



NF EN ISO 9001

RITMO Agroenvironnement
Z. A. BIOPÔLE
37 rue de Herrlisheim
CS 80023
68025 Colmar Cedex
Tel : 03 89 80 47 00 / Fax : 03 89 21 16 70



Conséquences de l'application d'un inducteur des réactions de défense des plantes sur l'efficacité de deux relations symbiotiques du soja (soja-*Bradyrhizobium* et soja-*Glomus*)

Auteur : *Laurent KREMER*

Encadrant : *Ludovic FAESSEL*

Résumé : During the evolution, plants have developed a broad set of defenses that can be actively expressed in response to pathogens and parasites of various scales, ranging from microscopic viruses to insect herbivores. The induction of these defense reactions involves recognition of the pathogen through a signalling molecule called elicitor, that can be exogenous (produced by the pathogen himself) or endogenous (synthesized by the plant, in consequence of the pathogen's attack). Once the elicitor is perceived, a signalling pathway using salicylic acid (SA) takes place that confers a resistance to the whole plant, named Systemic Acquired Resistance (SAR). The establishment of this resistance induces changes in plant's physiology, in particular in roots exudates.

The knowledge of these resistance phenomena allowed the development of molecules that permit the preconditioning by miming a prior infection that results in resistance against subsequent challenge by a pathogen or parasite. One of the best studied elicitor is Syngenta's BION[®] (acidenzolar-S-methyl). It acts as a functional analog of SA, activating SA's signalling pathway conducting to SAR.

On the other hand, some plants (papilionoid legumes) have acquired the ability to settle mutualistic associations with soil micro organisms (fungi and bacterias) whose benefits are enhanced nutrition for both partners. But the symbiotic process requires a strategy of embezzlement of the resistance mechanisms in order to initiate, and later, to carry on the symbiosis. So what happens with the soil communities when a plant, who has already established some mutualistic interactions undergoes a defense reaction, induced by an elicitor ?

The aim of the study presented here was to quantify potential unintended side effects of an induced resistance (by applying the commercial elicitor BION[®]) on the mutualistic interactions woven between soybean (*Glycine max*) and two symbionts : a rhizobacteria (*Bradyrhizobium japonicum*) and an arbuscular mycorrhizal fungi (*Glomus mosseae*).

Intermediate results show that the BION[®] (at a concentration of 0,15 g/l) has activated an induced resistance that has for consequence to significantly inhibit the nodulation on soybean roots at a rate of almost 30%, although it has been demonstrated that it has no direct action on *Bradyrhizobium*. Whereas the elicitor is homologated for a foliar application, we tested to application methods : on the seed and by foliar spray ; and showed that the application has no incidence on its efficiency.

Some other analysis are in course of treatment, to point the effect on the fungal symbiosis (by quantifying the rate of fungal colonisation and mature arbuscules presence) and the nutritional benefits for the plant (N, P, K contents).