



PG & RESEARCH DEPARTMENT OF ZOOLOGY &  
DEPARTMENT OF MICROBIOLOGY  
MUSLIM ARTS COLLEGE

[Affiliated to Manonmaniam Sundaranar University]  
Thiruvithancode - 629 174, K.K. Dist, Tamilnadu, India.



ISO 9001:2000  
Reg. No. : RQ91/3688

NATIONAL SEMINAR ON  
CLIMATE CHANGE AND BIODIVERSITY  
CERTIFICATE

This is to certify that Prof./Dr./Mr./Mrs./Ms T. RENISHEYA JOY JEBA MALAB, Assistant Professor, Pgs  
Research Dept. of Nutrition & Dietetics, Muslim Arts College, Thiruvithancode has participated /presented a research  
paper entitled GERMINATED BROWN RICE : PROCESSING AND VALUE ADDITION FOR  
DEVELOPMENT OF INSTANT PANCAKE MIX.....in the National  
Seminar on “ Climate change and Biodiversity” organized by the PG & Research Department of Zoology &  
Department of Microbiology, Muslim Arts College, Thiruvithancode - 629 174, held on 27<sup>th</sup> September 2023.

Thij  
Dr. M. Thilsath Fatima Quraiza  
Organizing Secretary

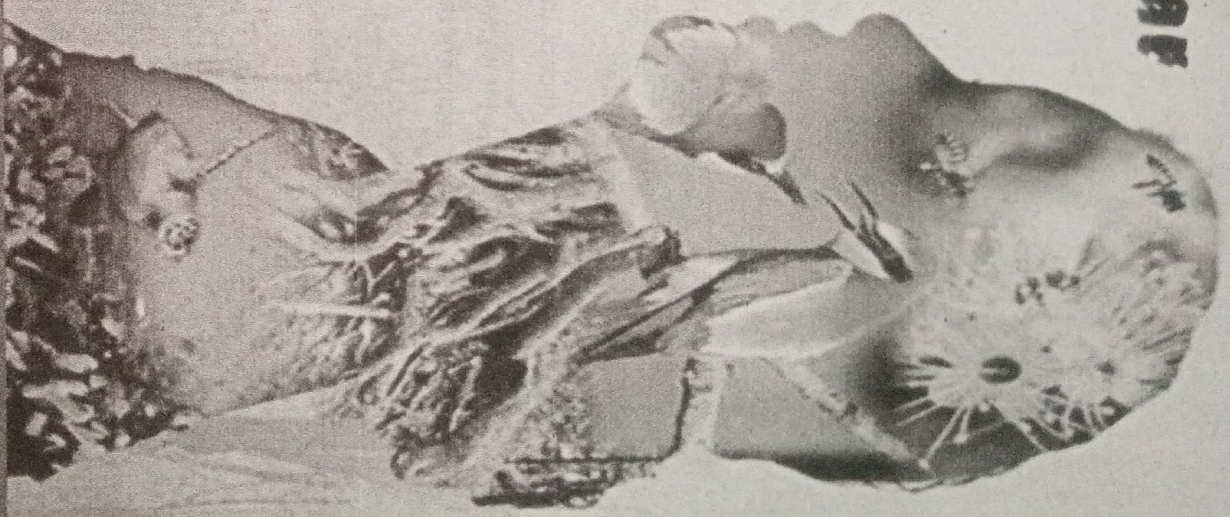
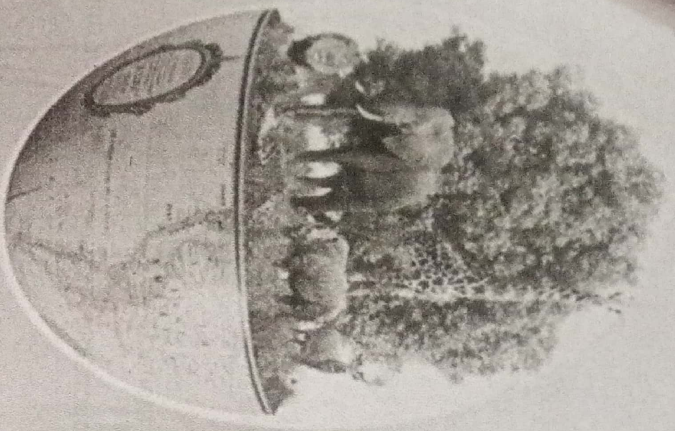
Ramani Bai  
Dr. M. Ramani Bai  
Convener

Sheela  
Dr. G. Edwin Sheela  
Principal

Ali  
Lion Dr. H. Mohamed Ali  
Secretary/Correspondent



# National Seminar on



EDITED BY

Dr. M. Thilsath Fatima Quraiza

Dr T. Kumaran

27<sup>th</sup> September, 2023



## CLIMATE CHANGE AND BIODIVERSITY

PG & RESEARCH

DEPARTMENT OF ZOOLOGY

**MUSLIM ARTS COLLEGE**

(Affiliated to M.S. University, Tirunelveli)

Thiruvithancode-629174

88	NUTRITIONAL COMPOSITION OF VARIOUS PARTS OF <i>MORINGA OLEIFERA</i> PLANT  G.C.Gilbis Tamil Priya and N.Yasmine
91	EFFICACY OF A SYNTHETIC PESTICIDE AND A BIO PESTICIDE AGAINST THE OKRA LEAF ROLLER, <i>SYLEPTA DEROGATA</i>  Dr.K.Reeba Jasmine and Dr.P.Beautlin Sheribha
94	PHYTOCHEMICAL INVESTIGATION AND ANTIBACTERIAL ACTIVITY OF <i>PUNICA GRANATUM</i> LEAF EXTRACT AGAINST THE PATHOGEN <i>AEROMONAS HYDROPHILA</i>  S.Jeba Sheeba, R.Raja Jeya Sekar and S.M.Vijila
99	SERICULTURE PRACTICES NAVIGATING TRADITION AND MODERNITY  T. Sam Suji, G Pappa and Dr. Ramani Bai
103	A STUDY ON THE SENSORY CHARACTERISTICS OF ARENGA <i>PINNATA</i> BASED PRODUCTS  T.Sherin Mary and J.Vijila Jasmine
109	ASSESSMENT OF BREEDING SOURCES OF <i>AEDEES MOSQUITOES</i> IN URBAN KANYAKUMARI, TAMIL NADU  Sony X. Vincent and Grace Marin
112	EVALUATION OF ANTIOXIDANT AND NUTRIENT ANALYSIS OF INCORPORATED PRODUCTS WITH <i>FAGOPYRUM ESCULENTUM</i>  Sudha. UV and Dr.N. Yasmine
118	ANALYSIS OF FLUORIDE LEVELS IN FOOD AND THEIR IMPACT ON HEALTH IN TIRUNELVELI DISTRICT  L. GnanaSubirtha and A.Subramanian
123	STUDIES ON THE IMPACT OF PHOTOPERIODS ON THE UREASE ACTIVITY OF MULBERRY LEAVES AND SILKWORM, <i>BOMBYX MORI</i> L.  T.Thanga Suji, Dr. C. Sreekumari and Dr. M. Thisath Fatima Quraira
126	EFFECT ON <i>COCCINIA GRANDIS</i> ON THE PROTEIN CONTENT OF BACTERIAL INFECTED <i>BOMBYX MORI</i> L.  N.Vijaya Prabha, I E. Serolin Suganya, and Dr.M. Thisath Fatima Quriza
129	REVIEW ON NUTRACEUTICAL AND MEDICINAL PROPERTIES OF <i>MACROTYLOMA UNIFLORUM</i>  B. Maria Regina Femi and Dr. T. Renisheya Joy Jeba Malar
132	GERMINATED BROWN RICE: PROCESSING AND VALUE ADDITION FOR DEVELOPMENT OF INSTANT PANCAKE MIX  Mrs. A. Marithangam and Dr. T. Renisheya Joy Jeba Malar

## GERMINATED BROWN RICE: PROPERTIES AND DEVELOPMENT OF INSTANT PANCAKE MIX

Mrs. A. Marithangam, Ph.D Scholar (22123092272005)  
thangamashok13@gmail.com, 7708424605

Dr. T. Renisheya Joy Jeba Malar, Assistant Professor,  
renibjoy@gmail.com, 9750904456

PG and Research Department of Nutrition and Dietetics, Muslim Arts College,  
Thiruvithancode, Kanyakumari District, Tamilnadu

### ABSTRACT

The study involves formulation of an instant pancake mix with germinated brown rice (GBR) flour at different concentrations of IDM refers to Instant Dry Mix (IDM)10% (IDM1), 20% (IDM2), 30% (IDM3) and 40% (IDM4) and analysed for its sensory evaluation and proximate composition. Incorporation of GBR in instant pancake mix resulted in a significant increase of nutritional ingredients. The IDM3 was found to have fat (3.78%), protein (13.30%), fiber (1.09%) and ash (3.94%). Results of sensory evaluation showed that germinated brown rice can be utilized in formulation of instant pancake mix up to 30 per cent (IDM3) was found to be well accepted.

**Keywords:** Germinated brown rice, value addition, instant pancake mix, sensory evaluation.

### INTRODUCTION

Germination of cereal grains is an economical processing technology that helps to improve nutritional value and health promoting functions. Germinated brown rice (GBR) is unpolished brown rice that has been allowed to germinate to improve the flavour and texture, and to increase its nutritional content profile. Recently, GBR has been emerged out as one of the most interesting germinated cereal products and it has received a great deal of attention, especially in Asian countries. During the germination process, hydrolytic enzymes are activated and this decomposes starch, non-starch polysaccharides and proteins, which lead to increase in oligosaccharides and amino acids (Manna *et al.*, 1995). Proteins and sugars broken down by enzymes produced during the germination process and impart a sweet flavour to the GBR (Kihara *et al.*, 2007). Germination could bring about the formation of new bioactive compounds, such as gamma-aminobutyric acid (GABA) which is said to protect the brain from harmful amino acids connected to Alzheimer's disease. It is also a powerful neurotransmitter, boosting the central nervous system's ability to support good sleep and reduce stress (Shiahs and Yatham, 1998).

Instant food mixes are the food products wherein some of the ingredients are premixed and provides convenience to the consumer with an easy and readily available homemade option. Rapid urbanization, enlarged phenomenon of working women's and change in consumption pattern have led to the development of instant mixes of several Indian traditional foods. Elevation of nutritional value and time saving can be achieved by development of instant food mixes. GBR has outstanding potential to become innovative rice by preserving all nutrients in the rice for human consumption in order to create the utmost value from rice. Looking to the health benefits of GBR, an attempt was carried out to explore its potential utilization in value added food products.

The aim of the present research study was to investigate the suitability for germinated brown rice (GBR) in development of instant pancake mix to raise the bar of nutritional index with consumer acceptability.

### MATERIALS AND METHODS

#### Raw Materials:

Raw materials like raw brown rice, whole wheat flour, sugar, sodium bicarbonate, citric acid, salt etc. required during present investigation were procured from local market of loyal world, Mysore.

### Processing Equipment:

The analytical equipment like muffle furnace, Soxhlet extraction apparatus, sieves shaker, incubator, spectrophotometer, laminar air flow cabinet were made available in the laboratories of CFTRI, Mysore.

### Materials and Methods

#### Preparation of germinated brown rice flour

The brown rice was germinated by soaking it in water of 35–40 °C for about 24 h, then water drained out and kept in moist condition for 18 h, and during soaking period, changing the water every 3–4 h to prevent fermentation (which usually produces undesirable odour) and to maintain consistent water temperature. Then germinated brown rice was dried in cabinet drier at 400°C for 2-3 hrs. Dried GBR were ground in an electric grinder to make fine flour. The formulations of pancake were displayed in Table.1.

Table. 1. Formulation of instant pancake mix

Treatments	Whole Wheat Flour	Brown rice flour	Germinated Brown rice flour
Control	60	40	-
IDM1	60	30	10
IDM2	60	20	20
IDM3	60	10	30
IDM4	60	-	40

#### IDM – Instant Dry Mix

#### Preparation of pancake from instant pancake mix by reconstitution

Instant pancake mix powder

Add 15ml oil and 130 ml water in 100g

Mixing Pour the batter in greased pan

Steaming 15 min in preheated pressure cooker

Garnishing Ready to serve

#### Sensory evaluation of pancake

The sensory quality characteristics of pancake prepared from various instant mixes were evaluated by panel of 10 semi-trained judges using nine-point hedonic scales as described by Amerine *et al.* (1965).

#### Proximate composition of instant pancake mix

The instant pancake mix formulations and control sample were analysed by standard method for moisture, total fat, crude protein, ash and fibre (AOAC 2007). The carbohydrate content was calculated by different methods.

#### Result and Discussion

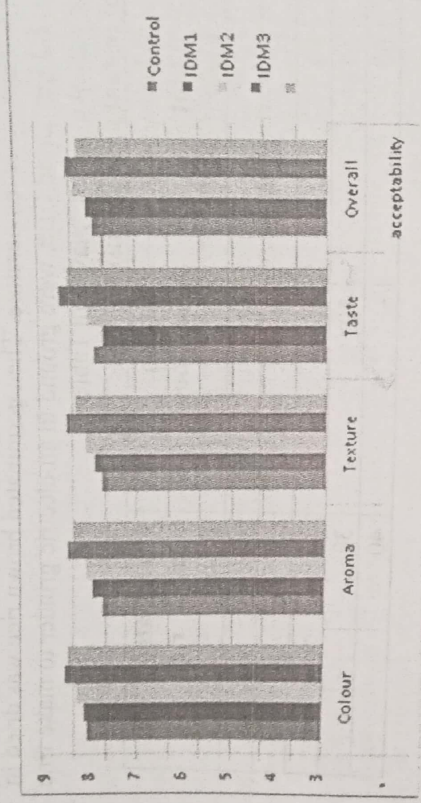
#### Sensory evaluation of pancake prepared from instant pancake mix

Pancake prepared with different formulations of instant pancake mix were subjected for sensory evaluation to evaluate maximum acceptability of the product.

The data revealed that the pancake prepared from formulation IDM3 i.e. instant pancake mix incorporated with 30 per cent germinated brown rice scored highest scores for all sensory parameters viz, colour (8.3), aroma (8.2), texture (8.2), taste (8.4) and overall acceptability (8.1) as compared to other four formulations.

The highest score for colour was secured by IDM3 sample (8.3) while lowest score by IDM1 (7.6). The probable reason for these results could be the partial replacement of raw brown rice (brown colour) with GBR (Creamish colour). At moderate level of GBR addition in Pancake, aroma was found to be appreciable and treatment IDM3 received highest score

(8.2), even more than control. Texture score values also showed significant variation across the treatments as the level of GBR flour was increased in pancake. This might be due to the specific textural properties of GBR. Brown rice after germination considerably influences the volume and texture of bread, porridge, cookies and other products. The taste of pancake was significantly influenced due to the addition of GBR in product. The treatment IDM3 has got a maximum rating (8.4) for taste. It might be due to the fact that GBR is soaked and germinated which gives a unique light taste as compared to raw brown rice, GBR upon addition in pancake gives a different taste. The sensory evaluation of different formulations of pancakes was displayed in figure.1.



**Figure.1 Sensory evaluation of different formulations of pancake**

These results are in good agreement with the findings of Mounika *et al.* (2017) who revealed that organoleptically acceptable nankhatai can be prepared by supplementing with 30% GBR in food products as an ingredient. Also, GBR would be acceptable by consumers and the food industry as a promising foodstuff that contains more nutritional and bio-functional components than ordinary rice products, as well as for improving sensory properties (Patil and Khan, 2011). The results of proximate analysis are depicted in Table.2.

**Table.2. Proximate composition of instant pancake mix fortified with GBR**

Treatments	Proximate composition (%)							
	Moisture	Crude fat	Crude protein	Crude fiber	Ash	Carbohydrate		
Control	8.3	4.03	13.14	0.97	3	70.23		
IDM1	7.99	3.95	13.21	1.03	3	70.11		
IDM2	7.94	3.89	13.26	1.06	3	70.09		
IDM3	7.90	3.78	13.30	1.09	3	69.99		
IDM4	7.85	3.71	13.35	1.12	4	69.95		

The moisture content of instant pancake mixes varied from 8.3 to 7.85 percent with a

highest value in IDM4 (7.85%) and highest in control sample. Results reported that fat content of pancake for control, IDM1, IDM2, IDM3, and IDM4 samples were found to be 4.03, 3.95, 3.89, 3.78 and 3.71 respectively. It can be concluded that addition of germinated brown rice into instant pancake mixes will decrease the fat content. The protein content of different instant pancake mix samples ranged between 13.14 % to 13.35%. The protein increased with increasing proportion of germinated brown rice as compared to control. It's due to brown rice as source of protein contribute on increasing protein content.

## CONCLUSION

It can be concluded that germinated brown rice flour can be successfully incorporated in the formulation of instant pancake mix for improved nutritional quality with acceptable sensory attributes. The pancake prepared from instant pancake mix with addition of 30 per cent germinated brown rice (IDM3) was found to be ideal in terms of nutritive and sensory parameters as compared to other formulations. The IDM3 was found to have fat (3.78%), protein (13.30%), fiber (1.09%) and ash (3.94%). This could be a step towards new product development by germinating brown rice which helps to enhance the nutritional status of the population

## REFERENCES

- Amerine, M.A., Pangborn R.M. and Roessler E.B. 1965. Principles of sensory evaluation of foods. Academic Press, New York
- A.O.A.C. 2007. Official methods of analysis 18rd edition. Association of the Official Analytical Chemist, Washington, D. C
- Kihara, M., Y. Okada, T. Jimure and K. Ito. 2007. Accumulation and degradation of two functional constituents, GABA and -glucan, and their varieties differences germinated barley grains. Breeding Science
- Manna, K. M., Naing, K. M. and Pe, H. 1995. Amylase activity of some roots and sprouted cereals and beans. Food Nutrition Bulletin
- Patil, S. B. and Khan, M. K. 2011. Germinated brown rice as a value-added rice product: A review. Journal of food science and technology