PAUSHTICON 2023

MUMBAI CHAPTER

Theme: Industry Innovations for Food Sustainability

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MUMBAI CHAPTER

Poster No: NSIMP-2022-004

Theme:Industry Innovations for Food Sustainability

Outcome Of *Phaseolus Vulgaris* (Kidney Bean) On Rheological Properties And Nutritional Enhancement In Idli

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Introduction

- Replacement or substitution of cereals and legumes in the formulation of idli can improve the nutritional profile and textural characteristics of the product.

Aim

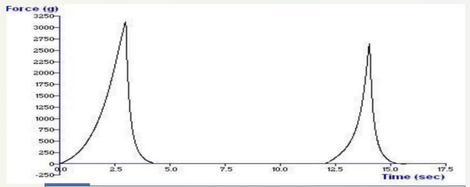
- **This work was aimed to study the processing parameter for formulation of idli and optimization of legumes in value added idli through texture profile analysis and sensory attributes.**

Methodology

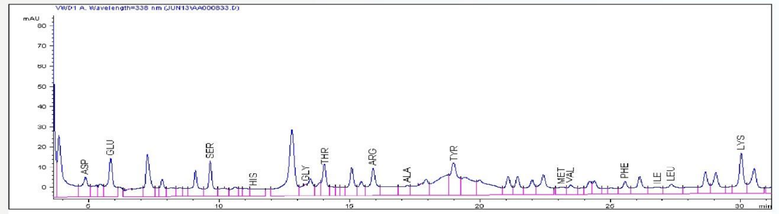
- **The *Phaseolus vulgaris* (kidney bean) idli prepared at ratio of 30%, 40% and 50% was carried out keeping the ratio of rice and black gram dhal as constant.**
- **The prepared batter is kept for fermentation for 8 hours at 30ºC and steam cooked in idli steamer for 15min.**
- **The texture of each idli was analysed using SMS/75mm compression probe in Texture Analyser (Stable Micro Systems, Surrey, UK)**
- **The formulated idlis were evaluated for their organoleptic, amino acid evaluation and glycaemic response characteristics (Ghosh and Chattopadhyay, 2012).**

Results

- **Textural and sensorial parameters:** 40% replacement of *Phaseolus vulgaris* in idli was more spongy and fluffy than control idli without affecting the structure of the idli. It was due to the batter viscosity and the albumin content which contributes foaming nature to the batter and thereby makes the product soft and fluffy.
- **Amino acids quantification:** There was a significant increment in the essential amino acids. It was found that arginine and histidine are the additional essential amino acids which are required for the growth of children.
- **Glycaemic Response**: Better glycaemic response were recorded for healthy volunteers due to the viscous fibres.



Textural and sensorial parameters



Amino acids quantification

Conclusion

- **40% -replacement of black gram dhal with *Phaseolus vulgaris* (without husk) in idli was proved to be the best on rheological properties and nutritional enhancement in idli. Thus Kidney bean places a vital role in formulating a novel product development.**

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Acknowledgement

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PAUSHTICON 2023

MUMBAI CHAPTER

Poster No:NSIMP-2022-016

Theme: Industry Innovations for Food Sustainability

LEAVES OF *Lantana camara*: PERFECT AMEND FOR NOVEL PROTEIN

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Introduction

Lantana camara is a widespread species belongs to the family *Verbanaceae* also known as Wild or Red sage. In the present scenario, the demand for Novel plant protein is increasing Plant protein plays a significant role for achieving the nutrition security. The present study highlights the extracted protein quality of the leaves of *Lantana camara.*

Aim

•To assess the efficacy of various extraction methods which yields high amount of protein from *Lantana camara* leaves.

• the qualitative analysis of extracted protein for amino acids.

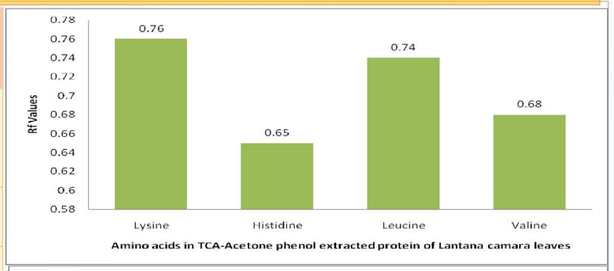
Results

Protein yield from Fresh *Lantana camara* leaves

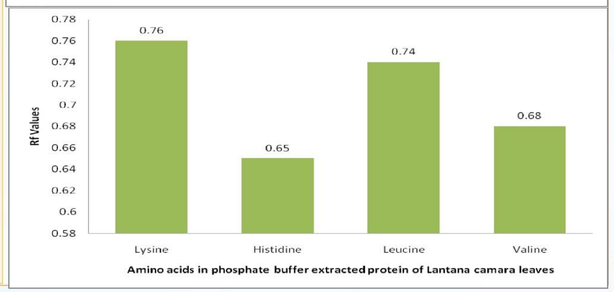
S.No	Type of Extraction	Protein Yield (g /100g)
1	Phosphate Buffer extraction	18.5
2	TCA –Acetone/Phenol extraction	17.6
3	Leaf protein concentrates	1.0

Qualitative Analysis of Amino acids in extracted protein of *Lantana camara* leaves

Phosphate buffer Extracted Protein	TCA –Acetone/Phenol extracted Protein
Essential Amino acids	
❖Lysine	❖Histidine
❖Methionine	❖Leucine
❖Histidine	❖Methionine
❖Leucine	❖Valine
	❖Lysine



Amino acids in TCA-Acetone phenol extracted protein of Lantana camara leaves



Amino acids in phosphate buffer extracted protein of Lantana camara leaves

Methodology

Nutrient analysis and phytochemical analysis were done using the standard methods. The protein extraction was done by different methods like manual extraction, TCA-acetone/Phenol Extraction and Phosphate Buffer Extraction Method. Qualitative analysis of Amino acid was done using the Thin Layer Chromatography.

Conclusion

The leaf protein increases the protein utilization in the present scenario of increasing protein demand. The utilization of leaf protein also helps in the ecological significance with biodiversity when blended with other deficient amino acids in extracted protein.

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References

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Acknowledgement

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PAUSHTICON 2023

MUMBAI CHAPTER

Poster No: NSIMP-2022-021

Theme:Industry Innovations for Food Sustainability

EFFICACY OF EMULSION ON THE QUALITY AND SHELF LIFE EXTENSION OF GUAVA FRUIT

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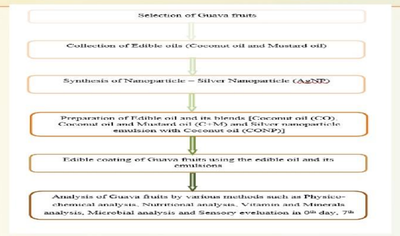
Introduction

- According to FAO, India is the second largest producer of fruits and vegetables in the world.
- The production of fruits and vegetables during the current year is estimated to be 314.5 million tons (mt), in 2017-18 (APEDA). In India Guava is one of the most commonly consumed fruit.
- The present study has taken an effort to extend the shelf life properties of Guava fruit by edible coatings made with various blends of Coconut oil and Nano emulsions

Aim

- To synthesis silver Nanoparticle emulsified with coconut oil, as an edible coating material.
- To formulate edible coatings using different blends of coconut oil, study the Sensory characteristics, Physico-chemical, Nutritional characteristics, Shelf life and Morphological characteristics

Methodology



Results

1.Sensory characteristic was done in order to check the attributes such as appearance, taste, texture, flavour, colour and overall acceptability. In this test, Variation II (C+M) was found to be acceptable and got the maximum score of all.
2.Water activity in Guava fruit is high which is one of the reasons for the decaying process. The proximate analysis showed that the Guava fruit contains 79% moisture, 15% carbohydrate, 4% ash, 2% protein and 1% fat.
3. Water activity in Guava fruit is high which is one of the reasons for the decaying process. The proximate analysis showed that the Guava fruit contains 79% moisture, 15% carbohydrate, 4% ash, 2% protein and 1% fat.
4.Phytochemicals were analyzed for the Edible coated Guava fruits both qualitatively and quantitatively. Phytochemicals which were analyzed Qualitatively are Alkaloids, Phenols, Saponins, Flavonoids, Phytosterols, Amino Acids and Proteins, Steroids, Tannins, Glycosides and Terpinoids
5. The result of the present study revealed that Guava fruit coated with Coconut oil and Mustard oil (Variation II/C+M) showed better results when compared with the other Variations and Control. It is because It showed a significant delay in the ripening process and stayed for 13 days.

Conclusion

This study provides new horizon to reduce the postharvest losses of fruits and vegetables by retaining the nutritional quality and helps to commercialize fresh products treated with chemicals as well as edible coatings which are Generally Recognized as Safe (GRAS).

References

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PAUSHTICON 2023

MUMBAI CHAPTER

Poster No: NSIMP-2022-026

Theme: Industry Innovations for Food Sustainability

IMPACT OF CITRIC ACID ON STRUCTURAL, FUNCTIONAL, AND DIGESTIBILITY PROPERTIES OF CASSAVA STARCH

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Introduction

- Cassava *(Manihot esculenta)* root is the world's sixth most important crop and is grown in almost all tropical countries
- Cassava starch has limited variations in structure and properties and is usually modified to diversify the design and functionality to suit diverse applications.
- Esterification is one of the most critical chemical modification methods for starch.
- Compared with other substances citric acid is nutritionally harmless

Aim

•To determine the effect of citric acid concentration and hydrolysis time on the structural, functional properties and digestibility of the modified Cassava starch.

Methodology

- Isolation of cassava starch
- Citric acid esterification by 3 different concentration and hydrolysis time
- Structural (SEM,XRD,FT-IR)
- Functional (Swelling, Solubility WAC, Degree of substitution and Amylose)
- In vitro Digestibility Properties

Results

• The structural, functional and digestibility properties of citrate starches were analysed at three different concentrations and hydrolysis times.
• In FT-IR, a new peak at 1724 cm-1 was observed and it could be attributed to the characteristic ester group from the citric acid in the structure of Citrate Starch.
• The presence of Citrate Starch esters was further confirmed by the degree of substitution (DS).
• SEM analysis revealed that CA attacked and exfoliates the outer layer of the modified starches and releases the amylose linear chains breakdown by the CA.
• As the Hydrolysis time lengthens, the corrosion and fissures in the starch granules also increase.
• The relative crystallinity determined from X-ray diffraction patterns for samples were as follows: NS=24.84%, A=25.16%, B=26.34%, C=26.96%, D=26.74%, E=28.81%, F=30.58%, G=32.83%, H=33.57% and I=34.16%, which was against the changing trend of DS.
• The amylose content was in the range of 24.9%, 28.41%, and 29.78% when the 15% concentration was hydrolyzed for 6, 12, and 18 hours. The yields from the 20% and 25% conc. were similar, falling between 23.52%, 28.75%, and 31.18% and 23.59%, 25.54%, and 28.41%, respectively. Native starch contained 17.28% Amylose linear chains.
• The free amylose in the starch granule was directly proportional to resistant starch yield (RS), and progression in functional properties was also observed. In general, changes in starch structural properties and Amylose content during CA esterification increased swelling properties and water affinity, and the increase in DS value confirmed this.
• As citric acid concentration increased, the RDS content of citrate starch samples significantly decreased, whereas the SDS and RS contents markedly increased. When the citric acid concentration was increased from 15% to 25%, the RDS content decreased from 63.23% to 18.27%, while SDS and RS contents increased from 27.03 to 32.28 and 9.74% to 54.62% respectively.

Conclusion

• Overall the sample that treated with 20 concentration and 18h hydrolysis time had higher amylose content, as well as its good swelling power, solubility, and Water Absorption Capacity than all other samples. For the reasons stated above, citrate starch has the potential to be use as a good stabiliser, and resistant starch can be used as a stabiliser in a variety of foods to improve gut health.

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PAUSHTICON 2023

MUMBAI CHAPTER

Poster No: NSINP-2022-032

Theme: Industry innovation for Food Sustainability

Study on Sensory Properties of Bajra Muesli and its Variation

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Introduction

- Bajra scientific name *Pennisetum glacum* also known as pearl millet.
- Grown exclusively in India and Africa.
- Food source of protein, carbohydrates, fiber, vitamins and minerals, antioxidants, polyphenols and phytochemicals.
- Its gluten free making a good choice for celiac diseases and other GIT diseases

Aim

The study aims to develop a product using millets (pearl millet) which is an healthy alternative to be included in the diet and the preparation of the said muesli is affordable and can be done at household level.

Results

The organoleptic properties were determined. The taste, texture, flavour, odour and appearance of variation 1 was highly acceptable. The nutrient value of variation 2 is high compared to basic and variation 1. The shelf life of the muesli is more than 3 months making it ideal and healthy alternative which can be included in the diet.

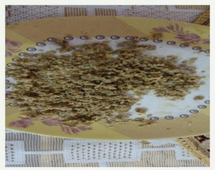
SOAKING BAJRA

BOILING BAJRA

BAJRA KEPT FOR DRYING

FLATTENING BAJRA

BASIC- BAJRA FLAKES WITH SALT



VARIATION –I :JAGGERY BAJRA FLAKES

VARIATION-II: BAJRA FLAKES WITH ALMONDS AND PUMPKIN SEEDS

Methodology

Bajra millet grains are rolled into flakes and one basic and two variations of muesli was prepared by soaking the bajra grains, and pressure cooking them and rolling it into the flakes and variations were added control being salt, variation 1 with jaggery syrup and variation 2 with almond and pumpkin seeds. The sensory evaluation and nutritive value was carried out with hedonic rating (5 points) of muesli by 50 untrained panelist.

Conclusion

The overall acceptability of the variation1 is high with the mean value of 4.4. The overall nutritional value is high of variation 2.

References

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2.Sensory evaluation and Nutrient content of Namaskars prepared by incorporating Pearl Millet. -Anubhav Mehra, Uttara Singh Studies on Home and Community Science 11(1),7-11,2017

Acknowledgement

I would express my gratitude to the institute Anwarul Uloom College for the encouragement and support during this study.

PAUSHTICON 2023

MUMBAI CHAPTER

Poster No: NSIMP-2022-035

Theme: INDUSTRY INNOVATIONS FOR FOOD SUSTAINABILITY

TRADITIONAL TEA CULTURE OF UTTRAKHAND – A CUP OF GOOD HEALTH AND POSITIVI'TEA"

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Introduction

- **Worldwide "Tea" is the most consumed beverage after water .**
- Long before the British introduced tea cultivation in the picturesque Uttrakhand, the natives had ethnic knowledge and they sure know how to have their cups of tea.
- Tea culture in Uttrakhand epitomizes the judicious use of **naturally available ingredients for optimum health benefits.**
- It is a beautiful amalgamation of health and taste.

Aim

- **To identify traditional tea recipes of Uttrakhand.**
- **To review their medicinal, therapeutic and nutrition aspects.**
- **Exploring commercial viability of traditional tea recipes.**

Methodology

- **Survey method** (25 villagers from both Kumaon and Garhwal regions of Uttrakhand were investigated)

- **Primary Data-** Field visits
- **Secondary Data-** Reference books, journals and authentic sources

Results

IDENTIFICATION OF TRADITIONAL TEA RECIPES OF UTTRRAKHAND

Ninteen (19) different types of tea recipes with key ingredients as flowers, herbs, seeds, leaves, fruit peels, petals, barks and shoots were identified as below.

Banafsha /Sweet violet ***(Viola odorata),*** Choru ***(Angelica glauca),*** Dalchini /Cinnamon ***(Cinnamomum zeylanicum),*** Gehoon ***(Triticum)*** / Mandua ***(Eleusine coracana),*** Himalyan Tulsi ***(Clinopodium vulgare),*** Kandali ***(Urtica dioica),*** Lemon grass ***(Cymbopogon citratus),*** Lemon ***(Citrus limon)*** Zest, Methi (***Trigonella foenum-graecum***) seeds, Mint ***(Mentha),*** Onion ***(Allium cepa)*** *peel,* **Orange** ***(Citrus Aurantium Dulcis)***zest, Papermint ***(Mentha piperita L.),*** Pomegranate ***(Punica granatum)*** zest , Rosemary (***Salvia rosmarinus)***, Rose ***(Rosa rubiginosa),*** Seasonal Herbs, Ghee, Salt, Jaggery, Tulsi ***(Ocimumtenuiflorum)***leaves, Timoor / *Timru* ***(Zanthoxylum armatum)***

MEDICINAL THERAPEUTIC AND NUTRITIVE ASPECTS

- Antioxidant rich
- Immunity booster
- Mood enhancer
- Caffeine free
- Pain reliever
- Manage weight and life style diseases in more effective manner
- Improve digestion
- Diabetic friendly
- Respiratory health promoter
- Warmth and energy during harsh winter.
- Improve sleep

COMMERCIAL VIABILITY AND ECONOMIC SUSTAINABILITY

As the scientific community says " **Himalayan herbs are modern day *Sanjeevani".*** Post COVID-19 the Himalayan herbs are back in focus. The best and easiest way to incorporate them in our routine life is through tea. During and post COVID-19, commercialization of this tea culture, equipped many villagers to earn a sustainable living. The tea recipes identified during the study has untapped market.

Conclusion

Traditional tea culture of Uttrakhand exhibits proven health benefits and has even more to offer. These teas are not only high on sensory properties but also have ability to ward off many diseases.

It is concluded that traditional tea culture is here to stay to brew up with good health, well being, economic success and sustainability. Further research is strongly recommended.

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2. Mehta P.S., Negi K.S. and Ojha S.N.(2010) Native Plant Genetic Resources and Traditional Foods of Uttarakhand Himalaya for Sustainable Food Security and Livelihood. *Indian Journal of Natural Products and Resources.* Vol. 1 (1), March 2010, pp 89-96.

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PAUSHTICON 2023

MUMBAI CHAPTER

Poster No: NSIMP-2022-052

Theme: Industry Innovations for Food Sustainability

Production of Fermented Moringa Oleifera Using Microorganism/s

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Introduction

- Moringa Oleifera, native to India is called "Shobhanjan," meaning very auspicious tree, "because of its multiple uses and benefits.
- The leaves are rich in minerals, vitamins and other essential phytochemicals.
- It is used as potential antioxidant, anticancer, anti-inflammatory, antidiabetic and antimicrobial agent.

Aim

The present study aimed to analyze the nutrition of *Moringa oleifera* using microorganism/s.

Methodology

- In this study, *Moringa oleifera* aqueous extraction performed for 10 minutes at 80 C and bacterial isolation was conducted along cultivation time and temperature. Determination of antioxidant activity of fermented *Moringa oleifera* sample performed with DPPH free radical scavenging assay and estimation of protein content followed by Bradford assay. Detection of presence of reducing sugars in a fermented sample performed by DNSA assay and non reducing sugars performed with Anthrone method.

Results

Results suggested that nutritional value increased throughout the fermentation time. The pH values showed decrease, the antioxidants and protein content presented considerable increased during fermentation process.

- Shake Flask conducted with ratio 1:5 aerobic fermentation with 5% inoculum 1% moringa leaves and 3% sugar at Temperature 30 C and agitation 120
- Unfermented Moringa- green tea have been taken as control total sugars 34.2mg/ml, protein 52.3 mg/ml and antioxidants 82% (% RSA)
- Profile of total sugars of fermented moringa : Total sugars utilized by Bacteria within 9hrs of fermentation period maximum reduction at 9h is 1.66 mg/ml.
- Profile of estimation of protein of fermented moringa : Protein increased during 9hrs of fermentation maximum is 63.2 mg/ml
- Profile of Antioxidant activity (%RSA) of fermented moringa during 9hrs of fermentation is 87%

Conclusion

Overall, obtained data suggested that natural *Moringa oleifera* fermented tea can be a potential candidate to be used in food as a beverage or supplement.

References

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PAUSHTICON 2023

NSIMP-2022-074

Industry Innovations for Food Sustainability

DEVELOPMENT OF GUAVA JAM BY INCORPORATION OF INDIAN PLUM TO ENHANCE ITS VITAMIN C & IRON CONTENT

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Introduction

- Guava or Psidium guajava plays a significant part in folk medicine; its extracts from the roots, bark, and leaves are used to cure a variety of ailments, including gastroenteritis, vomiting, diarrhoea, dysentery, wounds, ulcers, toothaches, coughs, sore throat, swollen gums, and others. Indian plum (ber) fruit is a fruit high in vitamin C that is used in Ayurveda to cure conditions such as excessive thirst, fever, burning feelings, and bleeding issues. Its seeds have the potential to be anti-cancer. The study focused on the development and assessment of value-added guava and ber products.

Aim

- To determine the nutritional and health benefits of guava and Indian plum (ber) through sensory evaluation and nutritional analysis.

Methodology

The study was divided into three phases

Phase 1—development of the products.

Phase 2—sensory evaluation

Phase 3—nutrient analysis

Results

❖ Sensory evaluation of Guava-Ber Jam

Fig. 1: Color Comparison

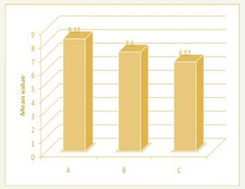

Table-1

Ratios	Score Mean±SD
A	8.27±0.74
B	7.30±0.95
C	6.57±0.93
p-value[1]	0.06

Fig.2: Texture Comparison

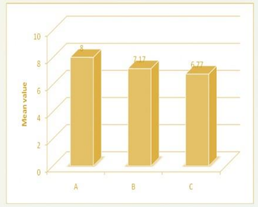

Table-2

Ratios	Score Mean±SD
A	8.00±0.78
B	7.17±1.17
C	6.77±0.72
p-value[1]	0.07

Fig. 3: Flavor Comparison

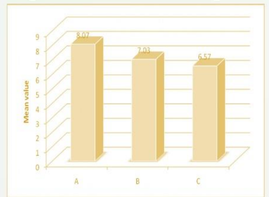

Table-3

Ratios	Score Mean±SD
A	8.07±0.74
B	7.03±1.06
C	6.57±0.83
p-value[1]	0.10

Fig. 4: Appearance Comparison

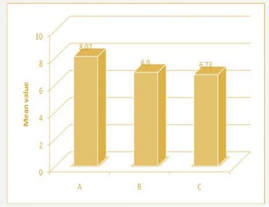

Table-4

Ratios	Score Mean±SD
A	8.07±0.69
B	6.90±1.02
C	6.73±0.86
p-value[1]	0.08

Fig. 5: Overall acceptability Comparison

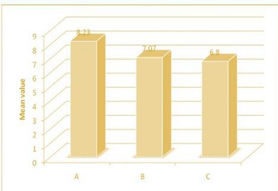

Table-5

Ratios	Score Mean±SD
A	8.23±0.62
B	7.07±0.94
C	6.80±0.76
p-value[1]	0.09

❖ Nutrient analysis for guava ber jam-

S.NO	Parameters	Results	Test Method
1.	Vitamin –c mg/100 gm	9.67	IS : 5838 : 1970
2.	Iron mg/100 gm	115.99	SP : 18(P-I) 1980

Conclusion

In all three variations (A, B, C) of guava ber jam, product A was found to be most acceptable through sensory evaluation. After that, product A was held to nutritional analysis in which it was found that by incorporating Indian plum in guava jam, the vitamin c and iron content of the developed product was increased.

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PAUSHTICON 2023

MUMBAI CHAPTER

Poster No: NSIMP-2022-095

Theme: Industry Innovations for Food Sustainability

TITLE: CHEMICAL CONSTITUENTS OF MULBERRY SILKWORM PUPA (*BOMBYX MORI*) POWDER

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Introduction

Traditional agricultural methods alone cannot deliver sufficient amount of nutrients to meet the expected demands of food. By 2050, the world population will be increased which may lead to food insecurity. To solve the problem of food insecurity there is a need to explore alternate sources food to mitigate the problem.

Implications

- ❖Silkworm pupa are a sustainable alternative protein source in food industry applications
- ❖Silkworm pupa are rich source of essential oils and its application in beauty industries
- ❖Silkworm pupa have many biochemical constituents which are useful in biomedical applications
- ❖Silkworm pupa can contribute to food and feed security

Aim

- To examine selected nutritional quality of locally (Manjuli, Assam) grow mulberry silkworm pupae

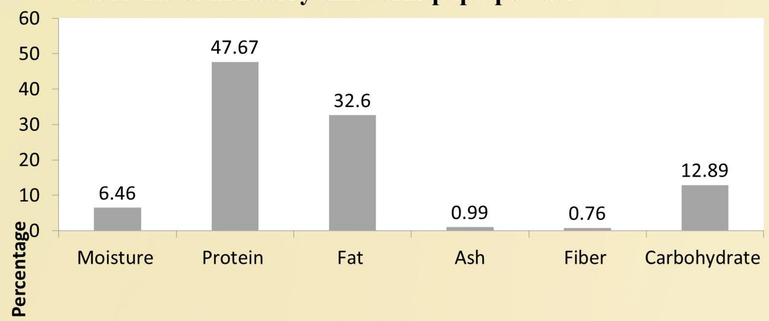
Methodology

Freshly harvested mulberry silkworm pupa were cut out of their cocoons and frozen at -20^{0}C, thawed at 5^{0}C for 12 hour, washed and dried at 60^{0}C for 16 hour. The dried pupa were milled into flour, passed through 177 micron mesh sieve and kept airtight for further investigation. `

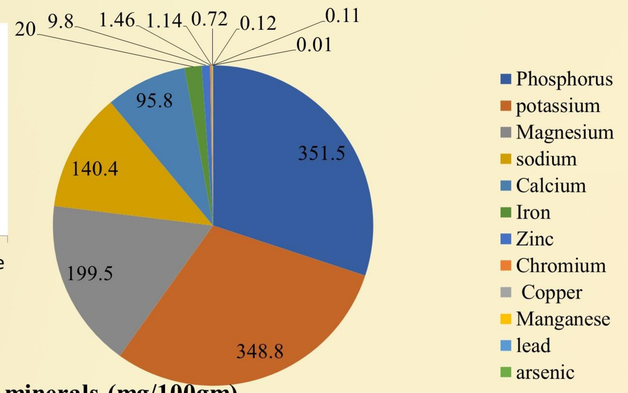
- •Proximate analysis by AOAC, 2000 standard method
- •Minerals analysis by atomic absorbance spectrophotometer (Lindsey and Norweyll, 1969)

Results

study result indicates that mulberry silkworm pupa powder have high nutritive value e.g. crude protein (47.67%), crude fat (32.6%) and energy (536 kcal). It contain high amount of antioxidant activity (77%), minerals and vitamins (vitamin A, E, C, B complex).



Proximate analysis of mulberry silkworm pupa powder



Total minerals (mg/100gm)

Conclusion

- ➢The focus of this research provide profiling of chemical compositions of silkworm pupa powder. Therefore, the presented data would be advantageous for manufacturers for developing functional ingredients and novel foods.
- ➢The unconventional food items with high cultural acceptability and nutritive value may be utilized in formulating potential alternate recipes for malnourished population as well as nutritious delicacy for others.

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MUMBAI CHAPTER

Poster No:NSIMP-2022-097

Theme: Industry Innovations for Food Sustainability

SENSORY EVALUATION AND NUTRITIONAL ANALYSIS OF MAIZE CHIPS ENRICHED WITH *ASPARAGUS RACEMOSUS (SHATAVARI)*

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INTRODUCTION

The significant properties of Shatavari are anti-oxidant, anti-allergic, anti-inflammatory, anti-protozoal, anti-bacterial, anti-candidal, anti-viral, anti-parasitic, anti-malarial, anti-aflatoxigenic, antipyretic, immunomodulatory, anti-diabetic, diuretic, adaptogenic, antitussive, antidepressant, anti-amnesic, anti-parkinsonian, cerebro-protective, anti-neoplastic, anti-spasmodic, hepatoprotective, anti-lithiatic, cardio-protective, hypolipidemic, prokinetic, fertility activity, anti-ulcerative, antisecretory (gastric HCl), anti-diarrheal, anti-dysenteric, enzyme-inhibitory activity (cholinesterase), Anti-HIV, galactagogue effects, enhance immune responses.

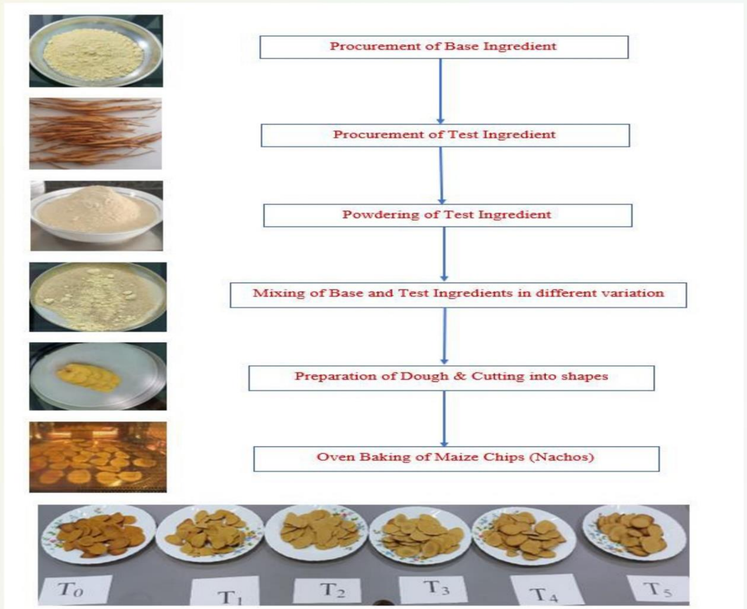
AIM

The present study aims on incorporating *Shatavari* as a dietary supplement into maize chips (nachos) to fortify the food product with enriching nutrients for boosting immunity, curing diseases and restoring health, and can further be utilized for areas unexplored . *Asparagus racemosus* can be proved to have potential to cure diseases.

METHODOLOGY

Six Products with different concentrations of *Shatavari* were made (0%, 10% , 20%, 30%, 40%, 50%), 0% concentration being taken as control. All the products were assessed for their organoleptic qualities using hedonic rating scale. Best product was assessed for nutritional properties (Energy, Carb, Protein, Fat)

RESULTS: 20% Shatavari incorporated maize chips scored best in the organoleptic evaluation.



S. No.	Test Parameters	Test Method Used	Evaluated values with units
1	Energy	FSSAI Lab Manual Method	350.18 Kcal/100g
2	Carbohydrates	FSSAI Lab Manual Method	80.97 g/100g
3	Protein	Kgeldahl Method	5.94 g/100g
4	Fat	Soxhlet Method	0.30 g/100 g
5	Ash	FSSAI Lab Manual Method	3.66 g/100g
6	Moisture	Hot Air Oven Method	4.97 g/100g
7	Crude Fibre	FSSAI Lab Manual Method	4.20 g/100g
8	Vitamin C	AOAC 21th ed Method 967.21	24.63 mg/100g
9	Calcium	Titration Method	160 mg/100g
10	Iron	AAS Method	5.2 mg/100g

CONCLUSION

Bioactive components of *Asparagus racemosus* have been found effective in management of manifestations of variable ailments. Elaborative comprehensive studies needs to be performed based on therapeutic intervention of *Asparagus racemosus* and its products.

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PAUSHTICON 2023

MUMBAI CHAPTER

Poster No: NSIMP-2022-102

Theme: Industry Innovations for Food Sustainability

Sonication and Microwave processing of Elephant apple (*Dillenia indica)* juice: A Synergistic Approach

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Introduction

- Elephant apple (*Dillenia indica*) is an underutilized fruit belonging to the family Dilleniaceae. Tribes in Northeast, especially Assam, use this herb extensively.
- Microwave in combination with sonication treatment increase the extraction efficiency and keeping quality of fruit juices.

Aim

- To investigate the combined effect of sonication and microwave treatments on change in physicochemical properties and functional properties of the processed fruit product.

Methodology

- **Formulation of Elephant apple juice** is adopted from Nadeem et. al., 2021 with slight modification.
- **Process**: Elephant apple → Washing, pulping & filtration → Juice
  - T0- (No treatment)
  - T0+ (0.05% KMS)
  - T1(2 min sonication+2 min microwave)
  - T2(4 min sonication+2 min microwave)
  - T3(6 min sonication+2 min microwave)
  - T4(8 min sonication+2 min microwave)
  - T5(10 min sonication+2 min microwave)
- The values are expressed as mean ± S.D.

Results

Table1. Physicochemical characteristics of raw elephant apple

Characteristics	Value
Moisture (%)	83.3±0.82
Ash Content (%)	4.45±0.04
pH	3.4±0.03
TSS (°Brix)	6±0.05
Titrable acidity (%)	1.02±0.01
Ascorbic acid (mg/100g)	6.40±0.01
Antioxidant activity %	62.02±0.01
Total phenolic content (mg GAE/L)	428.22±0.01
Total flavonoid content (mg CE/L)	485.43±0.02

Table 2. Combined effect of sonication + microwave on Elephant apple juice during 30 days of storage

	Treatment						
	T0-	T0+	T1	T2	T3	T4	T5
TSS (°Brix)	9.95±0.177^{bc}	10.04±0.02^{bc}	9.84±0.202^{a}	9.90±0.159^{ab}	9.96±0.111^{bc}	10.01±0.033^{c}	10.00±0.033^{c}
Titrable acidity	0.74±0.021^{a}	0.67±0.031^{b}	0.64±0.019^{c}	0.75±0.033^{e}	0.79±0.017^{e}	0.78±0.022^{cd}	0.77±0.026^{de}
Ascorbic acid (mg/100g)	5.67±0.314^{bc}	5.76±0.235^{c}	5.48±0.139^{a}	5.59±0.199^{ab}	5.59±0.199^{bc}	6.07±0.126^{d}	5.48±0.191^{a}
Antioxidant activity (%)	43.54±1.53^{a}	46.36±0.92^{c}	45.20±0.27^{b}	46.37±0.78^{c}	48.37±0.03^{d}	48.97±0.70^{d}	46.08±0.23^{c}
Total phenolic content (mg GAE/L)	392.37±15.56^{a}	397.37±10.68^{a}	395.69±17.18^{a}	401.87±10.39^{a}	401.87±17.31^{a}	403.25±22.28^{a}	399.27±14.98^{a}
Total flavonoid content (mg CE/L)	328.63±9.85^{a}	390.85±43.04^{c}	380.66±34.09^{bc}	390.09±38.96^{c}	419.87±29.88^{d}	433.85±44.20^{e}	376.69±4.81^{b}

Note: Values with different letters as superscripts in the same row/column are significantly different ($p < .05$) from each other.

Conclusion

Combining sonication with microwave treatment can be utilized as alternative to traditional thermal treatment while also preserving nutritional quality of the processed fruit products. This treatment can further be used in processing different fruit juices.

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