An Overview of Biotransformation for the Sustainability of Sweet Tasting Proteins as Natural Sugar Replacers

Emel H. Yusuf

Department of Fruit, Vegetable and Nutraceutical Plant Technology, The Wroclaw University of Environmental and Life Sciences, Wroclaw, Poland

INTRODUCTION

Sugar is an essential component for food processing with stability, texture, mouthfeel, flavour, colour and preservation features[1]. Moreover, sugar provides energy to our body as a carbohydrate, however, the origin of the sugar is the main point such as the sugars of fruit and vegetables are natural and rich in fibres[2], but excessive sugar consumption is an issue for obesity[3].

According to the World Health Organization[4], a healthy diet should include vegetables, fruits, legumes, nuts, whole grains, less than 30% of total energy intakes from fats, and less than 10% of free sugars for adults. Thus, natural substitutes of sugar such as sweet-tasting proteins may solve the overconsumption problems with a sweet taste, health benefits, and without caloric content.

OBJECTIVES

The study aims to overview the biotransformation studies on sweet-tasting proteins as sugar substitutes for healthy food manufacturing.

CONCLUSION

Biotransformation studies of sweet-tasting proteins provide more yield, sustainable solutions, low cost and better qualities.

REFERENCES

[1] Erickson, S., & Carr, J. (2020). The technological challenges of reducing the sugar content of foods. In *Nutrition Bulletin* (Vol. 45, Issue 3, pp. 309–314). Blackwell Publishing Ltd.

[2] Misra, V., Shrivastava, A. K., Shukla, S. P., & Ansari, M. I. (2016). Effect of sugar intake towards human health. *Saudi Journal of Medicine.*

[3] Stanner, S. A., & Spiro, A. (2020). Public health rationale for reducing sugar: Strategies and challenges. In *Nutrition Bulletin* (Vol. 45, Issue 3, pp. 253–270). Blackwell Publishing Ltd.

[4] WHO. (2020). *Healthy diet.*https://www.who.int/news-room/fact-sheets/detail/healthy-diet

RESULTS

Sweet proteins	Sweetness level compared with sucrose	Biotransformation by
Brazzein	*2000> 5%*	• *Kluyveromyces lactis* • *Bacillus licheniformis*
Curculin	*550 >*	• *Escherichia coli*
Mabinlin	400 >	• *E. coli* • *Lactococcus lactis*
Miraculin	Transform sour taste	• Only transgenic plants
Monellin	4000 >	• *Saccharomyces cerevisiae* • *E. coli*
Thaumatin	3000 >	• *L. lactis* • *Pichia pastoris*