Secont Laureate
Applied Research

Project Title: Achievement of biological sulfur fertilizer production technology(knowhow of Thiobacillus inoculants)
Executive Organization: Soil and Water Research Institute - Agricultural Research, Education and Extension Organization
Researcher: Hossein Besharati Kalayeh (Ph. D.)
Collaborator: K. khavazi
Collaborators Organization: Agricultural and natural resources research centers and research and technology, petroleum provinces

Abstract:

Majority of the agricultural land of Iran is calcareous soil. In this type of soils, essential plant nutrients such as phosphorus, iron, zinc, copper and manganese are fixed and become unavailable to plants. So nutrients deficiency and low fertilizer use efficiency are one of the main limiting factors in agricultural crop production in the country. For instance, less than 20 percent of consumed annually imported phosphate fertilizer (-500 700 thousand tons) is absorbed by plants. Using elemental sulfur as an abundant and most economical acid generating material in the country is one of the main strategies to increase nutrient availability in calcareous soils. Sulfur is one of the byproduct of oil and gas refineries which is produced around 2 million tons every year. By this opportunity in the country, Soil and Water Research Institute (SWRI) during last decade carried out a series of research projects from basic to applied phases to improve crop production. As a result, microbial sulfur fertilizer production technology (Know how of Thiobacillus inoculant) was obtained. The technical knowledge provided the possibility usage of sulfur as a biofertilizer which along with the increase of nutrient availability in the soil could be able to reduce part of needs for importing fertilizers in the country.

The produced biofertilizer is soft and moist powder containing more than 10 million Thiobacillus cells per gram. These bacteria are capable to oxidize elemental sulfur. This formulation is able to hold bacteria in its active state for a long time. Using this biofertilizer along with excess and abundant sulfur in the country could be alternate part of using chemical fertilizer and reduce import of chemical fertilizers. This achievement has following consequences:

1- Prevention of outflow of foreign exchange from the country
2-Reduction of chemical fertilizer application at the farm level
3-Production of safe products
4-Creation of jobs in the country
5- Usage of inexpensive raw materials for the fertilizer production
6-Improvement of soil and water conservation.

It is important to announce that 300 thousand packages of biofertilizer have been produced by the company who bought the technical knowledge which will be purchased and distributed by the Ministry of Jihad-e-Agriculture