



FORMULATION AND OPTIMIZATION OF ALOE VERA JELLIES FOR TYPE II DIABETIC MANAGEMENT.

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ABSTRACT:

The biological name of Aloe vera is aloe barbadensis miller and belongs to the (Liliaceae) family. Aloe vera is cultivated everywhere in the world for agricultural and medicinal uses. Aloe vera helps in managing and lowering blood sugar level in type 2 diabetes. Stevia rebaudiana bertonii is the sweetest plant belongs to the Asteraceae. It is non-caloric sweetener which is double times than sugar. Evidence tends to show that stevia is safe for human consumption. Stevia is a sugar and could be a tremendous aid for diabetes. China grass is known as agar agar, which is obtained from algae. Used to make jelly. This combination of ingredients does not spike insulin level. Instead, it helps to manage the level of insulin. Diabetes is a metabolic disorder resulting from there is no insulin secretion or excess of insulin secretion. According to the severity of diabetes, complications are also severe. To manage blood sugar level, aloe vera and stevia are used to make jellies. Formulation and optimization aloe vera jellies to help in managing diabetes. To have a positive impact on blood sugar levels. To manage blood glucose level stevia is used as a healthy alternative sweetener. In this study sensory evaluation was done by 50 consumers using a 9-point hedonic scale to find the palatability and acceptability of the product. The final product aims to strike a balance between palatability and texture, ensuring compliance and satisfaction among consumers.

KEY WORD: *Aloe vera, Stevia, China grass, blood glucose level, Palatability, texture, aloe vera jellies.*

INTRODUCTION:

Diabetes mellitus (DM) is a metabolic disease brought on by a malfunction in the secretion, action, or combination of both at insulin. A chronic hyperglycemia accompanied by disruptions in the metabolism of fat, protein, and carbohydrates is the result of insulin insufficiency. (Salim Bastaki; 2019).

Diabetes is a chronic disease that develops when the pancreas is unable to secrete enough insulin or when the body cannot use the insulin that is produced efficiently. One hormone in particular that controls blood glucose levels is insulin. Uncontrolled diabetes frequently results in hyperglycemia, a condition marked by elevated blood sugar or glucose levels. Over time, high blood sugar levels can seriously harm the body's systems, particularly the neurons and blood vessels. (Nicolae Gica, et al; 2023).

Roughly 90% of all instances of diabetes are type 2 diabetic mellitus (T2DM). Insulin resistance is the term used to describe the reduced response to insulin in type 2 diabetes. In order to maintain glucose homeostasis during this condition, insulin is ineffective and is initially countered by an increase in insulin production. However, over time, insulin production diminishes, leading to type 2 diabetes. Adults over 45 are most typically diagnosed with type 2 diabetes. However, because obesity, physical inactivity, and energy-dense diets are on the rise, it is becoming more common among kids, teens, and young adults. (Rajeev Goyal, et al;2023).

Diabetes is a complex and persistent disease that requires lifelong treatment. Microvascular complications include retinopathy, nephropathy, neuropathy Macrovascular complications include coronary artery disease, cerebrovascular disease and

peripheral artery disease and other complications include diabetic cardiomyopathy, diabetic foot ulcer. (Sabreen A. Mezhil, et al; 2021).

According to estimates, the prevalence of diabetes among adults aged 20 to 79 years was 10.5% (or 536.6 million) worldwide in 2021 and will rise to 12.2% (or 783.2 million) by 2045. Just over half a billion people worldwide suffer from diabetes, which means that more than 10.5 percent of the world's adult population currently suffers from the disease. (Hong sun, et al; 2022).

According to IDF, the three countries with the highest number of diabetics in 2019 are China (116.4 million), India (77.0 million) and the United States (31.0 million). This trend is expected to continue between 2030 and 2045, with China (140.5-147.2 million) and India (101.0-134.2 million) continuing to report increases in diabetes incidence and prevalence in India from 5.5% to 26.0%. a million 1990 - 7.7% and 65.0 million in 2016. Tamil Nadu had the highest prevalence in 2016 studies, followed by Kerala, Delhi, Punjab, Goa and Karnataka. (Rajendra Pradeepa, et al ;2021).

In Chennai, 22.8%, and in Delhi, 25.2% of the population was estimated to have diabetes. (Rajendra Pradeepa, et al; 2021).

2.MATERIALS AND METHODS

2.1 MATERIALS

2.1.1 RAW MATERIALS

Raw materials such as aloe vera leaf, stevia, China grass was purchased from the local market of Chennai.

2.2 METHODOLOGY

STANDARDIZATION OF ALOE VERA JELLY

Freshly purchased aloe leaf was cut into small pieces and soaked for 30 minutes to remove the bitter taste. Aloe vera gel was extracted from aloe vera leaf by scraping it with the help of a knife. The scrapped part was washed with running water to remove the stickiness and also bitter taste. The washed aloe vera was blended and strained completely. From that, 100 ml of aloe vera juice was taken and kept aside. For 100ml of aloe vera juice 5g of China grass was used. China grass was soaked for 10 minutes. In the pan-soaked China grass was added with 50 ml of water and made to cook until it got dissolved. Once dissolved, 100 ml of aloe juice was added and 1.2g of stevia powder was added. It was cooked for 3-4 minutes and left to cool at room temperature. Then, it was poured into the mold and kept refrigerated until it settled. Later, the jelly was demolded.

Table 1: Formulation of jelly.

INGREDIENTS	PORTION SIZE
Aloe vera juice	100ml
Stevia	1.2g
China grass	5g



Fig - 1



Fig -2



Fig -3



Fig-4



Fig -5

Figure: 1,2,3,4,5 (preparation of jelly).

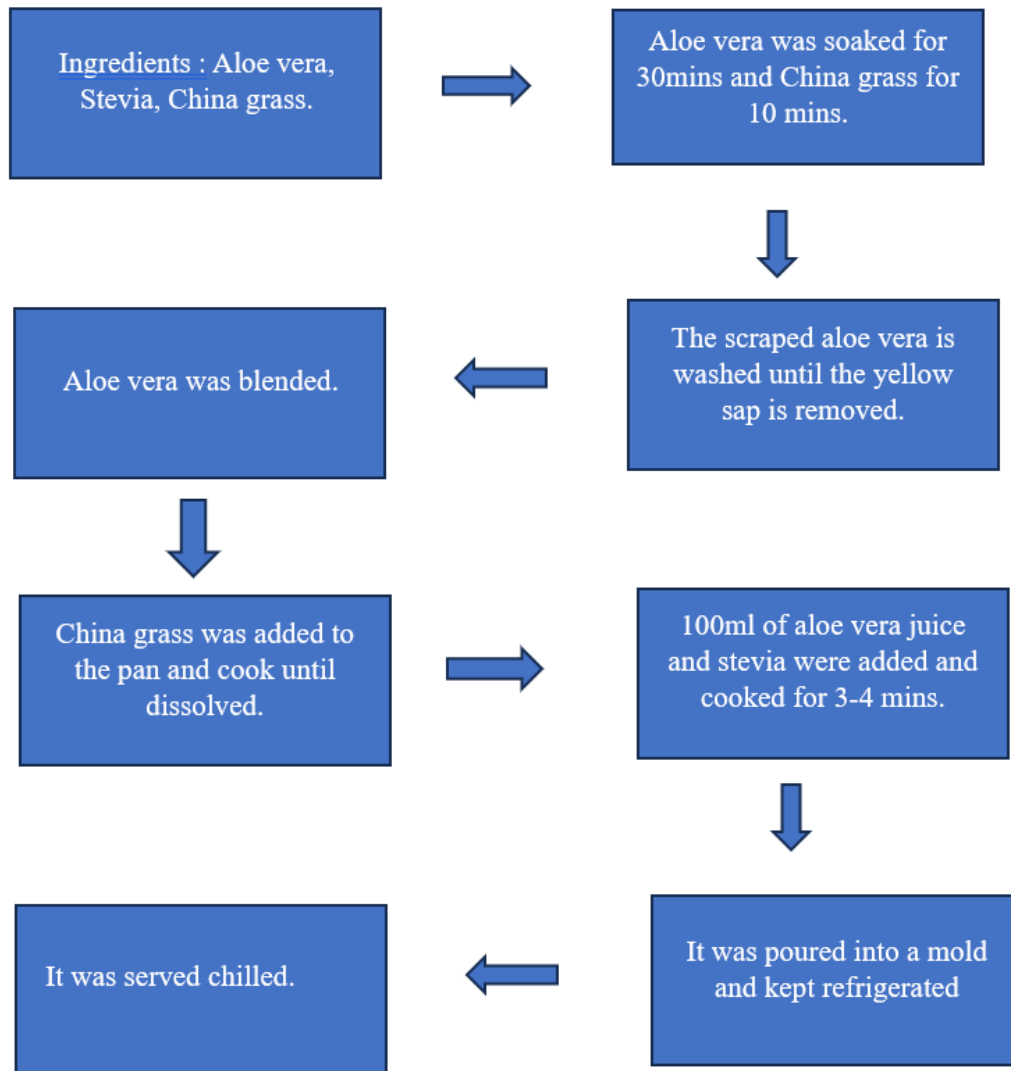


Figure 6: Process of making aloe vera jelly.

STUDY DESIGN: The design of the study was simple random sampling.

SAMPLE SIZE: Sample size was around 50 individuals.

DATA ANALYSIS: Data is analysed by sensory evaluation, which contains 9-point hedonic scale. For this, a total of 50 samples were collected. From that, the mean value has been analysed.

INCLUSION CRITERIA: Target population for this product was the general audience age category is around (18-50) years.

EXCLUSION CRITERIA: consuming aloe vera in excessive amounts leads to certain effects like diarrhoea, toxic hepatitis and some may have skin irritation. So, consult a doctor if you have these signs when consuming these.

2.2.1 Sensory analysis:

Sensory analysis of prepared aloe vera jelly samples were done using 9-hedonic scale rating.

3.RESULT AND DISCUSSION:

3.2 Physical characteristics of aloe vera jelly:

All the samples were bear shape, size around 4 cm and it is recorded white in colour because of aloe vera, weight around 4g.

3.3 Organoleptic characteristics of aloe vera jelly:

Attribute	Appearance	Flavour\Taste	Aroma	Texture	Mouthfeel	Overall acceptability
Sample	8.24±0.7	7.58±0.7	7.5±0.78	8.2±0.8	7.8±0.90	7.96±0.72

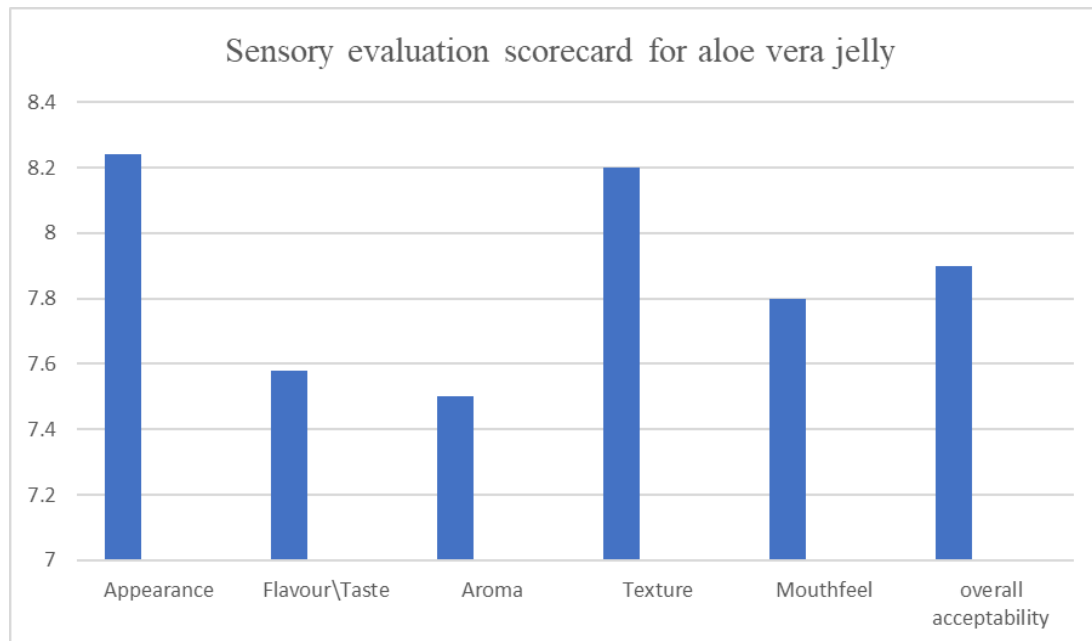


Figure - 7: Scorecard for aloe vera jelly.

CONCLUSION:

The study has demonstrated appearance, taste, aroma, texture and mouthfeel, so it is a palatable product and it is evaluated by a 9-point hedonic scale. The formulation and optimization of aloe vera jellies represent type II diabetes people. This study will help to treat diabetes. Consumption of aloe vera on a daily basis for a certain amount helps in managing blood glucose level. Long-chain sugars known as polysaccharides, such as *acemannan*, are found in aloe vera. This, by raising insulin sensitivity, aids in better glucose management. As a result, it has enormous therapeutic potential for use as a traditional diabetic therapy. Further investigation is needed to understand the mechanism behind the observation of Aloe vera's anti-diabetic property, and its potential application as an alternative medicine.

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