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Press release

Leibniz-Institut für Lebensmittel-Systembiologie
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Muscaris grapes: Molecular secret of lychee note revealed

A team of researchers from the Leibniz Institute for Food Systems Biology at the Technical University of Munich has succeeded for the first time in identifying the odorants responsible for the characteristic lychee note of Muscaris grapes. The new findings form the basis for further studies investigating the extent to which the aroma-relevant compounds are transferred from the grapes into wine. At the same time, they provide a scientific basis for the targeted breeding of innovative and resistant grape varieties with distinctly fruity aroma characteristics.

Bred in 1987 by the State Institute of Viticulture Freiburg, Germany, the white Muscaris grape variety combines the excellent fungal resistance of the Solaris variety with the intense aroma of the Gelber Muskateller, also known as Muscat Blanc. The characteristic aroma of Muscaris grapes is characterized by a distinctive, fruity lychee note, which also describes the bouquet of Muscaris wines.

No information on aroma-relevant compounds

Stephanie Frank, co-author and Senior Scientist at the Leibniz Institute, explains: "In the past, several studies had already looked at the composition of must and wine from Muscaris grapes. However, our literature research revealed no information about the odor-active compounds that contribute to the typical grape aroma of the modern variety."

"It was also previously unknown which odorants the Muscaris grape variety inherited from its parent variety, Gelber Muskateller," adds first author Xingjie Wang. "We were particularly interested in the molecular background of the unique lychee note," continues the PhD student from the Leibniz Institute.

Two odorants are crucial

To find out more about the molecular background of the special grape aroma, the Freising researchers carried out extensive investigations. As a comparative aroma extract dilution analysis revealed, Muscaris and Muskateller grapes differ only slightly in the odor-active compounds they contain. Of the 39 and 35 odorants identified, 16 exceeded their odor threshold concentrations.

Further experiments finally showed that the combination of two of the identified odorants is responsible for the distinct lychee note in the aroma of Muscaris grapes. These are the compounds (2S,4R)-rose oxide and geraniol.

"The results of our odorant analyses are groundbreaking for further aroma research on grape varieties such as Muscaris. The freely available study data also opens up new perspectives for the future of viticulture, as fruity wines are becoming increasingly popular," summarizes study leader Martin Steinhaus, who heads the Food Metabolome Chemistry research group at the Leibniz Institute.

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More information:

Grape varieties:

Muscaris is a relatively new grape variety with an intense aroma and good resistance to fungal diseases such as downy mildew, powdery mildew, and botrytis. Muscaris is early-ripening. The berries remain green, even at high must weights. They are particularly suitable for the production of dessert wine and dry wine. The cultivation area of Muscaris has increased in recent years, reaching 117 hectares in Germany in 2022.

Solaris is a white grape variety bred in 1975, whose fungal resistance originates from the Asian wild species Vitis amurensis. In fact, it has been proven that Muscaris has a similar resistance to diseases as Solaris.

Gelber Muskateller (also known as Muscat Blanc) is one of the most commonly cultivated white Muscat varieties. It is of Greek origin and has a long cultivation history in Germany. Its fungal resistance is low, however, it is highly appreciated for its floral and fruity notes. Muskateller grapes are often used as a blending partner for other white grape varieties to boost the aroma of the wine.

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Information about the Institute:

The Leibniz Institute for Food Systems Biology at the Technical University of Munich (Leibniz-LSB@TUM) comprises a new, unique research profile at the interface of Food Chemistry & Biology, Chemosensors & Technology, and Bioinformatics & Machine Learning. As this profile has grown far beyond the previous core discipline of classical food chemistry, the institute spearheads the development of a food systems biology. Its aim is to develop new approaches for the sustainable production of sufficient quantities of food whose biologically active effector molecule profiles are geared to health and nutritional needs, but also to the sensory preferences of consumers. To do so, the institute explores the complex networks of sensorically relevant effector molecules along the entire food production chain with a focus on making their effects systemically understandable and predictable in the long term.

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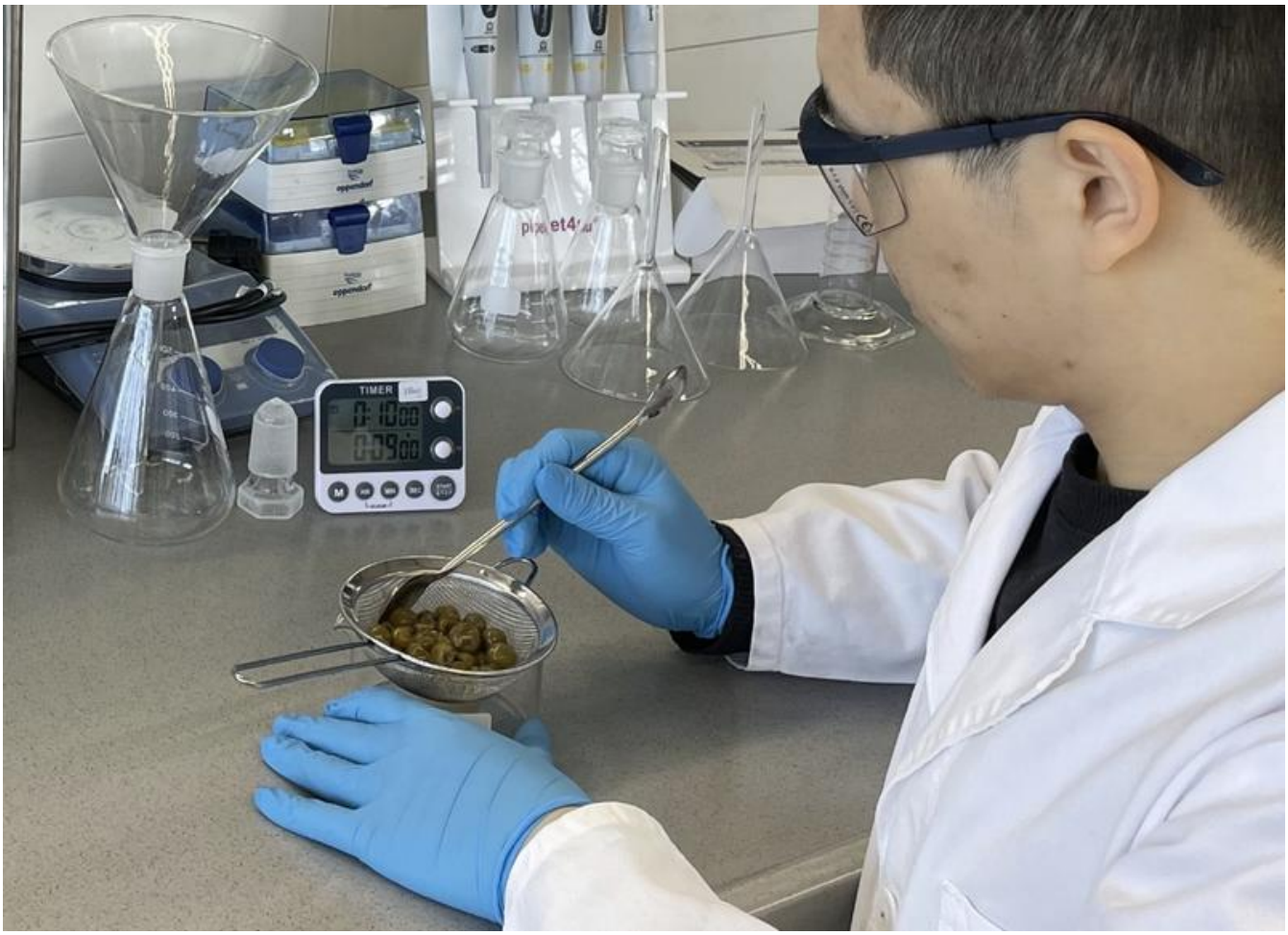

Xingjie Wang working in the lab
Zhenli Xu
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