



Project details: SalStrAI

1. TITLE (500 characters)		
Salt stress alleviation in crops: the combined use of humic substances and plant growth-promoting rhizobacteria		
2. ACRONIM (20 characters)		
SalStrAI		
3. III LEVEL ERC SECTORS (as detailed in Annex 4 Codici_ERC_ANVUR.xls)		
3.1 LS9_4	3.2	3.3
4. KEY WORDS (50 characters)		
Salt stress, humic substances, rhizosphere, PGPR		
5. PROJECT ABSTRACT (2000 characters)		
Climate change and conventional agricultural practices are expected to exacerbate salt accumulation in agricultural soils altering soil structure and microbiota. Salinity harshly affects glycophytes (non-salt tolerant plants), reducing growth and altering plant physiology. Salt stress alleviation in crops is becoming nowadays a pressing issue. Humic substances (HS) are capable to ameliorate rhizosphere conditions and nutrient bioavailability. In saline soils, HS have been shown to stabilise soil aggregates, buffer pH and reduce Na⁺ mobility in the soil solution by attracting Na⁺ ions on their negatively charged surfaces. In parallel, recent developments in genomics emphasised the role of plant growth-promoting rhizobacteria (PGPR) in enhancing salt tolerance in crops. PGPR are able to improve plant nutrient uptake and trigger plant acclimation to abiotic stresses, by their hormone-like action and upregulation of the activity of key enzymes. Both approaches are greatly promising, but mechanisms and potential synergic action are still unknown. So far tests were carried out exclusively in hydroponics or artificial culture media, but knowledge gaps impede successful upscaling and field use. The project aims to improve knowledge on action mechanisms of HS and halotolerant (HT-)PGPR in alleviating salt stress in crops, in order to implement a combined protocol for maintaining acceptable crop yields in salt-affected soils. In particular, the project challenges the use of HS, derived from sources available in great quantity and at low costs, together with HT-PGPR strains, extracted from the rhizosphere of key halophytes, in improving germination and growth of two target crops, i.e. maize and soybean. Primary objectives are: i) to investigate how appropriate HS preparations may modify the rhizosphere; ii) and to individuate HS properties affecting HT-PGPR inoculation success in soil.		