

Metabolic engineering of *Zymomonas mobilis* for industrial applications

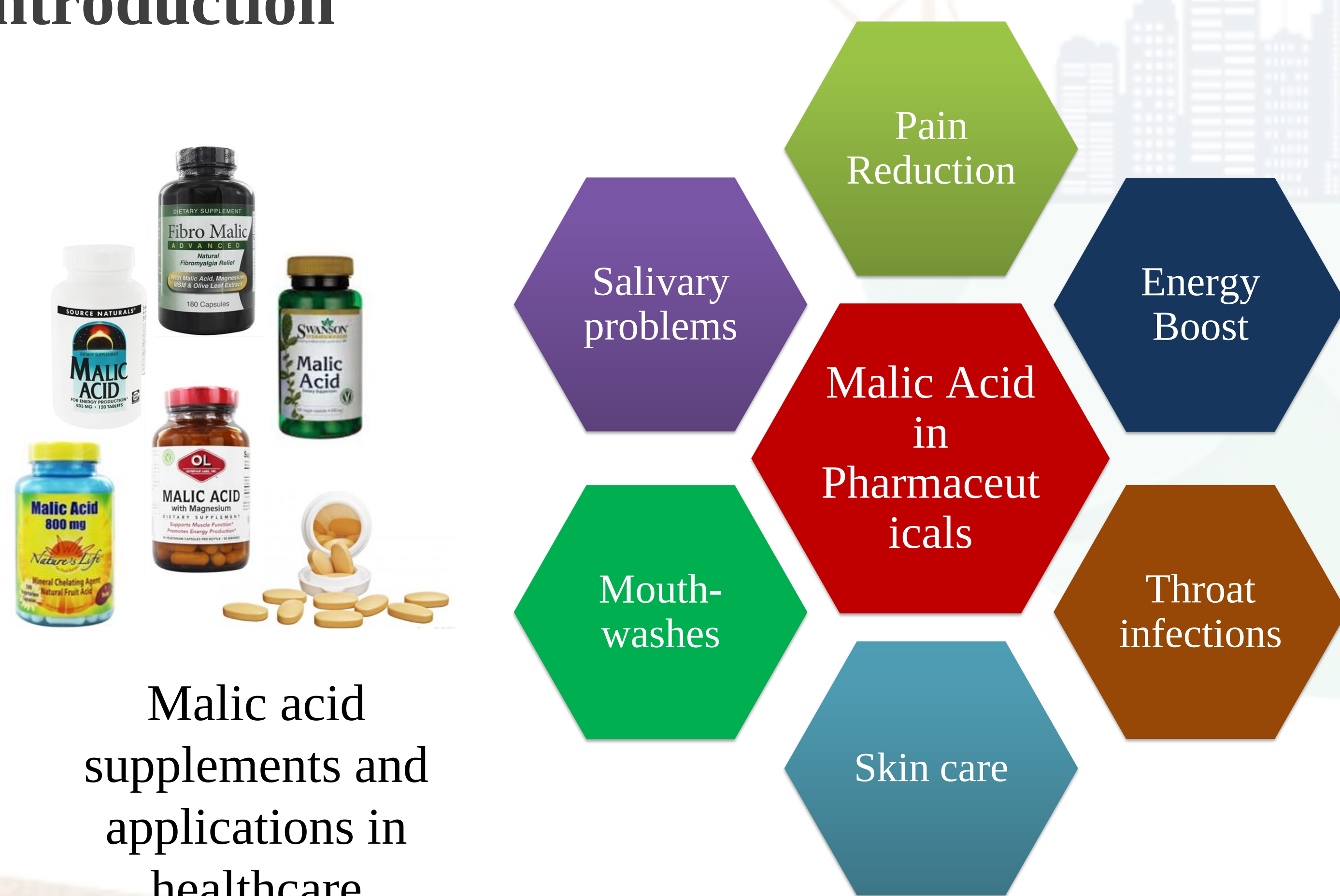
Rohit Khandelwal, Virendra S Bisaria, Preeti Srivastava*

*Corresponding author. Email: preeti@dbeb.iitd.ac.in

Abstract

Malic acid is useful for patients with several skin diseases, fibromyalgia and chronic fatigue syndrome. It is one of the intermediates synthesized in TCA cycle. In the present study, *Zymomonas mobilis* was genetically engineered by deletion of *pyruvate decarboxylase* (*pdc*) gene to increase malic acid production. Considering this, we hereby suggest bacterial production of malic acid for the manufacture of cost-effective medicines.

Introduction



Materials and Methods

Selection of GRAS-grade bacterium for malic acid production

Application of metabolic engineering to increase malic acid synthesis

Scale up in bench-scale reactor for malic acid production

Process optimization to obtain high titer, yield and productivity

Conclusions

✓ Metabolic engineering of bacteria synthesizing malic acid resulted in a maximum of 11-fold increase than that in wild-type strain.

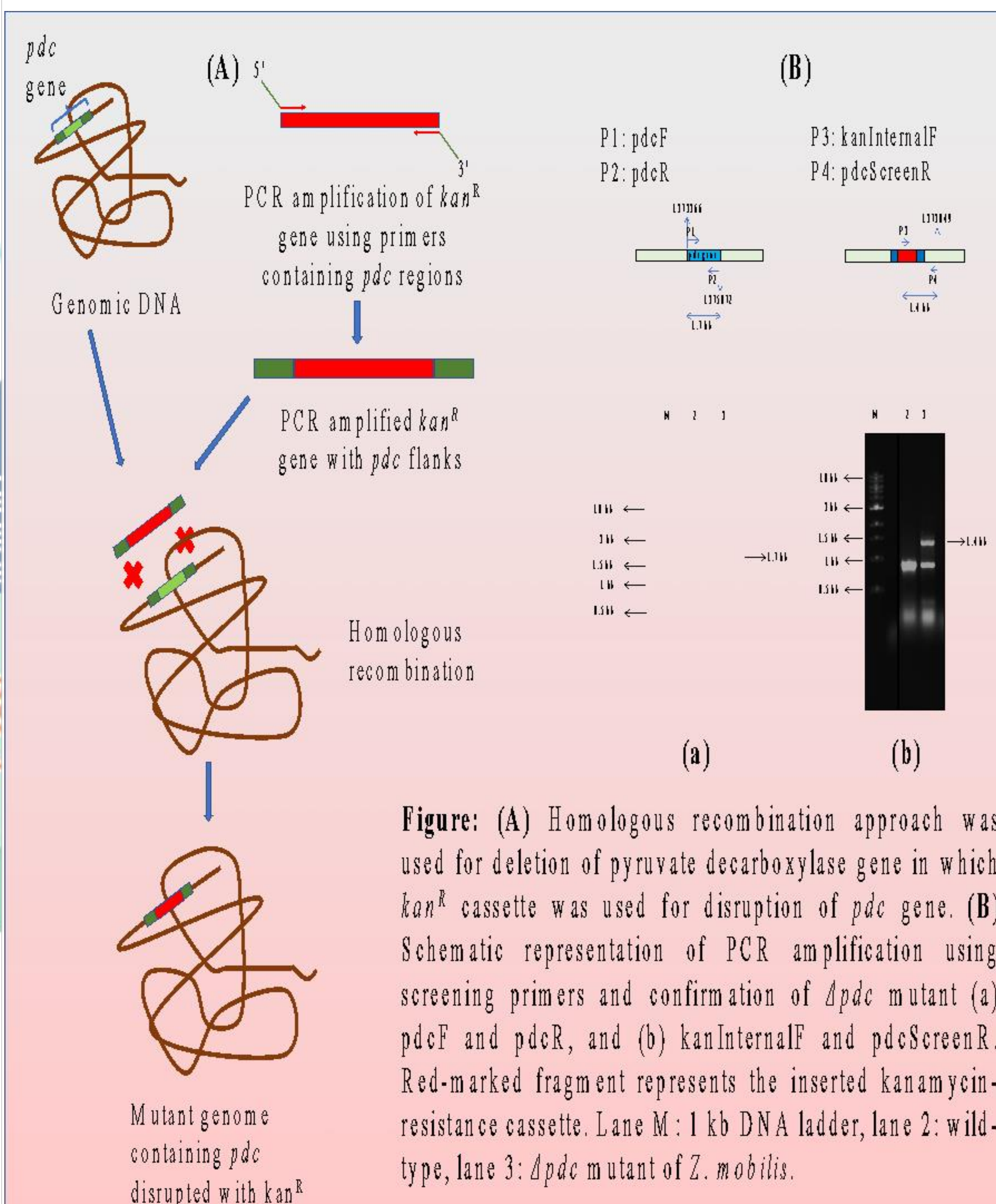
Industrial Significance

Improved and cost-effective bacterial production of malic acid leads to manufacture in high volumes in less time.

Technology Readiness Level

The malic acid production by the mutant strain is to be scaled up to the industrial production level.

Materials and Methods (Continued...)



Result

Substantial increase in malic acid production was observed in metabolically engineered strain, through disruption of *pdc* gene.

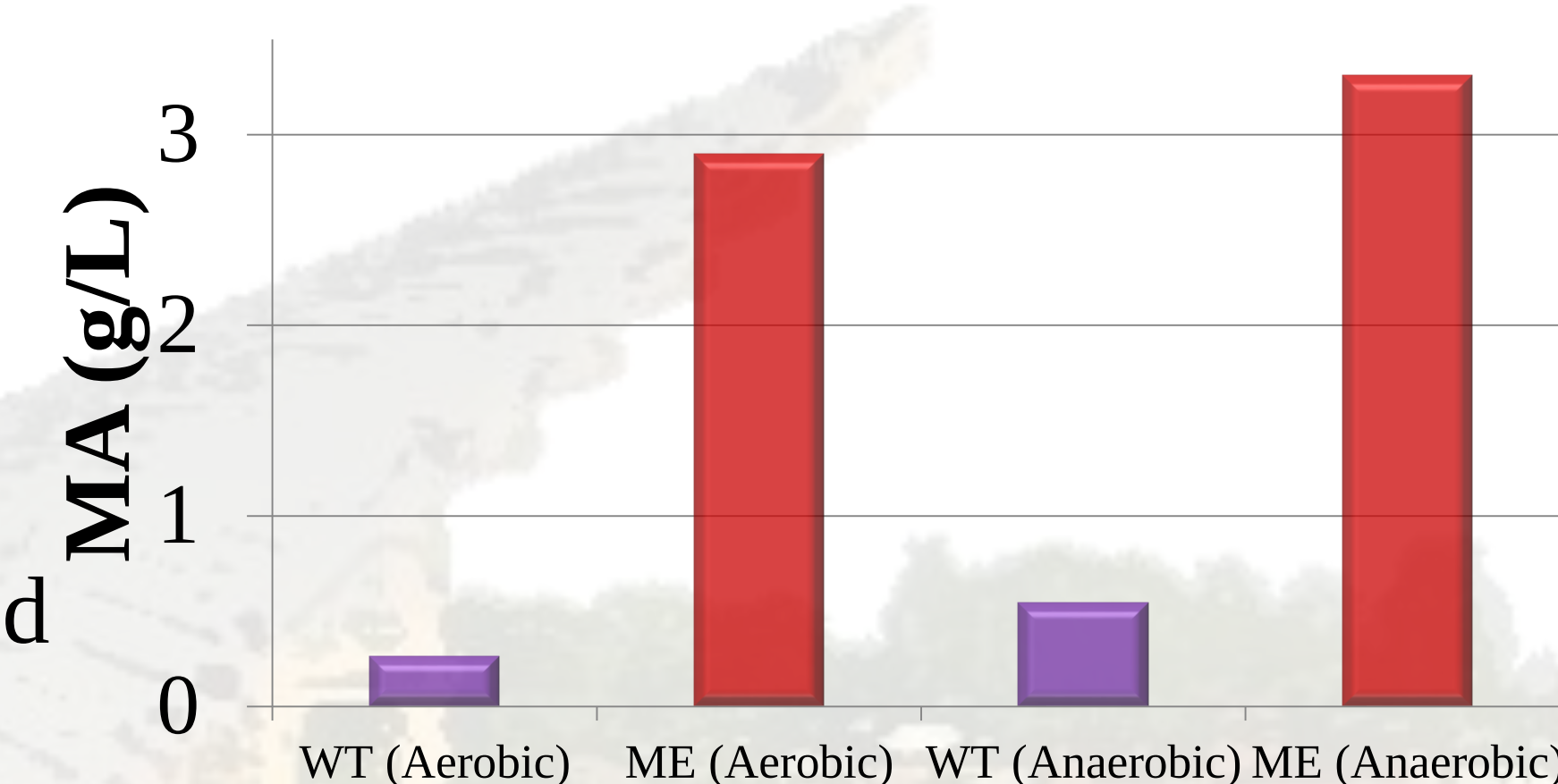


Figure: Increased expression was obtained by using metabolically engineered bacterial strain. WT: Wild-type, ME: Metabolically engineered strain.

References

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- Brown, S. H., Bashkirova, L., Berka, R., Chandler, T., Doty, T., McCall, K., McCulloch, M., McFarland, S., Thompson, S., Yaver, D., & Berry, A. (2013). Metabolic engineering of *Aspergillus oryzae* NRRL 3488 for increased production of L-malic acid. *Applied microbiology and biotechnology*, 97(20), 8903-8912.

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