

INNOVATIVE NISIN PRODUCTION SYSTEMS

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The use of bacteriocins in food production systems has been considered as an alternative and natural preservation method for ensuring consumer and product safety. Nisin is the first identified bacteriocin in *Lactococcus lactis*, classified as a type I (A) lantibiotic. Owing to its broad spectrum antimicrobial activity, FDA considered it as a “generally recognized as safe” (GRAS) agent (E234), and approved its use in the food industry. However, the main restriction of nisin usage at industrial scale is its high production and purification costs which in turn limit the development of applications of nisin in the food and pharmaceutical industry. This is notably due to the low production rate and limited maximal nisin production of strains. Therefore, in recent years innovative production systems have been developed and constructed by increasing the biomass rate, enhancing the stability of cells, avoiding feedback inhibition and generating high energetic cells. In this review, these constructed models were introduced by addressing the factors affecting nisin production of *L. lactis* cells. Especially genetic modifications at nisin producers provided significant increases at nisin production yields where almost 10-fold higher nisin production amount was achieved by innovative systems. In conclusion, nisin production at *L. lactis* could be enhanced when the effects of the limiting factors are decreased by innovative approaching. This outcome may promote the use of nisin which can enable to reduce microbial risks at food production.

Keywords: *L. lactis*, nisin, fermentation, innovation

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