



# DEVELOPMENT OF LOW GLYCEMIC INDEX BREAKFAST RECIPES AND ITS ACCEPTABILITY

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## Abstract:

Non communicable diseases (NCDs) are the most prominent health issue world wide. A high intake of carbohydrate and fat eventually results in developing NCDs and intake of high fiber with low glycemic index (GI) foods for help in preventing NCDs. The objective of the present study is to develop high fiber, low glycemic breakfast recipes which is an alternative to less healthy breakfast. Two test breakfast recipes (TRB) of high fiber, low glycemic index were formulated with different composition and the most acceptable proportion was selected. Whole grains and pulses (through rich in carbohydrates) have low glycemic index. So ready to mix dosa/ idli mix powders were developed. Whole grains like red rice and millets like foxtail, pearl millet, kodo millet, little millet, and horse gram, whole black gram was used to prepare (RTM) ready to mix powder. It can be concluded that the first RTMp1 test breakfast recipe overall acceptability 4.2 score for 5 point hedonic scale. And second RTMp2 test breakfast recipe overall acceptability for 4.6 score. The millet food RTMp1 and RTMp2 recipe had higher content protein and fiber compared to RTMpo recipe.

Keywords: NCDs- Non Communicable Diseases, LGI- Low Glycemic Index, TBR- Test Breakfast Recipes, RTM- Ready To Mix powder.

## INTRODUCTION

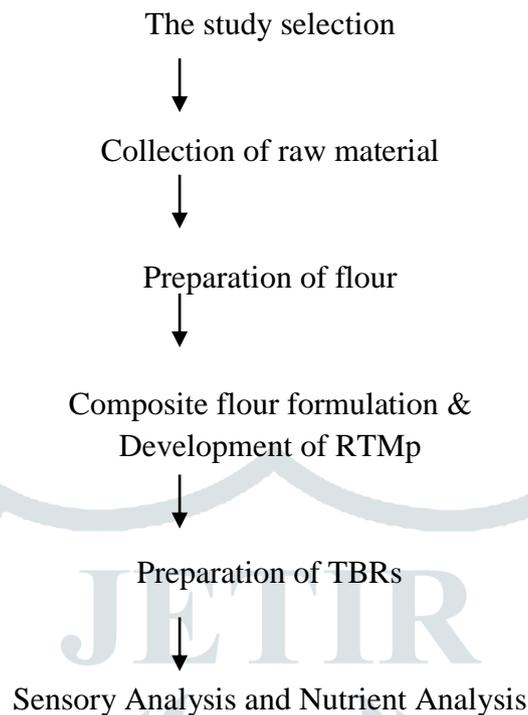
Millets are a group of small seeded species of cereal crops, widely grown around the world for food and fodder. The group includes millets such as little (*Panicum miliare*), foxtail (*Setaria italica*), kodo (*Paspalum scrobiculatum*), common (*Panicum miliaceum*), barnyard (*Echinochloa frumentacea*), pearl millet (*Pennisetum glaucum* (L.) and finger (*Elusine coracana*) millets. Little millet (*Panicum miliare*) is nutritious and has a significant role in providing nutraceutical components such as phenols, tannins and phytates along with macro and micro-nutrients. It is a fair source of protein (7.70 to 16.50 %), fat (2.45 to 9.04 %), carbohydrates (62.50 to 76.30 %), an excellent source of dietary fiber (15.90 to 18.10 %) with good amount of soluble (3.15 to 5.70 %) and insoluble fractions (10.20 to 14.95 %). Besides, it also contains appreciable amounts of minerals such as iron (9.30 to 20.00 mg/100 g), magnesium (133 mg/100 g) and zinc (3.70 mg/100 g) as revealed by several scientists in the field (Itagi 2003). Besides, it also exhibited hypoglycemic, hypolipidemic effects and faecal bulking effects (Itagi 2003).

Recently, millet has been found to be nutritionally superior compared to other traditional food grains due to the higher proportions of fibre, polyphenols and antioxidants [Saleh AS., ET AL., 2013]. This has drawn more attention to millet as a dietary option for helping manage diabetes by reducing blood glucose levels, which is of clinical importance for individuals with type-2 diabetes. Several studies have addressed the beneficial effects of millet on the risk markers for type-2 diabetes (Choi YY., 2005 and Naoyuki N., 2009).

Most of the pigmented traditional rice cultivars are being used in the Ayurvedic medical treatments such as diabetes and cancers. The red rice has potential health benefits due to its high dietary fiber content and antioxidant properties which could help reduce the GI, thereby reducing the risk of type II diabetes (Somaratne GM et al., 2017). Dietary fiber helps to delay the gastric emptying and absorption of carbohydrates and also by increasing satiety contributes to decrease the GI. Hence, the objective of this study is to investigate the effect of red pericarp traditional rice cultivars on the *in vivo* GI.

Glycemic index (GI) describes the blood glucose response after consumption of a carbohydrate containing test food relative to a carbohydrate containing reference food, typically glucose or white bread. GI was originally designed for people with diabetes as a guide to food selection, advice being given to select foods with a low GI. The amount of food consumed is a major determinant of postprandial hyperglycemia, and the concept of glycemic load (GL) takes account of the GI of a food and the amount eaten. Glycemic index measures how fast a given food raises your blood sugar level.

## METHOD



### The study selection:

Dosa & idli preparation involves special skill and its time consuming, since fermentation of about 15 to 18 hours has to be done and fermentation will be completed only in warmer climate where ambient temperatures are around 25°C or more. At high temperatures (40°C) there is too much of fermentation leading to too sour products, with poor acceptability. To overcome these problems, a ready mix had been developed earlier at this Institute, which contained chemical leavening additives for achieving appropriate taste and texture of finished products. To derive the nutritional advantages of fermentation and avoid/minimize the addition of leavening agents and other chemical additives, a new process has now been developed where in dehydrated ready mixes have been prepared from the fermented batters (both for dosa & idli) for their easy and quick preparation at home.

### Collection of raw material:

Red rice, whole black gram, Pearl millet, Kodo millet, Little millet, Horse gram, Rice bran and fenugreek seeds were purchased from the local market of Sivagangai.

## Composite flour formulation

**Table 1**

RTMp	Composite flour					
RTMpo	Red rice	Black gram	–	–	–	–
RTMp 1	Red rice 25 g	Whole Black gram 25 g	Pearl millet 25 g	Horse gram 25 g	Rice bran 5 g	fenugreek seeds 5 g
RTM p 2	Red rice 25 g	Whole Black gram 25 g	Kodo millet 25 g	Little millet 25 g	Rice bran 5 g	fenugreek seeds 5 g

Blending of millet grain with widely utilized cereals like rice, wheat and maize and some nutritious pulses is one possible way to enhance their widespread utilization may functional food products of wheat like cakes, pasta, macaroni, vermicelli, noodles and flakes are widely consumed in developed and developing countries, In General, the major ingredients of these products is refined wheat flour or semolina. Addition of millet flour in a certain ration will enhance the nutritional and functional properties and change the physic chemical properties of these products. (singh et al, 2005).

Blending of millet flour (10-30%) is reported to increase the percentage of protein, fat and reduced the percentage of total carbohydrates (singh et al, 2012).

### Development of RTMp:

Dosa mix and Idli mix

Ingredients → Soaking → Grinding → Blending → Fermentation → Mixing → Drying →

Regrinding → Packing

### Preparation of TBRs:

RTMp mix with water ferment for 15 minutes and next preparation for idli and dosa for cook pot.

### Sensory Analysis:

The evaluation was carried out for different parameters like colour, appearance, texture, flavor, taste and over all acceptability. The appropriate analysis was carried out to determine the significance of variations of average score and the contribution of individual parameter. Sample were served to the panelists and they were asked to rate the acceptability of the product on 5 point scale, ranging from the excellent (5) to as described by adeye et al., (2011).

## RESULT AND DISCUSSIONS

**Sensory Analysis Table 2**

Samples	Colour	Texture	Flavour	Taste	Over all acceptability
RTMpo	3.2	3.6	3.4	3.3	3.9
RTMp1	4.5	4.1	4.2	4.2	4.2
RTMp2	4.2	4.4	4.2	4.6	4.6

The mean acceptability scores for quality attribute evaluated (over all acceptability) of cereal, millet and pulses based RTMp1 and RTMp2 mix developed TBRs were revealed that idli and dosa were more over all acceptability than RTMpo.

**Nutrient value for RTMp Table 3**

Samples/ Nutrient	CHO (g)	PROTEIN (g)	FAT (g)	DIETARY FIBER
RTMpo	46.65	8.6	0.65	0.94
RTMp1	61.54	17	2.09	4.76
RTMp2	63.04	12.75	2.44	5.94

Milletts are very high in their nutrition content milletts are rich in B-Vitamins, Calcium, Iron, Potassium, Magnesium, Zinc, also gluten – Free and has low –GI (Glycemi Index). Thus milletts are suitable for people allergies/intolerance of wheat. Also for diabetic, weight loss milletts are excellent.

The Main purpose is to enhance the visibility and total acceptance of millet based products in the rural and urban populations. (CFTRI., 2017). <https://cftri.res.in/milletts/>

Millet is a functional grain known for its significant health benefits, attributed in large part to its high content of polyphenols and antioxidants. RTMpo is only cereal and pulses based so dietary fiber and macro nutrient value is fewer amounts. But cereal, millet pulses and seed and bran based RTMp1 and RTMp2 are greater than nutrient value for macronutrient and dietary fiber.

## CONCLUSION

Nutritionally millet is a superior grain with good amounts of macronutrients and dietary fiber. This study showed that red rice contained the highest content of carbohydrate and low GI while millet had the highest in protein and fat content. The Present study was found that the millet based food recipe were acceptable rice (RTMPO) Food Products. Millet based recipes (RTMp1 and RTMp2) was more acceptable

and rated highest score for over all acceptability as compared to rice and whole black gram RTMpo Recipe. All the millet food recipes had higher content protein and fibre compared to rice and whole black gram RTMpo recipe.

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