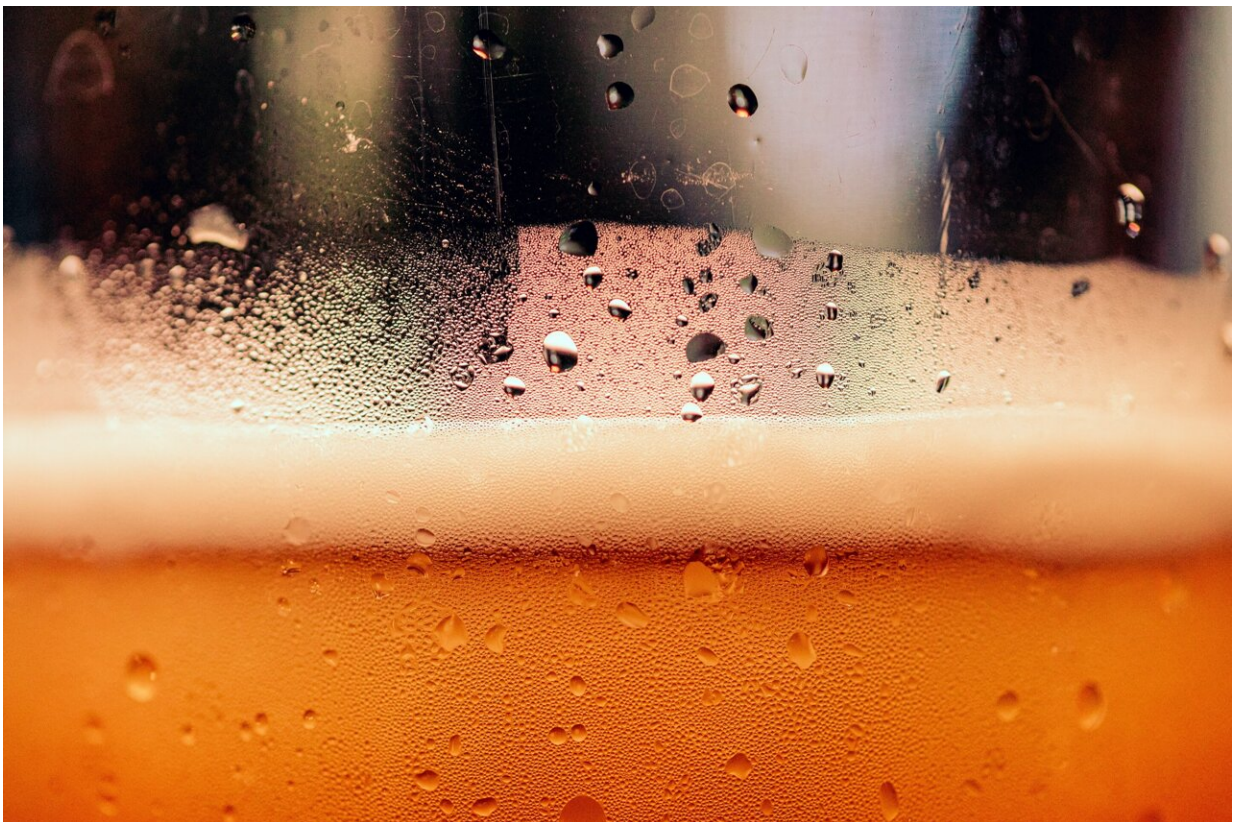


# AI predicts the taste and quality of beer

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Belgian scientists have developed AI models that can predict how consumers will rate a particular beer, and what aroma compounds

brewers can add to improve it. The research was [published](#) in *Nature Communications* and may revolutionize how the food and beverage industry develops new products.

Comparing and ranking flavor profiles of different beers is a challenge. There are a multitude of guides on the market describing beverages with generic terms like 'fruity' and rating them based solely on one person's taste. "This makes [beer](#) comparisons highly biased and makes it difficult to predict how a beer actually tastes," says Kevin Verstrepen, professor at KU Leuven and director of the VIB-KU Leuven Center for Microbiology and the Leuven Institute for Beer Research.

"I wanted to have a more neutral and scientific description of the different beers in the world," says Verstrepen.

The team started chemically analyzing beers, carefully measuring the concentrations of hundreds of aroma compounds. A trained panel of 15 people evaluated each beer on a set of 50 criteria. "It was a truly Herculean effort. We began the project with less than 100 beers and quickly realized this would not be enough to capture Belgium's incredible beer diversity, so we ended up analyzing 250 beers," remembers Dr. Miguel Roncoroni, who led the chemical analyses and tasting panel.

## **New insights with AI**

It took the team five years, but once they had the chemical concentrations and detailed tasting reports for hundreds of different beers, they knew it would be possible to use AI to connect the two. One model could predict key aromas and the final appreciation score of a beer without the need for human tasting.

These outcomes, in turn, were used further to improve the taste of an existing commercial Belgian ale by adding certain aromas predicted by the model to boost the beer's quality. Sure enough, the modified beer indeed scored quite a bit better in blind tastings.

"The flavor of beer is a complex mix of aroma compounds. It is impossible to predict how good a beer is by just measuring one or a few compounds. We really need the power of computers," says Michiel Schreurs.

The study can be expanded to other [food products](#), which may revolutionize how new foods are made.

"Our biggest goal now is to make better alcohol-free beer. Using our model, we have already succeeded in creating a cocktail of natural [aroma compounds](#) that mimic the [taste](#) and smell of alcohol without the risk of a hangover," says Verstrepen.

"However," Scheurs adds jokingly, "we did celebrate the paper with the alcohol-containing variants."

**More information:** Kevin Verstrepen, Predicting and improving complex beer flavor through machine learning, *Nature Communications* (2024). [DOI: 10.1038/s41467-024-46346-0](https://doi.org/10.1038/s41467-024-46346-0).  
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