CHAPTER 1

Synthesis of Rebaudioside A from Stevioside and their Interaction Model with hTAS2R4 Bitter Taste Receptor

Vikas Jaitak*, Ramit Singla

Centre for Pharmaceutical Sciences and Natural Products, School of Basic and Applied Sciences, Central University of Punjab, Bathinda(Pb), 151 001, India
Tel: +911642864213

*Corresponding author. Vikas Jaitak; e-mail: vikasjaitak@gmail.com

ABSTRACT

Steviol glycosides (SG’s) from Stevia rebaudiana (Bertoni) have been used as natural low-calorie sweeteners. Their aftertaste bitterness restricts its use for human consumption and limits its application in food and pharmaceutical products. In the present study, we have performed computational analysis in order to investigate the interaction of two major constituents of SG’s against the homology model of the hTAS2R4 receptor. A molecular simulation study performed using stevioside and rebaudioside A revealed that the sugar moiety at the C-3” position in rebaudioside A causes restriction of its entry into the receptor site, thereby preventing to trigger the bitter reception signaling cascade. Encouraged by the current finding, we have also developed a greener route using β-1,3-glucanase from Irpex lacteus for the synthesis of de-bittered rebaudioside A from stevioside. The rebaudioside A obtained was of high quality with a percent conversion of 62.5 %. The results here reported can be used for the synthesis of rebaudioside A which has a large application in food and pharmaceutical industry.

KEYWORDS: Steviol glycosides, Homology Model, Ramachandaran plot, hTAS2R4, β-1,3-glucanase, Transglycosylation

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