

Rice plant growth-promoting rhizobacteria: a focus on phosphate solubilization

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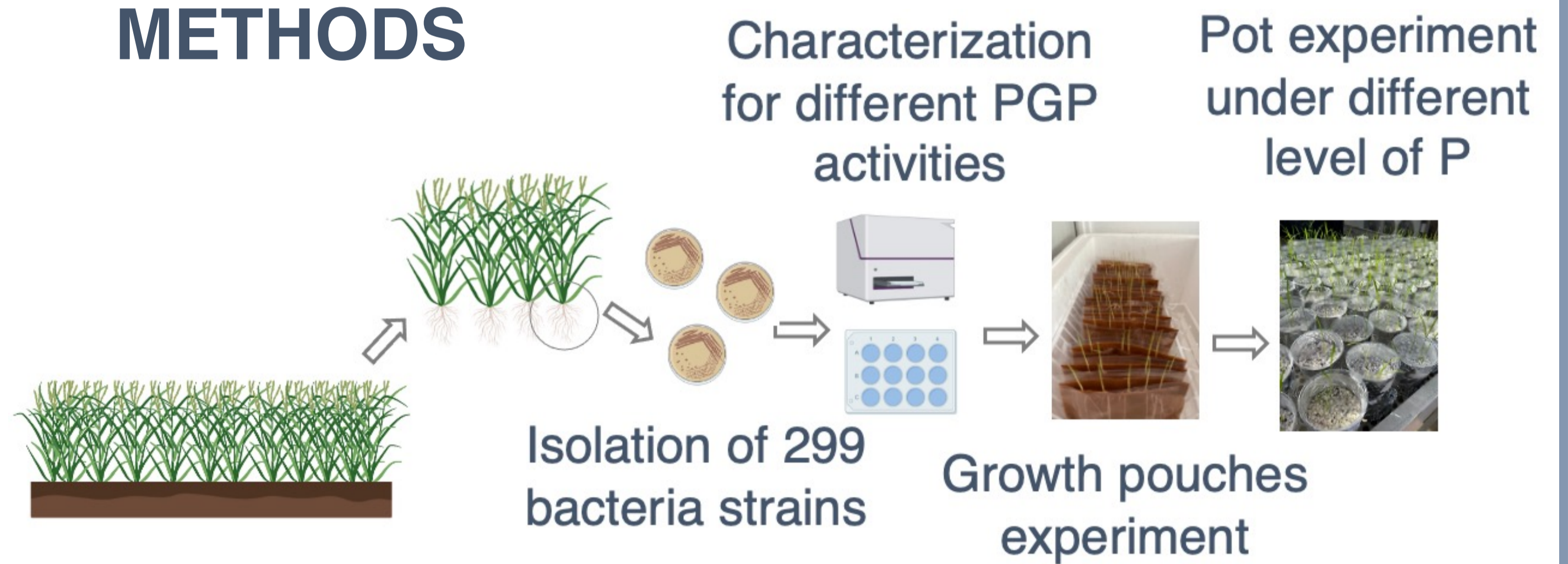
BACKGROUND

The application of microbial inoculants is an innovative biotechnology to preserve productivity and sustainability of rice cultivation. Rice cultivate under aerobic condition decrease the availability of P in soil solution. PGPR able to release soluble phosphorous (P) ions from insoluble mineral or organic forms is drawing attention, also in consideration of severe depletion of raw materials for P fertilizer manufacturing.

AIM

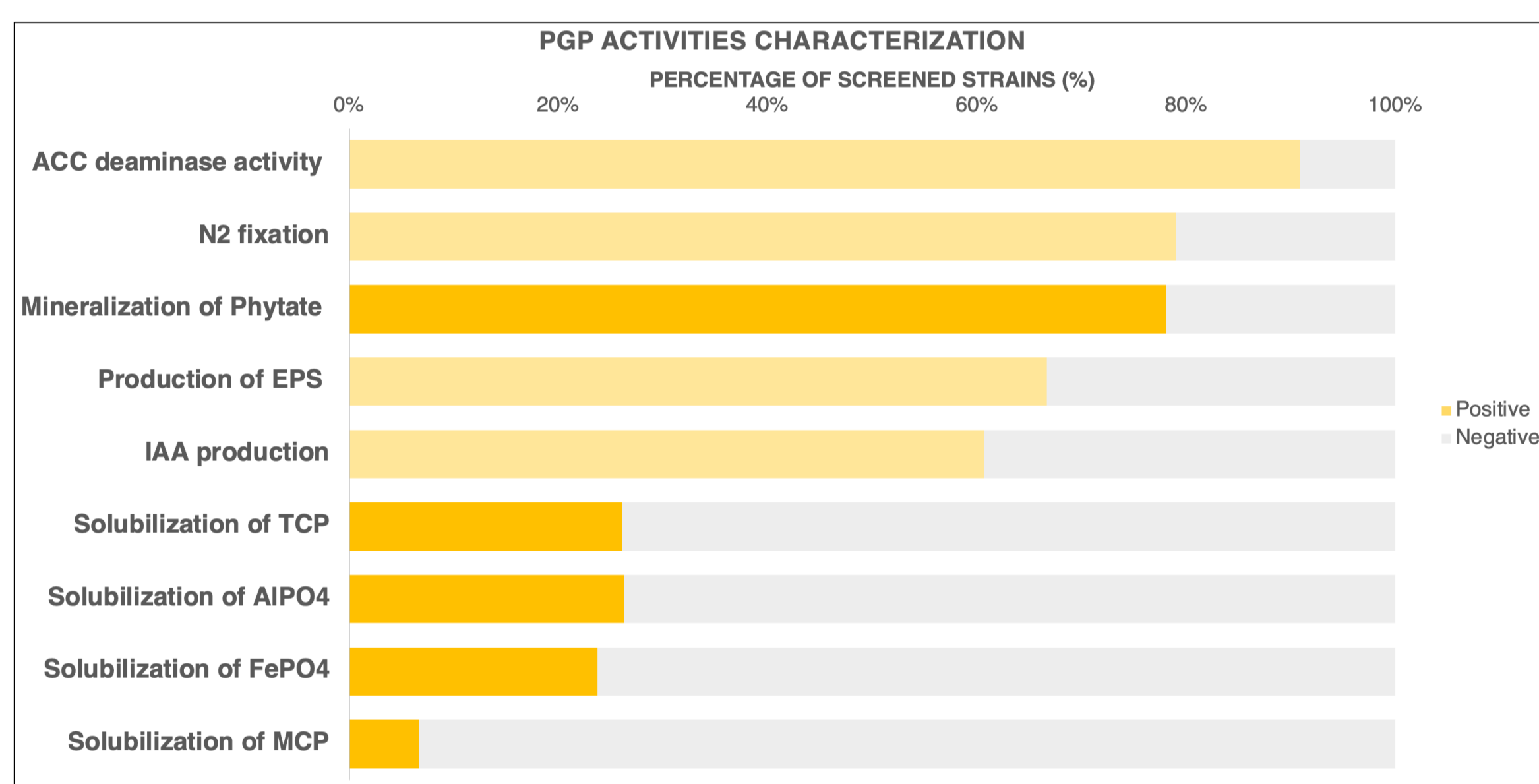
Isolation of PGP bacterial strains suitable as bioinoculant to promote plant growth and increase the amount of P available for plant uptake.

METHODS



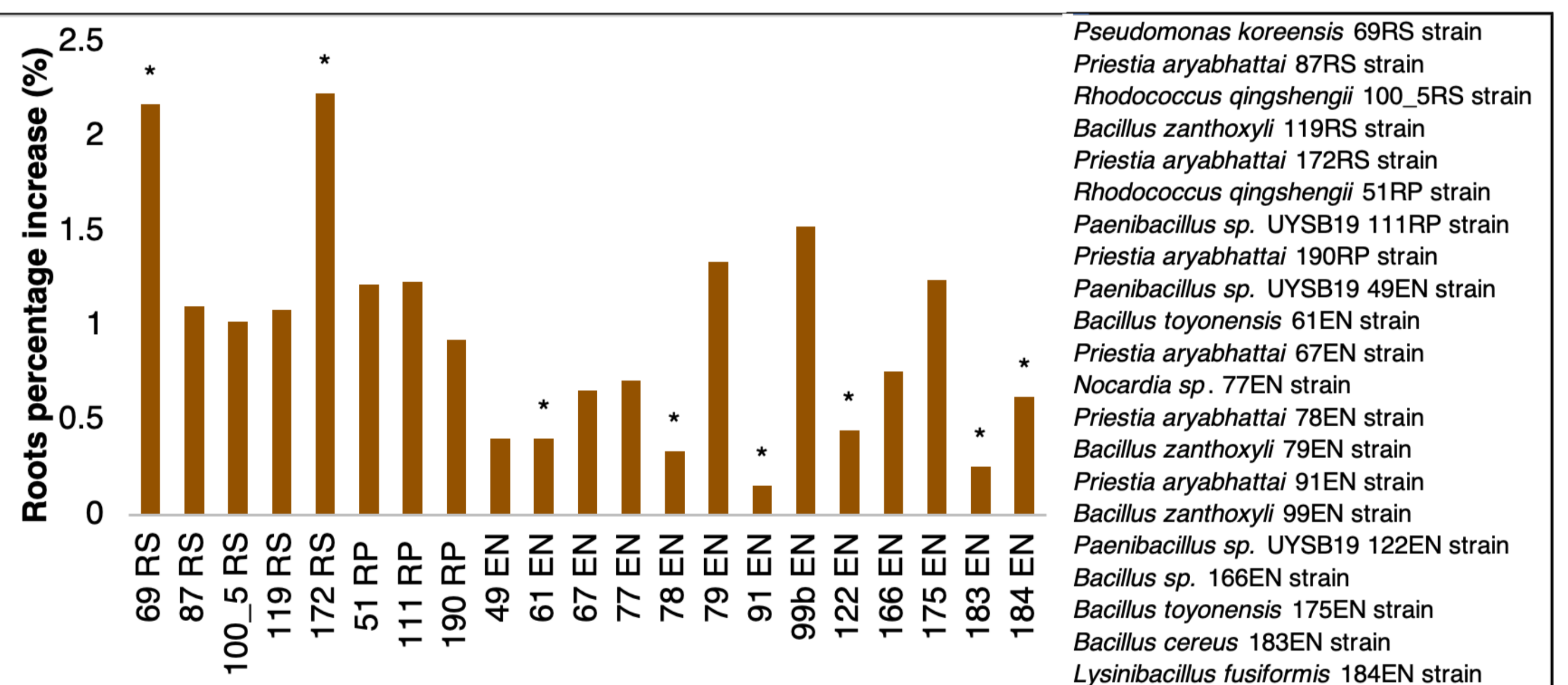
CULTUROMICS

30% of screened strains were able to solubilize different forms of inorganic phosphate while 80% of screened strains were able to mineralize inorganic phytate.



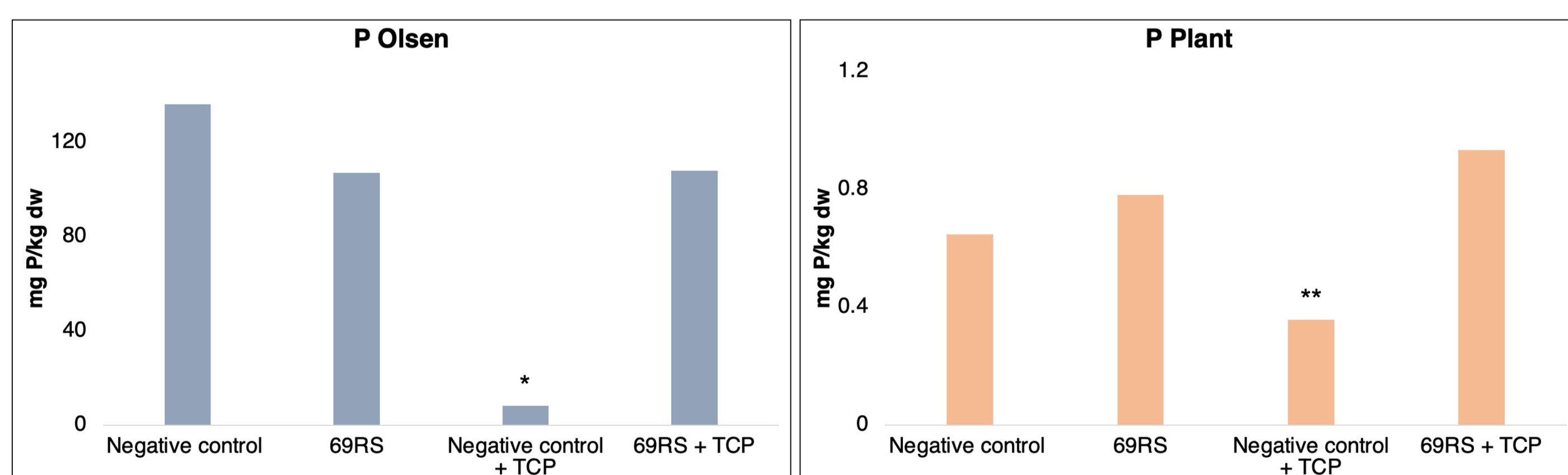
IN VIVO GROWTH POUCHES EXPERIMENT

Strains belonging to the *Bacillus* and *Pseudomonas* genera promoted mostly roots growth whereas *Priestia* genera promoted mostly shoots growth.

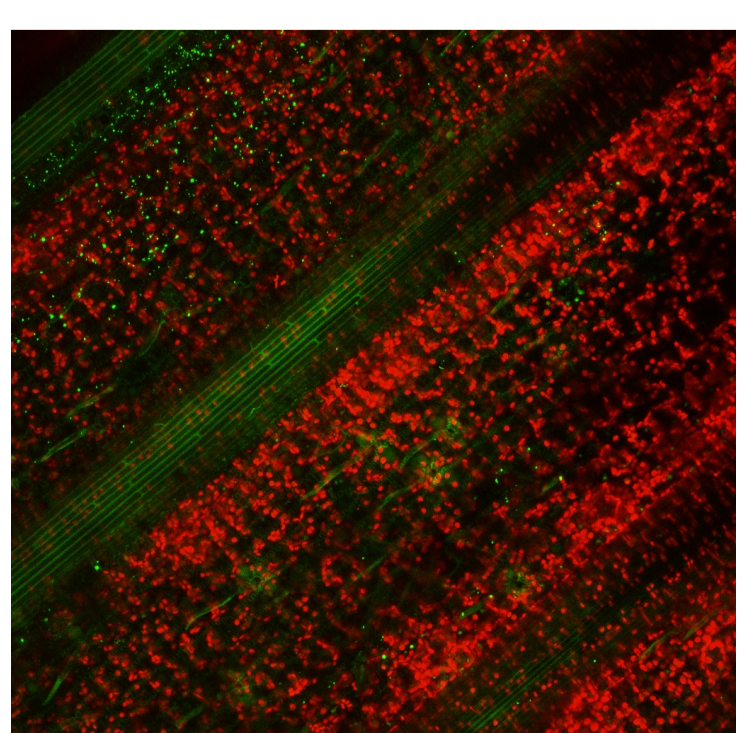


POT EXPERIMENT

P. koreensis 69RS strain promoted P available content in the plant (Murphy and Riley, 1962). In the presence of an insoluble P source (tricalcium phosphate - TCP), the strain increased the available P (P Olsen) in the growth substrate.



t-student, p-value * <0.05 ; ** <0.01 ; *** <0.001



P. koreensis 69RS strain located in rice stem

CONCLUSIONS

- Rice PGPR were isolated and characterized.
- *Pseudomonas koreensis* 69RS strain promoted biomass growth while increasing plant P uptake.
- Rice associated microbiome can be the source of bioinoculants to increment P bioavailability.