Electronic nose determines the quality of wine

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Credit: University of Gävle

An electronic nose consists of some sensors, a signal processing system and an analysis system. "The e-nose can identify substances using a method similar to the human sense of smell. The use of AI is increasing the potential of the e-nose every day," says José Chilo, researcher in electrical engineering at University of Gävle.

Electronic nose technology is not new; it has been used for everything from detecting explosives to determining whether a person is suffering from a serious illness. Chilo has studied the subject for more than 20 years in collaboration with KTH Royal Institute of Technology. He has, for example, developed a model that can determine whether water is drinkable.

The new version of the electronic nose, which Chilo developed in collaboration with researchers from Spain, focuses on wine or, more precisely, the level of acetic acid in red wine. Acetic acid is formed when alcohol oxidizes and is present in low levels in all wine. However, the concentration of acetic acid can become too high during winemaking or when some wines are aged for too long, which risks making the wine undrinkable. Simply put, Chilo's electronic nose measures how the acetic acid content of a wine changes over time. In addition to improved software, the new e-nose has a new component that blows air into the sensors.

"When adding oxygen, our results became better and more reliable, since oxygen releases substances from the wine. You can compare it to when a sommelier aerates wine before tasting," Chilo says.

One advantage is its high reliability, but the method's main competitive advantage is speed. Moreover, in traditional wine tasting, where wine connoisseurs sample the wine, people can fall ill and have a reduced sense of smell.

"Possibly, [chemical analysis](#) can provide an even more accurate result, but the drawbacks here are that it is slower and costs more money. The e-nose provides faster answers regarding the quality of the wine," Chilo says.

The new e-nose is a prototype that is primarily intended for use in winemaking. However, potentially it will be able to assess the quality of an aged wine.

"If we develop this method further, it will be able to identify essential components in a wine. By using AI, we are improving the technology every day," Chilo says.

The research is published in the journal *Sensors*.