

Development and Evaluation of Low Glycemic Index Stevia-Infused Biscuits for Health-Conscious Individuals

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ABSTRACT

In recent years, the focus has shifted from viewing diet merely as a source of fiber and nutrients for body building to recognizing the more subtle effects of food bioactive on human health and well-being. In this context, the present research was designed for the development and compositional profiling of low glycemic index sugar free biscuits, storage stability assessment of the developed biscuits for 30 days with special reference to physicochemical and sensorial attributes, elucidation of their glycemic index in human based experimental modeling, namely chickpea, barley flour and stevia as a replacer of sugar against health-conscious individuals and diabetics. Amongst the varieties, 70% barley and 30% chickpea blend exhibited better nutritional profile followed by 50% barley:50% chickpea flour, 30% barley:70% chickpea flour and 100% barley flour. The 70% barley and 30% chickpea blend proved to be a good source of sodium (13.96 ± 0.27 mg/100 g), calcium (4.33 ± 0.08 mg/100 g), potassium (12.83 ± 0.25 mg/100 g) and zinc (1.81 ± 0.03 mg/100 g) along with other micronutrients. The chromatographic phytochemical analyses demonstrated maximum gallic and caffeic acids, kaempferol and quercetin in 70% barley and 30% chickpea blend while, myricetin was also found in it. Antioxidant potential reflected by ABTS, TFC and TPC scavenging capacity assays indicated better performance of 70% barley and 30% chickpea extract, whereas 50% barley:50% chickpea flour, 30% barley:70% chickpea flour exhibited higher ABTS and flavonols. The selected composite flour was used in the development of stevia-infused biscuits that proved to be an energy rich nourishing product with good physicochemical and sensorial attributes having shelf stability of one month or more without any preservative. Considering the hedonic response, 70% barley and 30% chickpea blend were selected for the human based experiment modeling. Purposely, clinical trials were conducted on health-conscious and diabetic subjects for a one week comprising of three groups. The subjects were divided into two broad categories; one fed on reference food (all-purpose flour biscuits), whereas the others were administered test food (70% barley and 30% chickpea biscuits) to evaluate glycemic index and load, satiety scores and incremental area under the curve. Each module was then further divided on the basis of reference food and test food consumption. The formulated groups were G1 (all-purpose flour biscuits) and G2 (70% barley and 30% chickpea biscuits). The findings showed that stevia- infused biscuits dietary regimen has proven effectual in mitigating diabetics and health- conscious individuals. It is a good source of fiber, low glycemic 25 and load of food 2.65. Mean glucose concentration of reference food at different intervals during 2 hours of healthy and diabetic subjects is 3.85 and 6.25. Conclusively, stevia-infused biscuits encompass beneficial nutritional matrix that need to be promoted to develop designer foods against various lifestyle related disorders with special reference to diabetics and obese people.

Keywords: Biscuits, Clinical, Flour, Glycemic, Physiochemical.

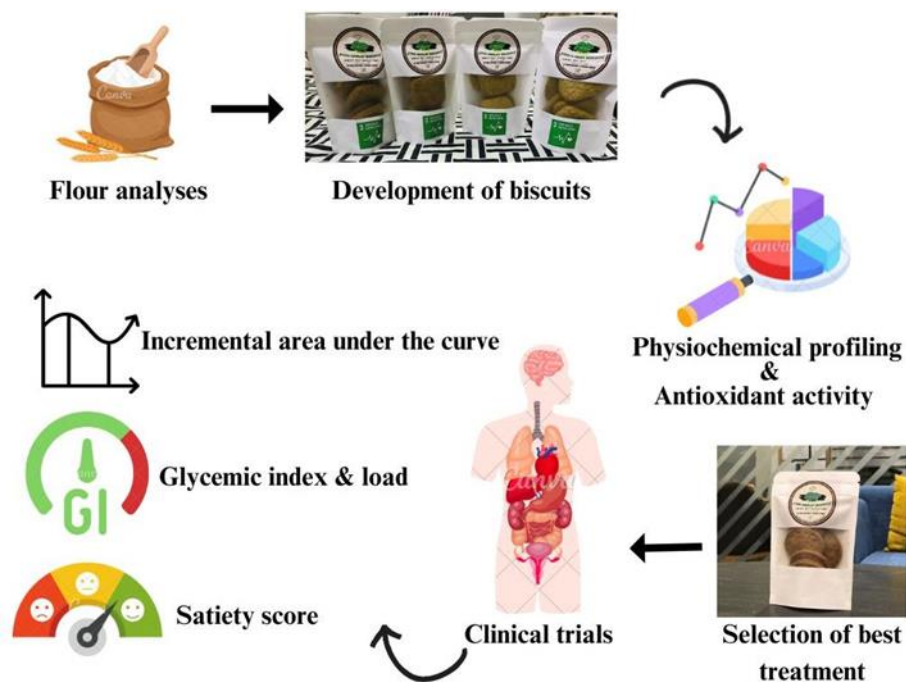


Figure 1. Graphical abstract.

Table 1. Glycemic Index of Biscuits.

Samples	GI Values	Classification of GI
All-purpose flour biscuits	70±1.40	High
70% barley: 30% chickpea flour biscuits	25±0.50	Low

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