

New method for the early detection of vineyard mildew, powdery mildew and botrytis

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The Basque Institute for Agricultural Research and Development, Neiker-Tecnalia, has developed a new method for the early detection of the diseases mildew, powdery mildew and botrytis in vines. The new methodology based on molecular biology techniques makes it possible to detect the disease before the symptoms appear on the plant. That way it is possible to carry out the rapid treatment of the plots or areas affected and prevent the disease from spreading all over vineyard, which reduces infective pressure. The R&D centre has also studied the evolution of infection by the pathogen *Plasmopara viticola* –the cause of mildew– on four vine varieties: Solaris, Cabernet Sauvignon, Tempranillo and Petit Courbu. Solaris turned out to have the greatest resistance to the fungus.

The [early detection](#) of diseases is fundamental for the agricultural sector. In the sphere of vine growing there are three diseases caused by fungi and which greatly affect vineyards: mildew, [powdery mildew](#) of the grapevine and botrytis, also known as grey mould or grey rot and which also affect other fruit crops. The fungi that cause them are *Plasmopara viticola*, *Erysiphe necator* and *Botrytis cinerea*, respectively. The three reduce crop yields and fruit quality, which leads to significant production and economic losses for the grape producing sector. This is compounded by the hazards arising out of the intense applications of plant protection products to combat these diseases, because they contaminate the soil and water in the vineyards and also pose a risk for the people who carry out the fumigation.

To spot the above-mentioned three diseases rapidly, Neiker-Tecnalia has fine-tuned a molecular biology technique based on Polymerase Chain Reaction or PCR; it is a method capable of detecting the genetic material of the relevant spores to confirm their presence or otherwise in the vineyard. This technique constitutes an alternative to the method based on identifying, under the microscope, the spores gathered in the vineyard by means of devices to capture the air, either volumetric or passive ones; in any case, this can only work a few days in advance of the appearance of symptoms on the plant, when the disease can be spotted with the naked eye. The problem facing this [methodology](#) is the contamination of the spore samples by remains of fungicides, dust from the ground, pollen and other matter. These elements are potential inhibitors of the reaction of the polymerase and therefore prevent the spores from being identified.

The PCR technique proposed by Neiker-Tecnalia includes the washing of the spores and ensures that they reach the DNA obtaining process in a clean state. Once the possible inhibitors have been eliminated, the R&D centre's researchers subject the samples to the PCR technique to identify the presence of the spores of *Plasmopara viticola*, *Erysiphe necator* and *Botrytis cinerea* and that way confirm each disease in the vineyard.

Solaris, the variety that best resists mildew

The other line of research conducted by Neiker-Tecnalia has been channelled towards studying the degree of resistance of mildew –a disease caused by the fungus *Plasmopara viticola*– which arises in the Solaris, Cabernet Sauvignon, Tempranillo and Petit Courbu grape varieties. The Solaris variety, of German origin, has turned out to be the most resistant, since it has a gene making it resistant to this fungus and is the one that takes longer to develop the infective process of the disease. Cabernet Sauvignon –a very widespread variety internationally– displayed intermediate resistance, and the least resistant to the pathogen

were Tempranillo –the most common grape in the Rioja Qualified Appellation of Origin– and Petit Corbou –common in the south of France and in the vineyards of Txakoli (Basque white wine)-.

Provided by Elhuyar Fundazioa

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