

## A PROTEIN EXTRACT IN THE PLANT PROTECTION: NOVEL ALTERNATIVE TO CHEMICALS AGAINST POWDERY MILDEW

Giovannini O., Angeli D., Pertot I

Department of sustainable agro-ecosystems and bioresources, Fondazione Edmund Mach (FEM), via E. Mach, 1, San Michele all'Adige 38010, Italy

Powdery mildew is a disease caused by obligately parasitic fungi which attacks about 10.000 angiosperm species. These fungi belong to the family *Erysiphaceae* that includes ca. 650 species. Powdery mildew attacks a lot of cultivated plants including grapevine (*Erysiphe necator* and *Oidium tuckeri*) and cucumber (*Golovinomyces cichoracearum* and *Podosphaera xanthii*).

Since 1850 sulphur is been amply used to control this disease and still it represents the main product in organic agriculture for its good efficacy and low cost. However it has a toxic effect versus humans and beneficial arthropods, causes a cytotoxicity on leaves and shoots in presence of high temperature, dirties the fruits reducing its commercial value and interferes in the fermentation process of white wine at early harvest.

Many studies have tested antimicrobial and antifungal activity of proteins and peptides. This class of molecules can control the pathogen directly, by antibiosis, or indirectly, inducing the resistance system of the host plant.

SCNB2 is a patented product for the use in plant protection and is a preparation based on hydrolyzed natural proteins that possesses a good activity against powdery mildew of the most important fruit and vegetable crops. It acts principally as a resistance inductor (local and systemic) and, since it is based on compounds of natural origin (vegetal and animal proteins), the product can be considered safe for human health and for the consumer.

SCNB2 was tested against powdery mildew on Zucchini plants in greenhouse and on grapevine in field in two different season.

The Zucchini plants were inoculated with *Podosphaera xanthii* and treated weekly with the proteins hydrolyzed in comparison with an untreated control. The disease severity on leaves was evaluated weekly and elaborated to obtain the AUDPC values (Area Under the Disease Pressure Curve).

In the all trials SCNB2 showed an high efficacy (75.9-79.4%), statistically different to the control.

In the seasons 2010 and 2011, the effectiveness of product was evaluated the control of grapevine powdery mildew in a susceptible vineyard of Trentino with weekly applications. The weather conditions, in both years, were very favorable to the development of pathogen, but the proteins hydrolyzed showed an high antifungal activity. The disease was reduced of the 94.6-96.8% of AUDPC for disease severity on leaves and 76.7-65% of incidence on bunches, statistically comparable at the sulphur control, with values respectively 99.0-99.24% and 60.0-80.0%.

Unfortunately SCNB2 showed a slight phytotoxicity on young leaves, probably due to the salt content, but this problem is easily resolvable. A cheaper production process of protein hydrolyzed should be found to allow a commercial use of this promising product.