



Technology CTC 22: Rhizoctonia Solani potato treatment

Market need

Rhizoctonia Solani is the agent that is responsible for “black scurf” in potatoes and other underground crops, such as sugar beet, peanuts and carrots. This disease affects 20% of the crops and reduces yield and marketability by 15%¹. Based upon USDA data, the economic impact of black scurf on potato crop in the U.S. alone was around US\$600 million in 2008.

There is no biocontrol for black scurf currently on the market. There are only chemical products that have no proven effectiveness against the disease, and they are toxic to workers, the environment, insects, plants and animals, and are corrosive to machinery.

Both biopesticides, MELAREST® and RHIZOREST®, were developed for agro biotechnology companies that are interested in licensing and commercializing innovative, effective and natural technologies for disease management.

Benefits

MELAREST® and RHIZOREST® reduce the impact of the disease by 30% and improve yields an average of 144%, according field trials done in Valdivia, XIV Region of Chile for Austral University. The manufacturing, processing and sourcing is easy, inexpensive and needs no other special considerations, such as international standards procedures.

Technology description

This technology consists of two bio pesticides formulated with bacteria, which have been isolated and identified in Valdivia, Chile, at Austral University of Chile by a group of scientists led by Luigi Ciampipanno, Ph.D. This bio-formulation was achieved with new strains of *Bacillus subtilis* (two Chilean isolates designated as DO3-01 and DO3-01, and deposited in the USA at the ATCC® as PTA-8804 and PTA 8805, respectively, both considered as GRAS (Generally Regarded as Safe), an American Food and Drug Administration (FDA) designation that a chemical or substance added to food is considered safe by experts, and as such is exempted from the usual Federal Food, Drug, and Cosmetic Act (FFDCA) food additive tolerance requirements.

They control and biologically reduce the incidence of *Rhizoctonia solani*, a plant pathogen which attacks crops of high economic value. Specifically, they prevent, reduce and eliminate rhizoctoniasis in plants and black scurf in most types of tubers and roots that grow underground, such as potatoes, carrots, beets and other related crops to which *R. solani* poses a serious threat.

Production and formulation are unique and low in cost. The process to induce bacterial sporulation is easy, and media for cell growth are low cost to acquire. MELAREST® and RHIZOREST® come in three different delivery methods (liquid, powder and capsules), and are non-toxic to workers, the environment, insects, plants and animals. They are non-corrosive to machinery and can be used in organic crops, given their GRAS designation.

Development status

This technology is a commercially-ready and scalable Prototype

Two Chilean strains have been deposited with ATCC® (American Type Culture Collection). There are two patent applications, in Chile and the United States. The patent covers the Chilean strain, the

¹ Source: Dr. Robert Larkien, plant pathologist from US Department of Agriculture (USDA)





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cultivation process and sporulation of the strain, the formulation, process for spray-dry and encapsulation and its efficacy on potato and other underground crops

There is an Engagement Agreement signed with North Dakota State University to conduct trials in the US field and confirm the efficacy of the biopesticides in different weather and soil conditions than those already tested in Chile. Trials will begin in Q4 2009



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