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DEVELOPMENT AND ANALYSIS OF STEVIA AND SUCRALOSE-BASED CHOCOLATE CHIP COOKIES

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ABSTRACT

In recent years, there has been a growing consumer demand for healthier alternatives to traditional sugar-laden products. This trend is driven by an increasing awareness of adverse health effects. Stevia is a natural sweetener known for its zero-calorie content and high sweetness intensity. Sucralose, an artificial sweetener, offers a similar sweetness profile with minimal caloric contribution. The experimental process involved formulating chocolate-chip cookies with varying concentrations of stevia and sucralose, comparing them to a control batch made with sucrose. The cookies were prepared using the classic creamery method. Stevia, sucralose, and control cookies have been made with the following concentrations:1.4g/100g, 21.5g/100g, and 4.2g/100g, respectively. Physicochemical tests measured pH, water activity, weight, thickness, diameter, and spread ratio. Nutritional and proximate analysis were carried out, and the cookies made of sucralose and stevia had a moisture content of 4.86±0.07g and 4.64±0.05g, respectively. Ash content analysis was found to be 2.11±0.07g and 2.73±0.04g. The pH of the samples was seen to be 7.13±0.02, 7.43±0.03, and 7.52±0.02, respectively. The water activity of all samples was found to be 0.4, which indicates that the samples have a good shelf-life at ambient storage conditions. A panel of 18 people evaluated the cookies using a hedonic scale for taste, texture, aroma, and flavor.
The results indicated that stevia and sucralose could effectively replace sucrose without compromising the taste and texture of the cookies. The amount of sucralose and stevia was found to be 0.036g/100g and 0.090g/100g, respectively. The amount of sucrose content being reduced in the final product is due to the process parameters of the experiment. The results obtained were in line with those of Handa C. et al (2012). The study also confirms that stevia-based cookies have a better overall acceptance. This study contributes to the expanding literature on sugar alternatives in confectionery, emphasizing their potential in the food industry.

INTRODUCTION

This study examines the incorporation of stevia into chocolate chip cookies, comparing them to those made with sucrose and sucralose. Stevia, a natural sweetener from the Stevia plant, offers health benefits and is rich in bioactive compounds. Research shows that stevia extracts may inhibit starch breakdown enzymes, reducing digestibility (Ruiz-Ruiz *et al*., 2015), and can lower blood glucose levels in animals (Ferreira *et al*., 2006). Stevia belongs to the Asteraceae family, with *Stevia rebaudiana* as the sweetest variety (Carakostas *et al*., 2008). Its primary sweeteners, stevioside and rebaudioside A, are widely used in commercial products.

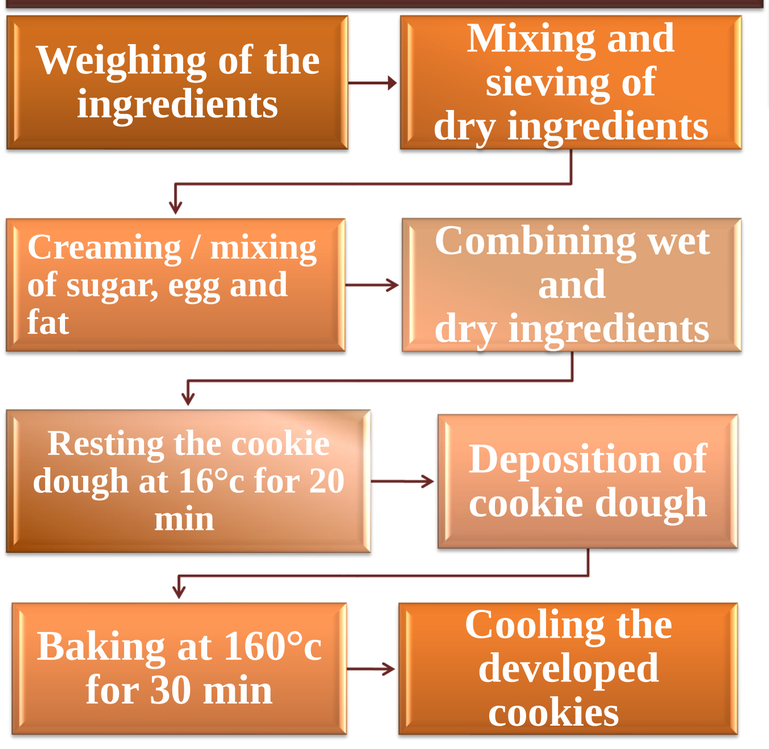
The aim is to see if stevia, a natural sweetener, can stand up against artificial sweeteners used in commercial products. The comparison will provide insight into whether stevia could be a viable solution to various health concerns associated with sugar consumption.

MATERIALS

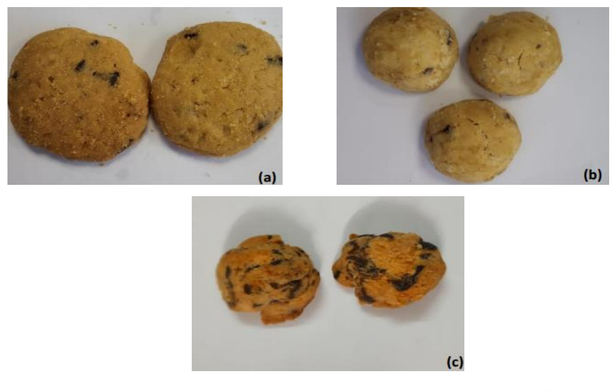
Ingredients	SU (%)	ST (%)	SL (%)
Refined wheat flour	27.3	39.9	38.8
Unsalted butter	25	24.2	23.5
Granulated sugar	21.5	-	-
Stevia Powder	-	1.4	-
Sucralose	-	-	4.2
Egg	5	7.1	6.9
Vanilla essence	0.5	0.7	0.7
Baking soda	0.4	0.6	0.6
Salt	0.3	0.4	0.4
Chocolate chips	20	25.6	24.9

Raw materials formulation and composition

METHODOLOGY



PROCESS FLOWCHART FOR THE PREPARATION OF COOKIES



Sucrose concentration in (a) SU001, (b) ST001, (c) SL001 developed cookies

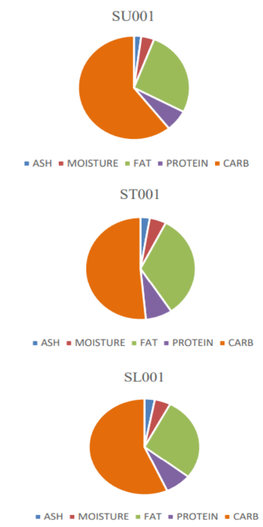
RESULTS

PHYSICAL AND PHYSICO-CHEMICAL ANALYSIS

PARAMETERS	SUCROSE	STEVIA	SUCRALOSE
PH	7.13±0.02	7.43±0.03	7.52±0.02
WATER ACTIVITY	0.41±0.01	0.44±0.00	0.47±0.01
WEIGHT (G)	12.17±0.21	11.65±0.27	11.34±0.24
THICKNESS (MM)	9.81±0.16	12.89±0.12	14.29±0.27
DIAMETER(MM)	54.05±0.16	50.20±0.34	46.09±0.29
SPREAD RATIO	5.51±0.10	3.90±0.08	3.23±0.06

AVERAGE SENSORY OF VARIOUS PARAMETERS ON A 9-POINT HEDONIC SCALE

PARAMETERS	SU001	ST001	SL001
Appearance	8.00	5.71	5.21
Body and texture	7.83	5.79	4.71
Flavour	7.96	6.54	5.17
Taste	8.25	7.17	6.29
Overall acceptability	8.46	7.58	7.17



NUTRITIONAL COMPOSITION OF THE DEVELOPED COOKIES

CONCLUSION

The growing demand for healthier food options has led to increased interest in sucrose alternatives, particularly due to sedentary lifestyles and processed food consumption. Cookies, being a versatile food, can deliver bioactive compounds. This study focuses on replacing sucrose in cookies, a challenging task due to its unique sweetness, texture, and structural properties. Artificial sweeteners, though calorie-free, are linked to health concerns like weight gain and cancer. Stevia, a natural sweetener, has gained public and scientific attention as a better alternative. The study shows stevia-based cookies are more accepted and suitable for managing obesity and diabetes.

REFERENCE

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