



Gwangju Institute of Science and Technology

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Section of Public Relations	Dongsun Cho Section Chief 062-715-2061	Nayeong Lee Senior Administrator 062-715-2062
Contact Person for this Article	Professor Tae-Young Kim School of Earth Sciences and Environmental Engineering 062-715-3647	
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Professor Tae-Young Kim's research team develops an optimal analysis method for accurate measurement of free fatty acids in food

- GIST (Gwangju Institute of Science and Technology) School of Earth Sciences and Environmental Engineering Professor Tae-Young Kim's research team developed an analysis method that can accurately measure the amount of free fatty acids in food.
 - The research team found that the content of free fatty acids in foods measured by conventional methods can be inflated up to twice the actual value because a significant amount of exogenous free fatty acids* present in the extraction container causes the error. It was confirmed that plastic containers used for extraction showed on average a larger amount of exogenous free fatty acid diffusion than glass containers.
- * exogenous free fatty acid: Free fatty acid introduced through a route other than food in the extraction process for analysis of free fatty acids in food. It is known to occur due to contamination by impurities or added to improve surface properties during the manufacturing process of experimental consumables such as extraction vessels and pipettes. Due to this exogenous free fat diffusion, the fatty acid content in food is measured incorrectly as being higher than it actually is.



- Free fatty acid is a fat component released into the blood by decomposition of fat cells through exercise, and it is used as an energy source for muscles and other metabolism. Excessive intake of free fatty acid has a profound effect on cardiovascular diseases, including hyperlipidemia, and is known to be closely related to the onset of type 2 diabetes, immune disease, and cancer. Therefore, accurate measurement of the content of free fatty acids is very important nutritionally, and it is essential for quality control of foods.
 - However, it has been found that the existing free fatty acid analysis method has a problem that the amount is incorrectly measured due to the exogenous free fatty acid introduced from a route other than food during the extraction process.
- The research team developed an analysis method to remove exogenous free fatty acids in the extraction vessel to minimize distortion of the free fatty acid amount in food. As a result of comparing various container pretreatment methods and extraction methods, it was confirmed that exogenous free fatty acids can be most effectively removed by using the methanol ultrasonic cleaning method of glass test tubes and the experimental solvent chloroform extraction method.
 - By applying the developed analysis method to the analysis of residual free fatty acid in skim milk, the error caused by exogenous free fatty acids could be reduced to the level of 7-16%, which is one-third of the content error (31-45%) of the existing analysis method.
- Professor Tae-Young Kim said, "This research result was able to improve the accuracy of the analysis of free fatty acids in food through a new pretreatment method. Because free fatty acids are used not only as food but also as major ingredients in cosmetics, detergents, and shampoos, this analysis method can be applied to the quality control of free fatty acids contained in household chemical products.
- The research was led by GIST Professor Tae-Young Kim and conducted by master's graduate Hyejin Park and Ph.D. students Woo-Young Song and Hyeonjeon Cha with support from the Korea Environment Industry & Technology Institute through the Technology Development Project for Safety



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