A Project Work Report

On

Development of different tested functional tea using Rosella, Beet-root & Moringa leaves by using MCSTD technology.

Supervised by

Prof. Dr. Md. Bellal Hossain

Professor and Head

Department of Nutrition & Food Engineering

Daffodil International University

Co- Supervised by

Dr. Amir Ahmed

Adjunct Faculty

Department of Nutrition & Food Engineering

Daffodil International University

Submitted by

Name: MD. Rashadul Islam Rezvi

Id: 162-34-534

Department of Nutrition & Food Engineering

Daffodil International University

Submitted date: 13-05-2019

Letter of Transmittal

Date: 13-05-2019

To

Prof. Dr. Md. Bellal Hossain

Professor and Head
Department of Nutrition & Food Engineering
Daffodil International University.

Subject: Submission of Project Report.

Dear Sir

I would like to take this opportunity to thank you for the guidance & support you have provided me during the course of this report. Without your help, this report would have been impossible to complete. Daffodil International University has many more respective persons, for providing me all most supervising during my thesis in the organization.

To prepare the report I collected what I believe to be most relevant information to make my report as analytical & reliable as possible. I have concentrated my best effort to achieve the objectives of the report & hope that my endeavor will serve the purpose. The practical knowledge & experience gathered during report preparation will immeasurably help in my future professional life. I request you to excuse me for any mistake that may occur in the report despite of my best effort.

I would really appreciate it you enlighten me with your thoughts & views regarding the report. Also, if you wish to enquire about an aspect of my report, I would gladly your queries.

Thank you again for your support & patience.

Sincerely Yours

MD. Rashadul Islam Rezvi

ID: 162-34-534

Department of Nutrition & Food Engineering

Daffodil International University.

Declaration

I am pleased to certify that the project report ON "**Development of different tested functional tea using Rosella, Beet-root & Moringa leaves by using MCSTD technology**" conducted by **MD. Rashadul Islam Rezvi**, bearing respectively **ID: 162-34-534** of the department of Nutrition & Food Engineering has been approved for presentation & defense/ viva-voice.

I am pleased to hereby that the date & finding presented in the report are the authentic work of MD. Rashadul Islam Rezvi. I strongly recommended that report presented MD. Rashadul Islam Rezvi for further academic recommendations & defense/ viva-voice. Md. Rashadul Islam Rezvi bears a strong moral character & a very pleasant personally. It has indeed a great pleasure working with him.

I wish him all success in life.

Supervisor

Prof. Dr. Md. Bellal Hossain

Professor and Head

Department of Nutrition & Food Engineering
Faculty of Allied Health Science
Daffodil International University.

Co- Supervisor

Dr. Amir Ahmed

Adjunct Faculty

Department of Nutrition & Food Engineering

Faculty of Allied Health Science

Daffodil International University.

Acknowledgment

In the preparation of this report, I would like to acknowledgment the encouragement & assistance give to me a number of people. At first, I would like to express my gratitude to my creator the Almighty Allah for enabling me the strength & opportunity to complete the report in time successfully. I am gratefully to each & every people who are involve with me in every phase for my life.

I am grateful to my parents without whom I can't be here. Without the support of my parents, I could not be able to achieve my objectives and goals.

My deep gratitude & sincere thanks to the honorable dean, Faculty of Allied Health Science, Professor Dr. Ahmed Ismail Mustafa for his kind cooperation & to accept this degree.

I am deeply indebted to my supervisor Prof. Dr. Md. Bellal Hossain, Head of the Department of Nutrition & Food Engineering, Daffodil International University for his whole-hearted supervision during my organizational attachment period.

I would also like to express great & warmest to my co- supervisor Dr. Amir Ahmed, Adjunct Faculty, Department of Nutrition & Food Engineering, daffodil International University for his whole-hearted supervision during my project work.

I also grateful to all the other NFE Faculty members for their great help during university life.

I also thankful to Ms. Najia Kamrul, & Mr, md. Abir Hossain helps me during my attachment period & project work.

Finally, I wish to express immense gratitude & humbly convey my heartfelt respect to the managing director.

Abstract

The study, Development of different tested functional **Tea** using Rosella, Beet-Root & Moringa leaves by using MCSTD technology. Take different Percentage of Rosella, Beet-Root & Moringa leaves. Sample 1: M-90%, R-5%, BR-5%; Sample 2: M-90%, R-7%, BR-3%; Sample 3: M-90%, R-3%, BR-7% & make 3 different Tea. Proximate Analysis that Moisture, Ash & Protein; which results are: Moisture: S1-3.5%, S2-2.95%, S3-3.95%; Ash: 9.79%, 9.69%, 8.95%; Protein: 6.56%, 10.94%, 16.4%. A sharp increase in Moisture, Ash & Protein content was observe with the increase of Rosella, Beet-Root & Moringa Leaves Powder in each Sample. All Sample tested are good & acceptable with or without Sugar. Sample-1 is better than other Sample. Include maximum Nutritional value in this tea, Should Develop this type of Tea.

Dedicated to

The memory of my Parents

Contents

Chapter One

Introduction

1.1. Rosella:

Rosella (Hibiscus Sabdariffa), is an introduced species that typically grows in the most north parts of Australia from Cairns in the east through to Broome in the west. Now In Bangladesh rosella is available.

There are lots of benefits that can be obtained from the **Red Rosella** flowers. Usually the presentation is often done dried & brewed into a cup of tea. It felt ourselves somewhat sour-sour. Per 100gr Rosella we found 260-280 of vitamin C, vitamin D, B1 & B2. Rosella tea contains calcium 486mg / 100gr. It also contents Magnesium, Omega 3, vitamin A, Iron, Potassium, and Beat Acid Essential Carotene. (Mgaya et al., 1973).

Picture 1: Rosella

1.2. Beet-Root:

Beet-Root (Beta vulgaris L.) has numerous cultivated varieties, the most well-knownwhich is root vegetable known as the beetroot. The deep red colored beetroots are most popular for human consumption. Beetroot are rich in valuable, active compounds such as carotenoids, glycine betanin (de Zwart et al., 2003).

Beet-Roots tea can prove to be a better option because it contains many nutrients. There are many nutrients present in beetroots such as iron, antioxidants & vitamins. If we consume beetroot, we will avail too many health benefits. Benefits of beetroot tea like Detoxification, prevent anemia, regulates blood pressure, keeps the skin pressure, and keeps the skin healthy, Improves digestion. (Pedreno and Escribano, 2001).

Picture 2: Beet-Root

1.3. Moringa:

A tree that's native to the sub-Himalayan regions of India, Pakistan, Bangladesh & Afghanistan, Now is commonly grown in various tropical & subtropical areas around the world. Also known as "horseradish tree" & "drumstick tree," Moringa has been dubbed as a "miracle tree" because of its potential medicinal properties. It also earned the super food status.

Moringa tea comes from the leaves of Moringa oleifera. In this tea nutrients include – Vitamin B6, Iron, Potassium, Vitamin C, Riboflavin, Protein, Vitamin A, Calcium, Flavonoids. The health benefits of Moringa Oleifera tea are attributed to its rich nutritional profile. A lot of these Benefits are not backed by traditional beliefs. It helps fight against free radicals, Helps improve our gastrointestinal health, Helps regulate our blood sugar levels, Helps reduce inflammation, Helps reduce the effects of arsenic toxicity, Helps maintain a healthy cardiovascular system. Moringa tea also help maintain proper liver function & may even boost brain function, which can be beneficial against Alzheimer's disease. (Dr. Mercola, october13, 2018).

Picture 3: Moringa

So, we need to consume healthy food & drinks for better health. Now-a-days people life has become busy due to which they consume oily food & junk food. Due to the consumption of these foods, many health problems erupted & the risk of infection is also increased. In this regard, Rosella, beetroot & Moringa tea can be too much better option, because they contains many nutrients.

Chapter Two
Materials & Methods

The study was conducted in the Laboratories of the Department of Nutrition & Food Engineering, permanent campus, Daffodil International University, Ashulia.

2.1. Collection of Raw materials

Rosella collect from my Supervisor Bellal Sir, Beet-root collect from local market & moringa leaf collect from my local area.

2.2. Powder Production:

i) Rosella powder:

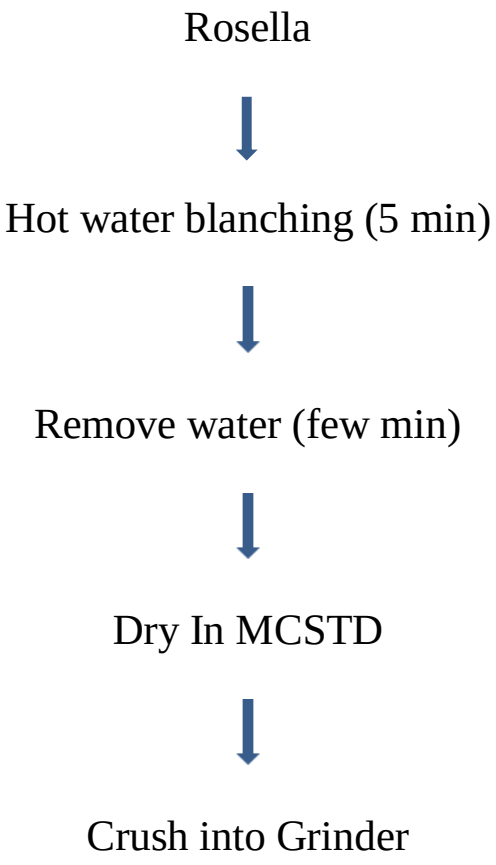

Figure 1: Making Rosella Powder

ii) Beet- Root Powder

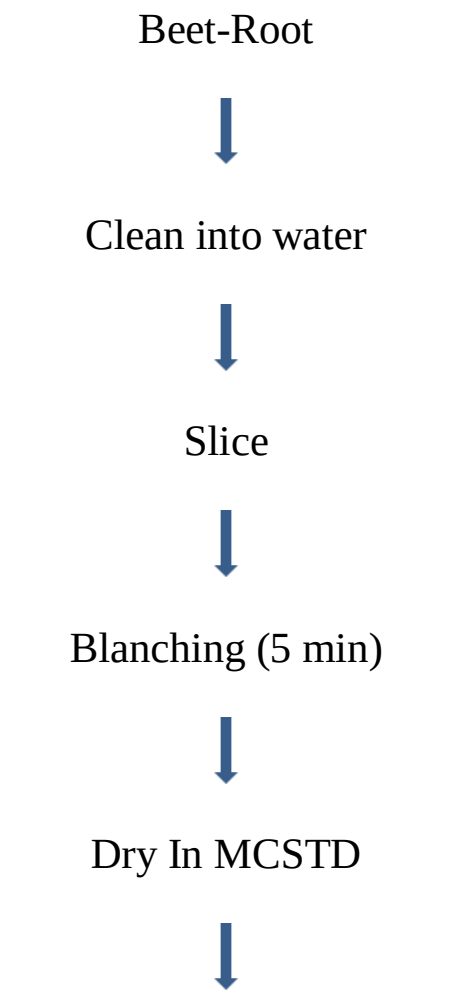

figure 2: making Beet-root Powder

iii) Moringa Leaf Powder

Moringa leaf

↓

Hot water blanching (5min)

↓

Remove extra water

↓

Dry in MCSTD

↓

Crush into Grinder

Figure 3: Making Moringa leaf Powder

Picture 4: MCSTD (Product)

2.3. Tea Production:

Take parentage of Moringa, Beet- Root & Rosella Powder-

Product	Sample:1	Sample:2	Sample:3
Moringa	90	90	90
Rosella	5	7	3
Beet-Root	5	3	7
Total			=100 %

Table 1: Tea Production (Different percentage of Moringa, Beet-Root & Rosella Powder)

Picture 5: Powder Tea Sample

2.4. Proximate Analysis

Moisture, Ash, Protein, of tea samples were determined by following methods described by, Moisture content by drying oven method at 105ºC for 1 hour; Ash content by Muffle furnace ignition at 600ºC; Protein content by Kjeldahl method.

2.5. Determination of Moisture content of the Tea:

Apparatus:

- Crucible lid
- Oven
- Measuring
- Desiccator

Procedure:

- 1st of all set 105º C temperature on the oven.
- Then weight crucible lid
- Then weight sample
- Then weight crucible lid + sample
- Then heat sample 105ºC temperature on the oven in 1 hour
- After the sample cool in 30 minute on desiccator
- Then again weight crucible lid + Sample
- Then calculate it for a result.

Picture 6: Oven

Calculation:

$$\text{Percentage of Moisture content} = \frac{W1-W2}{W1-W} \times 100$$

There,

W= Empty crucible weight

W1= Crucible + Sample weight

W2= after 1 hour weight crucible + Sample.

Results:

Sample 1: 3.5%

Sample 2: 2.95%

Sample 3: 3.95%

2.6. Determination of Ash content of the Tea:

Apparatus:

- Crucible lid
- Muffle furnace
- Measuring
- Desiccator

Procedure:

- 1st of all set 600ºC temperature on the muffle furnace
- Then weight crucible lid
- Then weight tea sample
- Then weight crucible lid + sample
- Then heat sample 600ºC temperature on the muffle furnace in 6 hours
- After Then again weight crucible lid + sample
- that sample cool in 1hour on desiccator
- Then calculate it for a result

Picture 7: Muffle Furnace

Calculation:

$$\text{Percentage Ash content} = \frac{C-A}{B-A} \times 100$$

Where,

A = Weight of empty dish

B = Weight of empty dish + Sample before Ashing

C = Weight dish + Ash.

Results:

Sample 1: 9.79%

Sample 2: 9.69%

Sample 3: 8.95%

2.7. Determination of protein from Tea sample by Kjeldahl method.

Materials Required:

- H_2SO_4
- Digestion Mixture (2g $CuSO_4$+98 K_2SO_4)
- 40% NaOH
- 0.1 N HCL
- Methyl Red Indicator
- 0.1 NaOH
- Distilled Water

Procedure:

Digestion:

- 1st of all take 0.4gm of tea sample, H_2SO_4 10 ml & digestion mixture
- Then it was put on the digestion flask
- Then heat 90ºC about 14-18 hours.
- The endpoint will be no white Smoke of H_2SO_4 & the solution will be crystal clear
- Then cool it for some time

Picture 8: Digestion machine

Distillation:

- At 1st, taken volumetric flask then make it 100ml level using distilled water for Pure the solution.
- Then taken 10ml from that conical flask to the distillation flask
- Then taken 150ml distilled water and 10ml of 40% NaOH to the distillation flask
- Then taken another trapping conical flask 25ml 0.1 HCL and 2 drops of methyl red.
- After that use three distillation flasks for this procedure where one of them will be blank i.e. no sample
- Only take 150ml distilled water with 10ml 40% NaOH
- Then use three trapping solution in 3 trapping conical flasks remaining the same thing.
- Then set up the condenser and start it, temperature 90°C
- Start the distillation unit & run for 30 minute.

Picture 9: Chemical process

Picture 10: Chemical Added

Picture 11: Distillation Machine

Picture 12: Sample take into Distillation flask

Titration:

- Fill the burette with 0.1 N NaOH
- Do the titration 3 times with 3 trapping solution
- The endpoint will be color change from red to light yellow

Picture 13: Titration

Calculation:

$$\% \text{ Protein} = \frac{(B - S) \text{ X } 1.4 \text{ X } 10 \text{ X } 6.25 \text{ X } o.1}{\text{Sample weight}}$$

Results:

Sample 1: 6.56%

Sample 2: 10.94%

Sample 3: 16.4%

Chapter-Three

Result & Discussion

3.1. Proximate Composition of Tea samples with Rosella, Beet-Root & moringa leaf Powder:

Sample	Moisture%	Protein%	Ash%
Sample1	3.5	6.56	9.79
Sample2	2.95	10.94	8.95
Sample3	3.95	16.4	9.69

Table 2: Proximate composition (Percentage of Moisture, Protein & Ash)

3.2. Discussion:

(i) Moisture: 3 Samples show 3 different results, I add different percentage of Rosella, Beet & Moringa powder. Sometime the result not accurate cause of measurement problem or drying Problem.

(ii) Protein: All samples protein are good, long time process, 3 samples I found all results about 1week. But sometime heating & titration not accurate calculate that's why deferent results.

(iii) Ash: All samples I found good results. But sometimes power loaded problem shows & muffle furnace stop. 2days + I found results. Another, no accurate result cause of measurement & drying problem.

Chapter – Four

Conclusions:

The result from the study shows that the use of 90% of Moringa leaf powder with Rosella & Beet; Sample 1,2,3; 5% & 5%; 7%& 3%; 3% & 7%. A positive result & was approved to be the best in all sensory attributes by the panelists. A lot of percentage of Moringa leaf power added that's why a deep smell found, when drink the Tea. When add sugar its test change, A fantastic test found from this Tea. My three sample are good, but sample 1 was more accepted than sample 1 & 2. Now a days that types of Tea are more Accepted in the market of Bangladesh, because people need verities product, which are most nutrient food. The Tea with Moringa, Beet & Rosella Powder can help to fulfill the Nutritional requirements of people of beverage food items in the country.

Chapter – Five

REFERENCE

- Cisse, M., F.Vaillant, A. Kane, O. Ndiayea and M. Dornier, 2011. Impact of the extraction procedure on the kinetics of anthocyanin and colour degradation of rosella extracts during strong. J. Sci. Food agricult., 92: 1214-1221.
- Du, C.T. and F.J frncis, 1973. Anthocyanin of rosella (Hibiscus sabdaniffa, L). J. Food Sci., pp: 810-812.
- Mgaya, k.B., S.F. Remberg, B.E. Chove and T. Wicklund, 2014. Physio-Chemical, Mineral composition and antioxidant properties of rosella (Hibiscus sabdaniffa L.) extract blended with tropical fruit juices. African Journal of food, Agriculture, Nutrition and Development, 14.
- Chattopadhaya, P., Chatterjee, S. and Sen, S.K. (2008). Biotechnological potential of natural food grade biocolorants. African J. Biotechnol., 7 (17): 2972-2985.
- Srilakshmi, B. (2014). Food science, New Age Publication, NEW DELHI (INDIA).
- Green Earth Heritage Foundation, The History of Moringa Tea
- WebMD, Moringa
- USDA National Nutrient Database, Drumstick Leaves, Raw, April 2018
- Stylecraze September 19, 2017
- Mind Body Green December 7, 2015
- Fast Company August 21, 2015
- J Food Sci. 2012 Jul; 77(7):T124-30.
- J Neurosci Rural Pract. 2011 Jan-Jun; 2(1): 56–61.
- Moringa Oleifera: Nature's Miracle Tree
- Fabricant, Florence (April 8, 1990). “FOOD: Meeting the Challenge of a Dessert for the Passover Meal”.