Two types of sensors that provide information on vineyard water status are designed

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Test made in a vineyard. Credit: Elhuyar Fundazioa

Researchers at the NUP/UPNA-Public University of Navarre have designed two types of sensors whose innovative technologies obtain information on the water status of a vineyard. The work has been developed by a NUP/UPNA multidisciplinary team in collaboration with various Navarrese companies.

The first of these sensors does not require contact with the plant, and works by capturing information in the terahertz range. "These devices transmit a terahertz signal and measure what proportion of the signal is returned by the trunk of the vine," explained Gonzaga Santesteban-García, lecturer in the Department of Agricultural Production and leader of the research project. "It involves reflectance technology without any contact with the plant. That way, we can check the plant's water status. It is a technique that has not been used before for this purpose." The results of this development have been published in the journals *Frontiers in Plant Science* and the *Journal of Infrared, Millimeter and Terahertz Waves*.

The sensor design is simple because high bandwidth is not needed; it uses planar technology, which allows a high degree of miniaturization and thus considerably cuts the cost per unit, since many of its chips can be obtained commercially at a low price.

The second of the sensors is based on a totally different principle. In this case, the aim was to use magnetoelastic sensors to detect the changes that take place throughout the day and night in the size of the trunk or branches of the vine. Gonzaga-Santiesteban explained that sensors of

this type offer two advantages over the classical dendrometers used by some wineries. "Firstly, this is a different technology enabling costs to be reduced and, secondly, we have made it more flexible so that these devices can be fitted not only to the trunk, as until now, but also to different parts of the vine, such as, for example, the cluster," he added. The results of this development have also been partially published in the journal *IEEE Transactions on Magnetics*.

Provided by Elhuyar Fundazioa