

# Beneficial microorganisms

for bio-control of plant and human pathogens

Food-borne diseases due to consumption of food contaminated with bacterial human pathogens are a food safety concern worldwide. Plant pathogens and plant parasites are causing tremendous amounts of crop loss every year, which is a major food security issue. The use of beneficial microorganisms to suppress such pathogens has become a reliable alternative to the application of chemically synthesized pesticides. For some pathogens biological control shows more satisfying results than chemical control.

Still, presently available solutions are insufficient due to a lack in understanding of the host-pest environmental relationships. Fundamental research is needed to provide solutions to design pest management programs for various pests and diseases. There is a need for different bio-agents from various local sources with numerous active ingredients in different formulations.

Expected outcome of this project is the development of a number of new and innovative bio-control agents and biotechnological products with high efficiency to control phytopathogens and human pathogens, transmitted by fresh vegetables and fruits. The products will be produced in commercial scale and provide new environmentally friendly and economically valuable solutions for local organic and traditional food production in Egypt and the surrounding region.



The project is a cooperation between ORGANIC INDUSTRY, RESEARCH and THE INTERNATIONAL ORGANIC MOVEMENT.

**INDUSTRY:** The project leader Libra Biodynamic Agriculture Company is part of the SEKEM group and a leading organic cultivation company in Egypt and North Africa.

**RESEARCH:** The Agriculture Research Centre (ARC), is the centralized agriculture research organization in Egypt, the Graz University of Technology (TUGraz), Austria, is a worldwide leading organization in Environmental Biotechnology, the Julius-Kuhn Institute, Federal Research Centre for Cultivated Plants (JKI) is a German leader in plant health and sustainable plant protection.

**ORGANIC MOVEMENT:** The International Federation of Organic Agriculture Movements (IFOAM) is the only international umbrella organization for Organic Agriculture, AgriBioMediterraneo is an independent regional body of IFOAM promoting Organic Agriculture in the Mediterranean.

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#### The Framework of the Project

This project forms part of Phase II of the Research, Development and Innovation Programme (RDI-2), an agreement between the European Union and the Egyptian Ministry of Scientific Research for supporting research, development and innovation initiatives in Egypt. A key component of the Programme is the Innovation Fund that supports research outputs' exploitation and innovation with closer links to the industries. The project started in May 2014 and the estimated duration is 24 months.

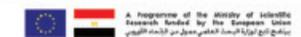
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# BioGuard

Protecting  
National Economic Crops  
via Application of  
**Beneficial Microorganisms**

to Bio-Control  
Plant and Human Pathogens  
in Organic Agriculture

A project implemented by  
Libra Biodynamic Agriculture Company  
Arab Republic of Egypt



## Main areas of the research

### HUMAN PATHOGENS

Food-borne diseases due to consumption of food contaminated with bacterial human pathogens are a food safety concern worldwide. Studies indicate that sprouting seeds serve as primary source of the human pathogens. Fruits and vegetables may also be an important reservoir for human pathogens.



### NEMATODES

Root knot nematode is considered as one of the most serious nematode pests of agriculture and horticultural crops in Egypt and most widely distributed droop of plant-parasitic nematodes all over the world. An estimated 10% of world crop production is lost due to nematode damage. It causes an estimated \$80 billion in losses worldwide.



### RALSTONIA

*Ralstonia solanacearum* is a soil-borne plant pathogen that causes a lethal wilting disease on many important crops. The host range includes more than 450 plant species representing over 50 families of plants. Chemical control does not provide satisfactory disease control. Biological control has emerged as one of the most important methods in the management of the disease.



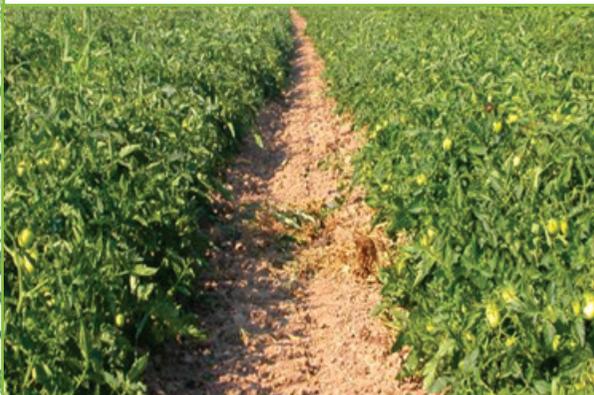
### ORGANIC AGRICULTURE - Definition

Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.

Organic agriculture contributes to sustainable development with significant socio-economic impact especially in the developing world. Through efficient management of local resources organic agriculture can have significant impact in cost-effectiveness and contribute improved to farm income and livelihood.

The project aims to increase the sustainability and competitiveness of organic farms in Egypt.

It not only promotes research to produce new and effective biological control agents to compete both plant and human pathogens, the project also comprises training and dissemination of knowledge to improve the skills of local stakeholders as well as their methods for sustainable agro-food production.



### GOALS and EXPECTED OUTCOMES

The scientific goals of this project are:

- to detect location, abundance and diversity of bacterial and fungal soil-borne pathogens, phyllosphere-human pathogens in Egyptian field soils,
- to develop bio-control products on the basis of antagonists as well as bacteriophages and
- to develop bio-control strategies, which can be integrated in plant protection systems for desert agriculture.

The project will provide dissemination of knowledge and scientific results among the Mediterranean countries.



### BioGuard team

