measuring meat freshness by measuring changes in the diffusion of the light spectrum.

☐ In buying meat at the market, checking the color of the meat is the most common way to determine its freshness. This is because the color of the meat's surface gradually changes from bright red to brown as the storage time of the meat increases.

◦ This change in color is due to the fact that the myoglobin protein * that makes up the meat changes to metmyoglobin, which is

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currently the most common way to measure the concentration of myoglobin via light reflectance.

◦ However, the surface color measurement method does not consider the degree of oxidation of meat and therefore has a low correlation with the actual metmyoglobin concentration. The method of measuring light reflectance of the meat surface has a disadvantage in that it requires having standard individual values.

* Myoglobin protein is mainly distributed in muscles and supplies / reserves oxygen to muscles when needed.

□ Therefore, the researchers measured the value of the myoglobin and applied diffuse reflectance spectroscopy * to quickly and accurately measure the amount and degree of oxidation of metmyoglobin in the meat with a high correlation.

* Diffuse reflectance spectroscopy: A method of detecting the components of a sample by irradiating the sample with white light and analyzing the spectrum by taking the diffused and reflected light scattered in the sample as a spectroscope.

◦ For this purpose, the spectrum of the optical fiber light collected on the meat surface at a distance of several millimeters is analyzed by the diffuse reflection spectroscopic technique to accurately measure the amount of the myoglobin in the meat and the degree of oxidation.

□ Professor Jae Gwan Kim said, "In this study, non-invasive were prepared for measurement, and the concentration and oxidation degree of metmyoglobin, which is produced in the meat as well as on the surface of red meat, is precisely measured and visually recognized. The advantage is that you can measure the freshness of meat over a period of storage much faster and more accurately than traditional methods."

□ This study, led by Professor Kim Jae-Kwan (correspondent author), Thien Nguyen (first author), and Sungchul Kim (first author) was supported by the GIST Research Institute and was recently published

in *Food Chemistry*, which is within the top 6% of the food science and technology fields.

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