The contamination of soil by petroleum hydrocarbons (PH) is a serious environmental problem. One of the most promising biological methods for cleaning up hydrocarbon-polluted environments is phytoremediation, which may be supported by hydrocarbon-degrading and/or biosurfactant-producing plant growth-promoting bacteria. The phytoremediation rate depends on many factors, but relies primarily on the activity of the microorganisms that are associated with the plant, which reside in the rhizosphere and inside plant tissues (endosphere). When the number of such microorganisms is low and/or their degradative activity is insufficient, bioaugmentation of soil using beneficial microbes is recommended. Microorganisms especially those named plant growth-promoting rhizobacteria (PGPR) and endophytes (PGPE) may enhance the efficiency of phytoremediation. When introduced into soil, PGPB have the potential to enhance the development of plants thus resulting in a higher biomass, size and more extensive root system. Additionally, such bacteria can produce surface-active compounds such as biosurfactants, which increase the bioavailability of organic pollutants such as PH, especially in the rhizosphere zone. Finally, some of the bacteria that are used in bacterial assisted phytoremediation can degrade PH, which contributes to the reduction of the pollutant concentration in soil. In order to make the phytoremediation process more effective, understanding the fundamentals of the correlation between the PH-degrading and biosurfactant-producing PGPB strains that are introduced and the indigenous microflora of the rhizo- and endosphere as well as the physiological responses of treated plants is a prerequisite for determining the factors that are responsible for the success and effectiveness of phytoextraction. The results of this project projects will extend the knowledge about the factors that influence the effectiveness of the bacterial-assisted phytoremediation of PH-polluted soils, which allows to increase the efficiency of the method and reduce its cost.