

Bio-based resistance inducers for sustainable plant protection against pathogens.

[Burketova L](#)¹, [Trda L](#)¹, [Ott PG](#)², [Valentova O](#)³.

Author information

- ¹Institute of Experimental Botany, The Czech Academy of Sciences, Rozvojová 313, 165 02 Prague 6-Lysolaje, Czech Republic.
- ²Plant Protection Institute, Centre for Agricultural Research, Hungarian Academy of Sciences, Herman Otto Str. 15, H-1022 Budapest, Hungary.
- ³Department of Biochemistry and Microbiology, Institute of Chemical Technology Prague, Technická 5, 166 28 Prague 6, Czech Republic.

Abstract

An increasing demand for environmentally acceptable alternative for traditional pesticides provides an impetus to conceive new bio-based strategies in crop protection. Employing induced resistance is one such strategy, consisting of boosting the natural plant immunity. Upon infections, plants defend themselves by activating their immune mechanisms. These are initiated after the recognition of an invading pathogen via the microbe-associated molecular patterns (MAMPs) or other microbe-derived molecules. Triggered responses inhibit pathogen spread from the infected site. Systemic signal transport even enables to prepare, i.e. prime, distal uninfected tissues for more rapid and enhanced response upon the consequent pathogen attack. Similar defense mechanisms can be triggered by purified MAMPs, pathogen-derived molecules, signal molecules involved in plant resistance to pathogens, such as salicylic and jasmonic acid, or a wide range of other chemical compounds. Induced resistance can be also conferred by plant-associated microorganisms, including beneficial bacteria or fungi. Treatment with resistance inducers or beneficial microorganisms provides long-lasting resistance for plants to a wide range of pathogens. This study surveys current knowledge on resistance and its mechanisms provided by microbe-, algae- and plant-derived elicitors in different crops. The main scope deals with bacterial substances and fungus-derived molecules chitin and chitosan and algae elicitors, including naturally sulphated polysaccharides such as ulvans, fucans or carageenans. Recent advances in the utilization of this strategy in practical crop protection are also discussed.