Due to decades of excess phosphorus (P) fertilization in Flanders, most acid sandy soils became P saturated. This saturation implies that farmers in these areas are bounded to very strict P fertilization rules. The bulk of the (excessive amount of) P in the soil is strongly adsorbed and not directly available for plant uptake. Therefore, it is necessary to look for a way to make the P more available to the crop, even in these P saturated soils. Phosphate solubilising bacteria (PSB) transform unavailable P into plant available forms, and could thus prove to be very useful even in P saturated soils under severe fertilization restrictions. The goal of this research is to investigate the survival and performance of PSB in conditions of high total P content in soil.

Five PSB species, namely three Bacillus and two Pseudomonas species, were selected. Firstly they were tested on different media with different amounts of insoluble phosphate, to check their survival and their P solubilising potential under completely controlled conditions. Then the bacteria will be brought in a more realistic environment, namely in quartz sand with a nutrient solution that supplies all nutrients to the bacteria except P. The P will be provided in an insoluble form as FePO$_4$, AlPO$_4$ or CaPO$_4$. In a next step, the bacteria will be inoculated in P saturated soil under controlled conditions, to test their P solubilising capacities under these specific conditions, and crop P uptake will be monitored simultaneously.