

PRESS RELEASE

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New Study Reveals Skin-Boosting Lipids Hidden in Rice Bran By-Products

The world's first identification of acylated glucosylceramides reveals new skin-protective compounds from rice bran by-products

Researchers have identified three previously unknown lipid molecules in rice bran, one of which strengthens the skin's barrier and reduces water loss. Named oryzaceramides A–C, these acylated glucosylceramides were isolated for the first time from plant sources and structurally characterized in detail. oryzaceramide A significantly improved skin hydration in laboratory models. The discovery opens new possibilities for cosmetics, functional foods, and future research into lipid metabolism and skin health.

A by-product of rice bran oil production, has long been recognized as a source of beneficial lipids for skin health and nutrition. Now, researchers have uncovered an entirely new class of skin-active molecules hidden within this agricultural residue. In a world-first discovery, scientists have identified three previously unknown compounds—named oryzaceramides A, B, and C. Of these, oryzaceramide A demonstrated significant skin barrier-enhancing effects, highlighting the untapped value of plant-derived lipids.

The newly discovered molecules belong to a rare group known as acylated glucosylceramides, which are lipids that play a crucial role in maintaining epidermal integrity. While glucosylceramides are widely distributed as cell membrane components across animals, plants, and microorganisms—supporting structural stability and cellular signaling—their acylated forms had not been definitively identified in plant sources until now. The researchers successfully isolated the compounds from rice bran and determined their chemical structures using advanced spectroscopic and analytical techniques.

The study, available online on November 26, 2025, and published in Volume 71 of the journal [Phytochemistry Letters](#) on February 1, 2026, provides a detailed chemical and biological characterization of these molecules, establishing a new category of plant ceramides. The research was led by Professor Toshio Morikawa of the Pharmaceutical Research and Technology Institute at Kindai University, Japan, in collaboration with industry partner Dr. Hiroshi Shimoda of Oryza Oil & Fat Chemical Co., Ltd., Japan.

“Our study revealed the world’s first plant-derived acylated glucosylceramides,” said Prof. Morikawa. *“These compounds represent a previously unknown modification of glucosylceramides and expand our understanding of lipid diversity found in nature.”*

To evaluate their biological relevance, the team investigated how the newly identified compounds influence skin barrier function. Using reconstructed human epidermal keratinocyte models, they measured transepidermal water loss, a key indicator of the skin’s ability to retain moisture. Among the three compounds, oryzaceramide A demonstrated a

significant reduction in water loss at low micromolar concentrations, indicating a strengthening of the skin barrier and enhanced hydration.

In contrast, oryzaceramides B and C did not exhibit the same effect, underscoring the importance of subtle structural differences in determining biological activity. *“The results suggest that the saturated fatty acid moiety present in oryzaceramide A plays a critical role in improving skin barrier function,”* explained Dr. Shimoda.

Beyond immediate cosmetic applications, the discovery carries broader scientific implications. Glucosylceramides are known to vary significantly in structure across species, and this diversity has made them useful markers in evolutionary biology and molecular phylogenetic analysis. The identification of acylated glucosylceramides introduces a previously unknown structural variant that may influence how scientists interpret lipid evolution and metabolic diversity.

In the longer term, this work is expected to stimulate further biochemical research into the biosynthetic mechanisms of acylated glucosylceramides, including the identification of enzymes responsible for acylation and the mapping of associated metabolic pathways. Over the next 5 to 10 years, these insights could support the development of new functional foods, cosmetic ingredients, and sustainable bioproducts derived from agricultural by-products—potentially improving human health while adding economic value to the rice-processing waste.

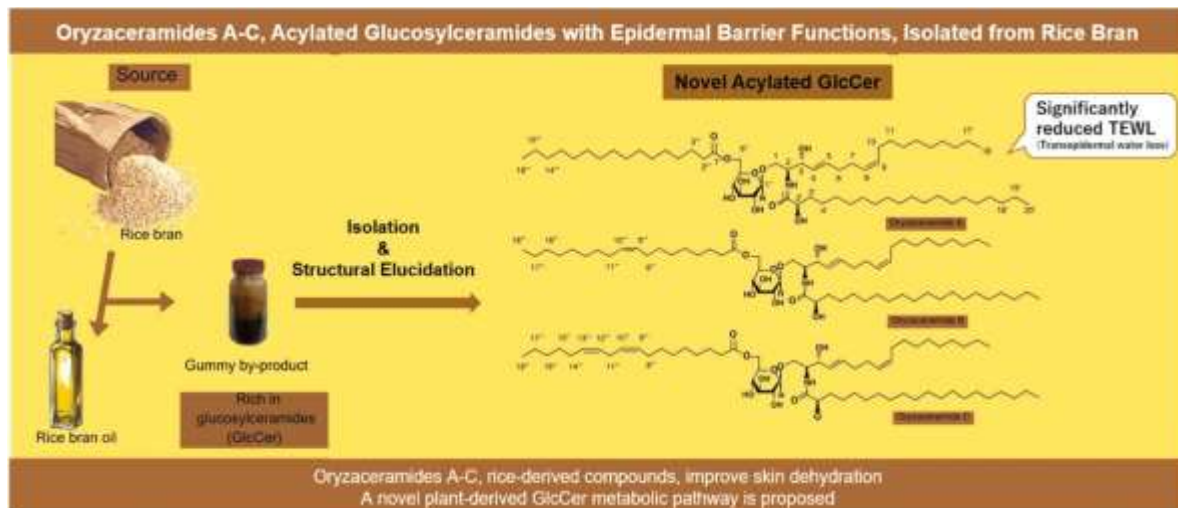


Image title: Oryzaceramides A–C identified from rice bran with epidermal barrier-enhancing activity

Image caption: Scientists at Kindai University and Oryza Oil & Fat Chemical Co., Ltd., Japan, discovered three novel plant-derived acylated glucosylceramides, oryzaceramides A–C, from rice bran. One compound, oryzaceramide A, reduced transepidermal water loss in epidermal models, indicating improved skin barrier and moisturizing potential.

Image credit: Prof. Toshio Morikawa from Kindai University, Japan

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About Kindai University

Kindai University was established in 1949 after the merger of Osaka Technical College (founded in 1925) and Osaka Science and Engineering University (founded in 1943). Over the past several decades, the university has transformed into a comprehensive educational organization with an ever-growing reputation. Kindai University has over 2,200 full-time faculty members, 6 campuses, and 18 research centers. As an academic institution offering a broad range of programs from across disciplines, Kindai University strives to impart practical education while nurturing intellectual and emotional capabilities. The university's academic programs are fully accredited by Japan's Ministry of Education, Culture, Sports, Science and Technology as well as by the National Institution for Academic Degrees and University Evaluation.

Website: <https://www.kindai.ac.jp/english/>

About Professor Toshio Morikawa from Kindai University

Dr. Toshio Morikawa is a Professor at the Pharmaceutical Research and Technology Institute, Kindai University, Japan. Since earning his Ph.D. in 2002 from Kyoto Pharmaceutical University, he has published over 330 scientific papers with more than 20,000 citations. His research focuses on pharmacognosy, natural products chemistry, medicinal food, pharmaceutical science, and chemical biology. Specializing in life sciences and pharmaceutical chemistry, he focuses on identifying bio-functional molecules from natural resources to prevent lifestyle diseases. By integrating advanced spectroscopic techniques with biological evaluation, Prof. Morikawa's prolific work continues to unlock the therapeutic potential of nature, supported by numerous patents and global collaborations.

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