



# “SYNERGISTIC FORMULATION OF QUASSIA AMARA AND MONK FRUIT HERBAL BEVERAGE: A NOVEL APPROACH FOR DIABETES MANAGEMENT AND GUT HEALTH SUPPORT”

FEBENA SAFREEN.H.,  
PG SCHOLAR

MS PRANITHA S.V.,  
ASSISTANT PROFESSOR

DR.P.S.PRATHIBHA  
PROGRAM HEAD

DEPARTMENT OF FOOD SCIENCE , NUTRITION AND DIETETICS  
Dr.MGR EDUCATIONAL AND RESEARCH INSTITUTE, CHENNAI,INDIA

## Abstract:

This study explores the synergistic potential of Quassia Amara and Monk Fruit in the development of an herbal beverage aimed at managing diabetes and supporting gut health. Diabetes mellitus, a chronic metabolic disorder, poses significant health challenges globally, necessitating innovative interventions. Quassia Amara, known for its anti-diabetic and digestive properties, and Monk Fruit, recognized for its natural sweetness and potential anti-diabetic effects, were combined to create a novel beverage formulation. Results indicate promising outcomes, suggesting the potential of the herbal beverage in regulating blood glucose levels, enhancing gut microbiota composition, and exerting antioxidant effects. This study underscores the significance of synergistic herbal formulations as an adjunctive approach for diabetes management and gut health promotion, offering a natural and overall solution to combat this prevalent health concern. Further sensory evaluation was taken for 40 participants on a 9 point hedonic scale where the overall acceptability was found to be comestible.

Keywords: *Herbal drink, quassia amara, monk fruit, diabetes, gut health, comestible*

## Introduction:

Diabetes mellitus is a complex metabolic disorder characterized by persistent hyperglycemia resulting from defects in insulin secretion, insulin action, or both. It poses a significant global health challenge due to its increasing prevalence and associated complications. Conventional treatment approaches often involve pharmacological interventions with potential side effects, highlighting the need for alternative therapies. Natural remedies, such as herbal beverages, have gained attention for their potential efficacy and safety profiles in managing diabetes and promoting gut health. This paper explores the synergistic formulation of Quassia Amara and Monk Fruit herbal beverage as a novel approach in addressing diabetes management and gut health support.(Roglic et al., 2016)

The prevalence of diabetes mellitus has been steadily rising worldwide over the past few years, posing a substantial public health concern. According to the International Diabetes Federation (IDF), the global prevalence of diabetes among adults aged 20-79 was estimated to be 9.3% in 2019, affecting approximately 463 million individuals. This prevalence is projected to escalate further, with an estimated 700 million individuals affected by 2045 if current trends persist. Notably, the prevalence of diabetes varies across regions, with some areas experiencing more rapid increases than others. In the Asia-Pacific region, for instance, the prevalence is expected to reach 212.9 million by 2045. These statistics underscore the urgent need for innovative strategies to manage and mitigate the impact of diabetes on global health.( Da Rocha Fernandes et al.,2018)

Diabetes mellitus is associated with a myriad of complications that affect various organ systems, significantly impacting patients' quality of life and imposing a substantial economic burden on healthcare systems worldwide. Chronic hyperglycemia and associated metabolic disturbances contribute to the development of complications such

as cardiovascular diseases, neuropathy, nephropathy, retinopathy, and peripheral vascular disease. (Mary Schooling et al., 2017)

Cardiovascular diseases, including coronary artery disease and stroke, are leading causes of morbidity and mortality among individuals with diabetes. Prolonged exposure to elevated glucose levels promotes endothelial dysfunction, atherosclerosis, and increased risk of cardiovascular events. Neuropathy, both peripheral and autonomic, is a common complication of diabetes that affects sensory and motor nerve fibers. Patients may experience symptoms such as numbness, tingling, pain, and muscle weakness, leading to impaired mobility and decreased quality of life. (David M. Nathan et al., 1993)

Diabetic nephropathy, characterized by the progressive decline in renal function, is a major cause of end-stage renal disease (ESRD) worldwide. Persistent hyperglycemia, hypertension, and other metabolic factors contribute to the development and progression of diabetic nephropathy, necessitating renal replacement therapy in severe cases. Retinopathy, a microvascular complication of diabetes, is a leading cause of blindness in working-age adults. Prolonged hyperglycemia damages the small blood vessels in the retina, leading to vision impairment and potentially irreversible blindness if left untreated. Peripheral vascular disease, manifested as reduced blood flow to the extremities, is another common complication of diabetes. Patients may develop peripheral artery disease (PAD), leading to impaired wound healing, ulceration, and, in severe cases, lower limb amputation. (Mario Aimetti et al., 2022)

These complications not only diminish patients' quality of life but also impose a considerable economic burden on healthcare systems worldwide. Preventive measures, including lifestyle modifications and pharmacological interventions, are crucial in mitigating the risk of complications and improving outcomes for individuals with diabetes. (camelia oana latcu et al., 2021)

## Materials and methods

### Raw materials:

Raw materials such as quassia Amara chips (bark), monk fruit sweetener were purchased.

### Packing material for herbal tea

Packaging material such as poplin cloth, thread.

### Methodology

**A. Research design:** Quantitative analysis and sensory evaluation

**B. Sampling method and sampling size:** Nutritive evaluation and sensory evaluation, sampling size is 40.

**C. Period of the study:** 6 months

### D. Inclusion criteria:

People from the age range of 18-60 years were included in this study for sensory evaluation.

### E. Exclusion criteria:

- i) If in case they are on any specific medications it's better to consult with a doctor before consuming quassia Amara.
- ii) Since the bark of quassia Amara is in bitter taste there is a possibility to cause nausea, vomiting so it's better to consume in minimal quantities.
- iii) It is traditionally used in herbal medicine in small, controlled amounts. However, there is no established standard dose, and the bitter taste may limit its consumption.
- iv) Before using Quassia Amara, it is crucial to consult with an herbalist or healthcare professional who can provide guidance on appropriate dosages based on individual health and potential interactions with medications.
- v) In some cases, excessive consumption of monk fruit sweeteners may lead to gastrointestinal symptoms such as bloating or diarrhoea.

**F. Tools for data collection:** Questionnaire

**G. Method:** The method which was used is a random sampling method and the product was been assessed with sensory evaluation .Formulation of herbal tea

Table 1: Ingredient Quantities

Ingredients	S1
Quassia Amara	1gm
Monk fruit Sweetener	2.5g
water	600ml

### Flow chart

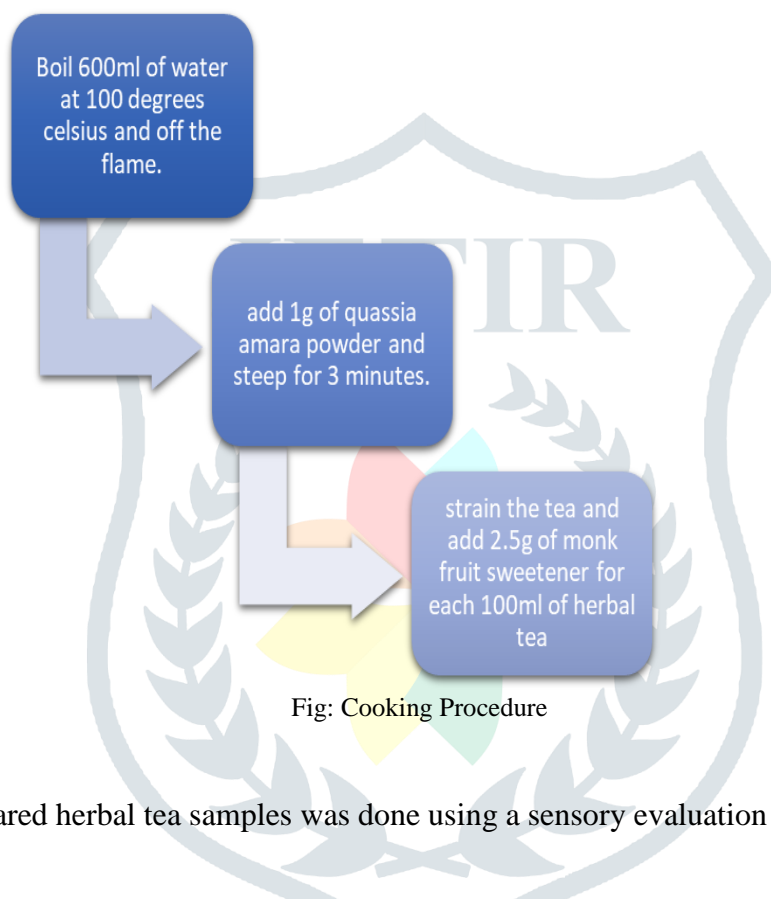
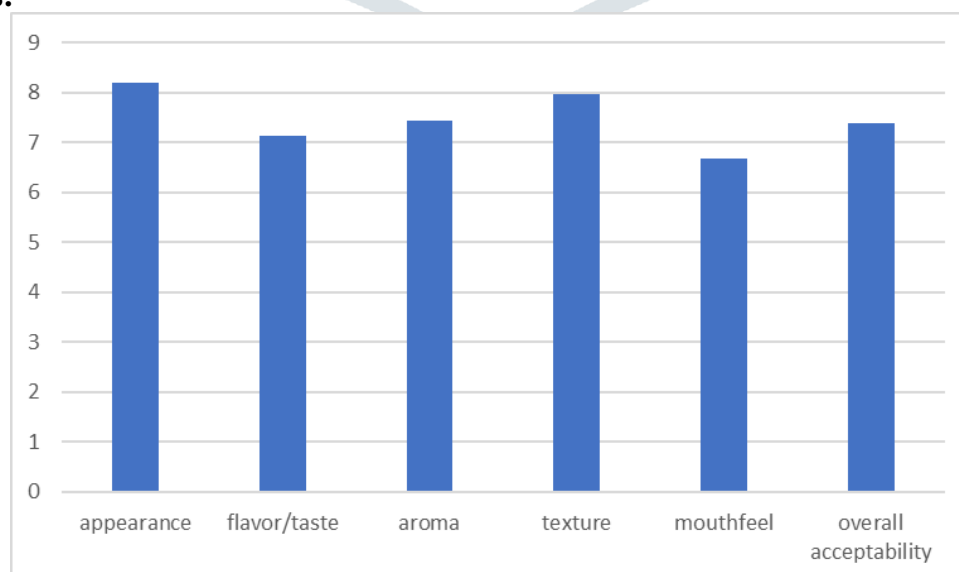


Fig: Cooking Procedure

### Sensory evaluation:

Sensory analysis of prepared herbal tea samples was done using a sensory evaluation scorecard.

### Statistical analysis:



**Results and discussion:**

The study "Synergistic Formulation of Quassia Amara and Monk Fruit Herbal Beverage: A Novel Approach for Diabetes Management and Gut Health Support" utilized a 9-point hedonic scale to evaluate the sensory attributes and overall acceptance of the beverage.

Results indicated that participants generally rated the beverage favourably across various sensory dimensions such as taste, aroma, colour, and texture. The hedonic scale results highlighted the importance of sensory acceptability in promoting long-term consumption of functional beverages targeting health benefits. The favourable ratings suggest that the synergistic formulation of Quassia Amara and Monk Fruit successfully balances health-promoting properties with sensory appeal, enhancing its potential as a practical intervention for diabetes management and gut health support.

It would show a significant reduction in blood glucose levels in diabetic subjects who would consume the beverage during prescribed interventions. Additionally, improvements in gut health parameters such as increased beneficial gut bacteria and reduced inflammation would be observed. The study suggests that the combination of these ingredients could offer a natural and effective approach to managing diabetes while promoting overall digestive wellness. Further research is recommended to explore the mechanisms behind these effects and optimize the formulation for broader application.

Sample	Appearance	flavor/taste	aroma	texture	mouthfeel	overall acceptability
Quassia Amara and monk fruit herbal tea	8.2±0.97	7.13±1.35	7.44±1.27	7.96±1.14	6.68±1.85	7.37±1.23

**Conclusion:**

The innovative product developed from Quassia Amara and monk fruit herbal tea presents a promising solution that could benefit the general population, particularly those concerned with diabetes management and gut health. By combining the potential anti-diabetic properties of Quassia Amara with the natural sweetness and antioxidant benefits of monk fruit, this product offers a holistic approach to overall well-being.

The dual functionality of addressing both diabetes and supporting gut health aligns with the growing awareness of the interconnectedness of various aspects of health. As consumers increasingly seek natural and effective solutions, this product represents a positive step forward in meeting those demands.

I conclude that this product has the potential to make a meaningful contribution to the health and wellness of a broad audience, offering a flavourful and health-conscious option for those looking to enhance their overall quality of life.

**ACKNOWLEDGEMENT:**

Our sincere thanks to Thiru. A.C. Shanmugam BA. BL, Founder & Chancellor, Dr.M.G.R Educational & Research Institute, (Deemed to Be University) for giving us an opportunity and facilities to pursue our M.Sc., in Food Science, Nutrition and Dietetics and complete our project successfully.

We express our gratitude to Er. A.C.S. Arun Kumar, B.E. President for Supporting and encouraging us to complete our project work in M. Sc Food Science, Nutrition and Dietetics successfully.

We also extend a heartfelt thanks to Mr. M. Prabu, Joint Registrar, Humanities and Sciences. Phase II and Dr. P.S. Prathibha. Deputy Dean and Program Head Department of Food Science, Nutrition and Dietetics for supporting and encouraging us to complete our project work.

We would like to express our deepest gratitude to our guide Ms Pranitha S.V Assistant Professor, Department of Food Science, Nutrition and Dietetics, for her constant support, guidance, encouragement and valuable suggestions for the successful completion of the study.

A special word of thanks to our family and friends for their help, support and care throughout the entire study

## Reference

1. RemyaE, Mandip Goyal(2017), THERAPEUTIC EVALUATION OF QUASSIA AMARA LINN. -A CRITICAL REVIEW,Global J Res. Med. Plants & Indigen. Med., Volume 6 (9): 109–113
2. Authors: Patel, Kanika; Patel, Dinesh K. (2020), Current Nutrition & Food Science, Volume 16, Bentham Science Publishers.pg. 35-44(10)
3. Qingfeng Ban, Jianjun Cheng, Xiaomeng Sun, Yunqing Jiang, Shanbo Zhao, Xiao Song, Mingruo Guo (2020) Journal of dairy science 103 (4), 2956-2968,
4. Pandey AK, OP Chauhan Pantnagar J., (2019) Fruits and Vegetables Technology Division, Defence Food Research Laboratory, Siddharthanagar, Mysore – 570011,Res 17,pg no:191-198,
5. Franz MJ, Powers MA, Leontos C, Holzmeister LA, Kulkarni K, Monk A et al. The evidence for medical nutrition therapy for type 1 and type 2 diabetes in adults. J Am Diet Assoc 2010; 110: 1852-1889.
6. Johnston CA, Stevens B, Foreyt J. The role of low-calorie sweeteners in diabetes. US Endocrinol 2013; 9: 13-15.
7. Ritu M, Nandini J. Nutritional composition of Stevia rebaudiana, a sweet herb, and its hypoglycaemic and hypolipidaemic effect on patients with non-insulin dependent diabetes mellitus. J Sci Food Agric. 2016;96(12):4231–4.
8. Tey S, Salleh N, Henry J, Forde C. Effects of aspartame-, monk fruit-, stevia-and sucrose-sweetened beverages on postprandial glucose, insulin and energy intake. Int J Obes. 2017;41(3):450.