

READY TO HEAT & EAT FOODS

These foods belong to the category of foods called Convenience foods.

Convenience foods are typically commercially prepared foods designed for ease of consumption. Products designated as convenience food are often prepared food stuffs that can be sold as hot, ready-to-eat dishes; as room-temperature, shelf-stable products; or as refrigerated or frozen food products that require minimal preparation (typically just heating). Convenience foods have also been described as foods that have been created to "make them more appealing to the consumer. Convenience foods and fast foods are similar, because the development of both occurred to save time in the preparation of food. Both typically cost more compared to the price of preparing the same foods from scratch.

A peep into the history of convenience foods

The Aztec people of Central Mexico utilized several convenience foods that required only adding water for preparation, which were used by travelers Cornmeal that was ground and dried, was used by travellers as a convenience food in this manner

A significant increased necessity for canned food occurred during World War I, and the proliferation of World War II contributed to the development of frozen foods and the frozen food industry.

Modern convenience food saw its beginnings in the United States during the period that began after World War II. Many of these products had their origins in military-developed foods designed for storage longevity and ease of preparation in the battle field. Following the war, several commercial food companies had leftover manufacturing facilities, and some of these companies created new freeze-dried and canned foods for home use

Types of Convenience foods:

Convenience foods can include products such as candy; beverages such as soft drinks, juices and milk; fast food; nuts, fruits and vegetables in fresh or preserved states; processed meats and cheeses; and canned products such as soups and pasta dishes. Additional convenience foods include frozen pizza, chips such as potato chips, pretzels and cookies.

These products are often sold in portion controlled, single serve packaging designed for portability.

Convenience food is often confused with Fast Food which is a term used for a limited menu of foods lending to production-line techniques. Consumers buy them and eat on the spot or at their workplace as they are in a hurry-and are on the move.

Why are these foods so popular?

The changing food habits, higher incomes, increasing number of working couples, lack of time for cooking at home, and the increasing number of

senior citizens without family help, have increased the demand for convenience foods.

It saves time, back-breaking effort and fuel. The foods are tasty and generally wholesome and the range of foods available in the market fulfills the family's needs instantly. They are also useful during emergencies, The traditional Indian society believed in cooking family meals daily and serving it fresh and hot. However, with both husband and wife working in offices, it is becoming a compelling need to switch over to ready-to-eat foods to save time and energy.

- Instant foods can be stored for a long period of time, much longer than fresh food.
Takes little time to prepare.
- Requires no knowledge of cooking.
- Avoids the risk of over cooking and under cooking.
- Available almost everywhere in the world.
- Growing number of nuclear families
- Significant rise in number of single working men and women professionals
- Improved economy
- Increased urbanization
- Rapid growth in organized retail with cold chain facilities for storage of RTE foods and frozen foods
- Found to be very convenient consuming less time in the kitchen
- Global shift to outsourcing of such foods from India

With a modest beginning in 1990s, the RTE food industry has grown to share a large portion of the food processing industry. Packaging plays a big role in preserving RTE foods, increasing shelf life and retaining freshness and taste. Attractive packaging also brings in impulsive buyers

Convenience foods are generally traditional foods prepared and packaged by a manufacturer that need little or no further cooking before being consumed. They can be used at any time, quickly and easily with or without heating. They can be stored and conveniently opened as the need arises. It is, however, better to consume the entire content in one go once the packet is opened. Refrigeration is possible but the food gets spoiled fast and loses the taste and flavour.

The consumer can choose the right product from the list of ingredients used and the nutritional information provided on the label.

Instant or convenience foods may be broadly classified into the following:

1. Ready to eat (RTE) products:

- **Heat and Eat products:** These products are currently referred to the recipes presented in retortable pouch packs with heat and eat concept.

These products are packed sterile in flexible packages to achieve long shelf life. However, some compromise has to be made with loss of attributes such as colour, flavor and nutrients due to processing at elevated temperatures of about 121 °C and storage period of about 1 to 2 years. These products include vegetable curries, rice preparations, full meals, or breakfast meals.

- **Ready to Eat products:** These are ultimate food products which may be consumed without further processing; e.g., Indian traditional snacks which may be Sugar or Cereal based sweets or snacks such as bhujia, pakoda etc. RTE extruded snacks are also included in this category.

2. **Ready to Use (Ready to cook, Ready to fry, Ready to reconstitute foods):** Water is added to the Ready to cook products and cooked before consumption. e.g., Macaroni, Spaghetti, Vermicelli, Noodles, Suji-halwa mix, Ready upma mix, Instant curried dal mix, Ready kichdi mix, Ready vegetable pulav mix, Ready idli mix.
Ready to fry products: Water is added to these products and fried in vegetable oil. Sometimes followed by immersing in sugar syrup; e.g., Instant Jamun mix, Instant Rasagolla mix.

Products available in the market:

I. **Instant foods for breakfast:** kesari bath, upma, vada, pav-bhaji (frozen), idly, dosa etc.

II. **Instant foods for lunch/dinner:** Today, almost any South Indian or North Indian staple dishes are available in the Heat and Eat category. e.g., vegetable curries such as Palak Paneer, Aloo Mutter, Navaratan Kurma, Bhindi Masala, Mixed Vegetable masala, Rajma/Cholay Curry etc.

III. **Preserved Chapathis and Parottas**

IV. **Dals such as Dal Makhani, Dal Fry**

V. **Rice preparations** such as Plain Rice, Curd Rice, Vegetable Pulav, Kichadi, Bisi- bele- bath (combination of Rice and Pulse).

VI. **Desserts** such as Moong ki Halwa, Carrot Halva, Payasams

VII. **Animal products** such as Fish fry, Fish Curry, Chicken Curry, Mutton Curry, Shrimp Pulav, Mutton Pulav etc.

Therefore, virtually, any staple food catering to the tastes of any region in the country, comprising of the major food groups as the ingredients are available.

COMPARATIVE TESTING

Comparative Testing is a formal process by which products & services of different vendors are tested for Quality; the services are tested for compliance to the regulations laid out by the regulatory authorities for services. CONCERT is undertaking to do this Comparative Testing for South India under a grant from Department of Consumer Affairs, Government of India. Concert is testing 7 products and 3 services. One of the products chosen for testing is Heat and Eat type of Ready to Eat Food.

This study further helps the consumer to understand if the convenience food compromise on the nutrition and if they contain harmful additives.

HEAT AND EAT TYPE READY TO EAT FOOD

These Ready to eat foods available are the ultimate instant foods which can be consumed straight from the packet or consumed hot by reheating in boiling water or heating in micro wave oven.

In-package thermal sterilization or simple heat processing is the basic principle involved in preparing these foods wherein the food in the form of assembly of uncooked ingredients or semi-cooked preparation is packed and sealed and processed at elevated temperature of about 121°C to get fully cooked, microbe-free shelf-stable products. Flexible pouches and trays are the low cost light weight packaging materials made of PET/Aluminium foil/PP or PE/paper board/PE/ Al foil/PE (tetrapak) or

Products chosen for Testing

We have chosen different brands and types of **Heat and Eat type of Ready to Eat Food** (Instant Food) for our comparative testing.

The following brands in six categories of foods (vegetarian and non-vegetarian) were purchased by us from different markets in Southern India for tests.

1. Dal Makhani (Black lentil simmered with butter, a signature delicacy from Punjab)/Dal Bukhara (Whole black lentil in a tomato gravy simmered over a slow coal fire for hours)

- a) Priya
- b) Aashirwad
- c) MTR
- d) Kitchens of India
- e) Soul

2. Mutter Paneer (A Famous Punjabi dish made with green peas and home made cheese)

- a) Priya
- b) Aashirwad
- c) MTR
- d) Gits

3. Pongal (Authentic South Indian breakfast food with rice and moong dal together and subtly spiced with pepper creating a unique taste)

- a) Priya
- b) Aashirwad
- c) MTR

4. Palak Paneer (A popular Indian dish, made with combination of cottage cheese, farm fresh green spinach & selected spices)

- a) Priya
- b) Aashirwad
- c) MTR
- d) Gits
- e) Soul
- f) Sundrop

5. Wheat Milk Dessert and Wheat Payasam

- a) Saras Sterilized Wheat Milk Dessert
- b) Double Horse Wheat Payasam

6. Non-Vegetarian

- a) Murgh Methi (Tender chunks of chicken seasoned and simmered in a gravy of green coriander and fenugreek) – Kitchens of India
- b) Chicken Darbari (Chunks of tender chicken in a butter laced tomato gravy) – Kitchens of India
- c) Chicken Chettinad (Chunks of chicken in a paste of curry leaves and ground pepper) – Kitchens of India

CRITERIA CHOSEN FOR TESTING

At present, standards for RTE foods of Heat and Eat type have not been prescribed by BIS or FSSAI.

Quality and safety of food products is regulated by Food Safety and Standards Authority of India (FS & SAI), Govt. of India. Since standards for Instant foods are not laid down by FS & SAI, such foods are considered as Proprietary foods. However, safety standards such as appropriate microbiological parameters such as Total plate count, coliform, E.Coli and other harmful bacteria are considered.

Also, the labeling aspects for pre-packaged foods as per FS & SAI regulations are taken into account.

Methods suggested by ASSOCIATION OF OFFICIAL ANALYTICAL CHEMISTS (AOAC) and other international procedures were adopted for testing the products for various chemical and micro biological characteristics.

(1) Packaging and Labeling

There are 12 parameters under this criterion

- Name of the product
- List of ingredients in decreasing order of the proportion by weight
- Names/INS No. of additives
- Nutritional label for macro nutrients such as protein, fat, carbohydrates, energy value per 100 grams as per BIS/Codex/AOAC methods
- Batch No
- Date of manufacture
- Best before Date or Expiry date
- Instructions for storage and preparation
- Address of Manufacturer
- Telephone No in case of consumer complaints, if any
- Any other label
- MRP

Only in the case of ADF SOUL products, "Instructions for storage and preparation" is not given on the label.

(2) Quality

i. Nutrition

- **Fat Content in g/100 g (AOAC Chapter 32, 18th Edition)**
- **Protein Content in g/100 g (AOAC Chapter 32, 18th Edition)**
- **Carbohydrates g/100 g (Pearson's Composition and Analysis of Food 9th Edition)**
- **Calories in kcal/100g (Pearson's Composition and Analysis of Food 9th Edition)**
- **Nutritional Claims verification, if any.**

Claims such as presence of Iron and Calcium in some products wherever such claim is made, is verified by the laboratory tests.

ii. Chemical Characteristics (Verification by tests):

- **Moisture in % (AOAC Chapter 32, 18th Edition)**

Moisture is measured in % and when it exceeds the prescribed limits results in lumping and caking of food leading to bacteria growth and spoilage of food.

- **Ash in g/100g (AOAC Chapter 32, 18th Edition)**

This is measure of presence of unwanted gritty matter.

- **Acid insoluble Ash in g/100g (AOAC Chapter 43, 18th Edition)**

This indicates the amount of such matter that is not digestible present in food.

- **Sugar in g/100g (AOAC Chapter AOAC Chapter 32, 18th Edition)**

Too much sugar adds avoidable calories and too little can deprive from the required energy.

- **Acid Value of Extracted Fat in g/100g (AOAC Chapter 41, 18th Edition)**

This is a measure to determining the deterioration of fat content in food leading to rancidity affecting essential nutrients and making the food unfit for consumption.

- **Uric Acid in mg/kg (Japan Society of Analytical Chemistry Dec 2008 Vol 4)**

This is a measure of insect infestation or the purity of the product.

- **Preservative in mg/kg (Journal of Chromatography A 2004 1032)**

Preservatives in foods are added to preserve the food and increase its shelf life. These are chemicals and should be restricted to permissible levels.

(3) Health and Safety

i. The Microbiological Characteristics were verified by test

- Total Plate Count should not be more than **(NMT)** 50 CFU/g. We have considered this as the maximum limit permissible.
- Coliform count – should be absent
- Salmonella, Shigella, and E-coli should be absent.

Test procedures used are as per Federal Drug Administration (FDA) – Bacteriological Analytical Manuals (BAM) 2001, 8th Edition)

ii. Incubation (Sterility) Test

Incubation at **37° C for 10 days** and **55° C for 7 days** – no bloating of the pack should be observed.

Test Procedure adopted is as given in Compendium of Methods for the Microbiological Examination of Foods, 4th Edition, 2001.

The packs of the following foods were bloated after the incubation test

MTR Pongal

ADF Soul Palak Paneer, and

Saras Sterilize Wheat milk Desert.

A greater variation in the pH value after incubation for 7 days (**55°C**) and 10 days (**37°C**) is also observed in these cases. We have considered a range of 6.5 to 7.5 as acceptable values for pH. Appreciable change in Ph of the contents before and after incubation means that acid producing bacteria are present in the food rendering it hazardous to health.

(4) Appearance and Flavour

The laboratory observations are recorded but not considered for scoring and rating.

(5) MRP

The price of each product tested is also given in the tables for information to consumer.

Scoring and Rating

We have chosen three Major Criteria against which the Heat and Eat type of Ready to Eat Foods (Instant Food) are scored and rated.

They are (1) **Packaging and Labeling** 2) **Quality (Nutritional Label Claims Results and Chemical Characteristics Results)**, and (3) **Safety and Health (Microbiological Results)**. Every test parameter will be evaluated/ tested, and scored. These are added to give the scoring to the Major criterion. Each criterion and parameter is rated individually on a 5-point scale. The rating given is **1 (Poor), 2 (Fair), 3 (Good), 4 (Very Good), and 5 (Excellent)**

For any parameter, when the test result fails to meet the defined standards, it will be given a scoring of **Poor** or **Fair** based on the extent of deviation, when it meets the defined standards will be given the scoring of **Good**.

When it exceeds the minimum standards substantially, it will be rated **Very Good**. When it exceeds the standards significantly and shows appreciable innovation, it will be rated **Excellent**.

We present the results against these major criteria that in our opinion is fair and without any subjective element. The user is encouraged to study these results and make their buying decisions based on their requirements and judgment.

We have given weightages for the three major criteria considered as follows in our scoring:

(1) Packaging and Labelling **20%**

(2) Quality

- **Nutritional label Claims Verification Results** **30%**
- **Chemical Characteristics Verification Results** **20%**

(3) Health and safety

Microbiological Characteristics Verification Results **30%**

The results are tabulated below.

Pongal	Priya	Aashirvaad	MTR
Packaging & Labeling	Good	Good	Good
Nutritional Label – Results (Quality)	Good	V. Good	Good
Chemical Characteristics – Results (Quality)	Good	Good	V. Good
Microbiological Characteristics – Results (Health and Safety)	Good	Good	Poor
MRP (Price in Rs)	42(300g)	45(285g)	36(300g)

Appearance	Pale Yellow	Dull White	Light Yellow		
Flavour	Agreeable	Agreeable	Pleasant		
Total score by different weightages (%)	81.19	93.69	70.60		
Dal Makhani	Priya	MTR	Aashirvaad	Kitchens of India (Dal Bukhara)	ADF Soul
Packaging & Labeling	Good	Good	Good	Good	Good
Nutritional Label – Results (Quality)	V. Good	V. Good	Good	Fair	Fair
Chemical Characteristics – Results (Quality)	V. Good	Good	Good	Fair	Fair
Microbiological Characteristics – Results (Health and Safety)	Good	Good	Good	Good	Good
MRP (Price in Rs)	50(300g)	55(285g)	60(300g)	95(285g)	49(300g)
Appearance	Brownish Orange	Light Brown	Brown	Light Brown	Brown
Flavour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Total score by different weightages (%)	96.55	96.19	81.19	71.79	77.74

Mutter Paneer	Priya	Aashirvaad	MTR	Gits
Packaging & Labeling	Good	Good	Good	Good
Nutritional Label – Results (Quality)	V. Good	Fair	Good	Fair
Chemical Characteristics – Results (Quality)	Good	Good	Fair	Good
Microbiological Characteristics – Results (Health and Safety)	Good	Good	Good	Good
MRP (Price in Rs)	57(300g)	60(285g)	60(300g)	70(285g)
Appearance	Yellow	Brown	Reddish Orange	Brown
Flavour	Pleasant	Agreeable	Agreeable	Agreeable
Total score by different weightages (%)	93.69	80.24	85.83	81.19

Palak Paneer	Priya	Aashirvaad	MTR	Gits	ADF Soul	Sundrop
Packaging & Labeling	Good	Good	Good	Good	Good	Good
Nutritional Label – Results (Quality)	Good	V. Good	Fair	V. Good	Fair	Good
Chemical Characteristics – Results (Quality)	Good	Good	Fair	V. Good	Fair	Good
Microbiological Characteristics – Results (Health and Safety)	Good	Good	Good	Good	Poor	Good
MRP (Price in Rs)	70(300g)	60(285g)	60(300g)	79(285g)	55(300g)	45(250g)
Appearance	Green	Green	Green	Green	Green	Dull White
Flavour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Total score by different weightages (%)	83.69	91.19	75.83	89.64	60.83	78.69

Wheat Milk Dessert & Payasam	Saras Sterilize Wheat milk Desert	Double Horse wheat Payasam
Packaging & Labeling	Good	Good
Nutritional Label – Results (Quality)	Good	V. Good
Chemical Characteristics – Results (Quality)	Good	V. Good
Microbiological Characteristics – Results (Health and Safety)	Poor	V. Good
MRP (Price in Rs) (400g)	65	62
Appearance	Pinkish White	Light brown
Flavour	Pleasant	Pleasant
Total score by different weightages (%)	71.19	99.05

Non – Vegetarian	Kitchens of India - Murgh Methi	Kitchens of India - Chicken Darbari	Kitchens of India - Chicken Chettinad
Packaging & Labeling	Good	Good	Good
Nutritional Label – Results (Quality)	V. Good	Good	Fair
Chemical Characteristics – Results (Quality)	V. Good	Good	Fair
Microbiological Characteristics — Results (Health and Safety)	Good	Good	Good
MRP (Price in Rs) (285g)	130	130	130
Appearance	Brown	Reddish Brown	Green
Flavour	Agreeable	Agreeable	Agreeable
Total score by different weightages (%)	89.64	86.19	72.38

Observations and Comments

Dal Makhani:

	Black gram dhal/Urad dhal	Protein	Gram / Price
Priya	15.0%	9.0%.	300g / Rs 50
Aashirvad	13.3%	5.0%	285g / Rs 60
MTR	19.0%	8.0%	300g / Rs 55
Kitchens of India	16.5%	5.0%	285g / Rs 95
ADF Soul	12.%	4.3%	300g / Rs 49

Comments

- **ADF Soul** brand did not have information on Instructions for storage/preparation/caution.

- **Priya Dal Makhani** had the additional label for % Daily values for Calcium and iron at 10% and 15% of RDI values respectively; however, **RDI** values of the nutrients or information whether the **RDI** values are based on **Codex/US-FDA** or **Codex** is not mentioned on the label.

Mutter Paneer:

	Green peas	Cottage Cheese / Paneer	Protein	Gram / Price
Priya	18.0%	15.0%	7.0%	300g / Rs 57
Aashirvad	17.3%	10.5%	3.9%	285g / Rs 60
MTR	23.0%	17.0%	12.0%	300g / Rs 60
Gits	16.0%	12.0%	5.0%	285g / Rs 70

Comments:

Aashirvad Ready Meals mutter has the Protein content of 3.9% only; however, the cost is relatively high.

Gits ready meals Mutter Paneer also has less Protein at 5% and price is even higher at Rs. 70/- for 285g.

Pongal:

	Rice content	Green gram dhal/ Moong dhal	Protein	Gram / Price
Priya	8.0%	4 .0%	2.0%	300g / Rs 42
Aashirvad	7.4%	7.4%	2.5%	285g / Rs 45
MTR	7.0%	Not Declared	2.0%	300g / Rs 36

Comments:

- MTR Pongal packet was observed to have bloated after incubation at 55° C for 7 days indicating presence of gas formers.

Palak Paneer:

	Spinach leaves	Paneer	Protein	Gram / Price
Priya	29.0%	13.0%	3.0%	300g / Rs 70
Aashirvad	72.0%	10.4%	6.9%	285g / Rs 60
MTR	32.0%	13.0%	4.0%	300g / Rs 60
Gits	46.0%	16.0%	4.5%	285g / Rs 79
ADF Soul	35.0%	18.0%	5.2%	300g / Rs 55
Sundrop	Not Mentioned	Not Mentioned	3.0%	250g / Rs 45

Comments:

- The claims made on labels of MTR Ready to Eat Palak Paneer and GITS Ready Meals Palak Paneer for the presence of Vitamin A (1848µg and 2644µg respectively) are much higher than the actual contents present in them. As such these claims are wrong.
- ADF Soul Palak Paneer packet was observed to have bloated after incubation at 55° C for 7 days indicating presence of gas formers.

Additional Comments on Priya Products:

All the four products of Priya brand chosen for tests namely (1) Dal Makhani, (2) Mutter Paneer, (3) Pongal, and (4) Palak panner display two tables on their labels on Nutritional Facts and Nutritional Information.

1. The Nutrition Information Table given on the reverse side of the packet gives nutrients present in kjoules per 100gm of the cooked product.
2. Whereas the other table speaks about Nutrition Facts. The nutrition facts are given as % Daily value based on a 2000 calorie diet. This may be interesting to read but is not user/consumer friendly as the energy values given here are in calories and are not comparable with values in kjoules given in the Nutrition Information Table. It is confusing and does not serve to assist the consumer to make an informed choice.

Wheat Milk Dessert & Payasam:

	Fat	Sugar	Protein	Gram / Price
Saras Sterilize Wheat Milk Dessert	3.0%	30.0%	4.0%	400g / Rs 65
Double Horse Payasam	5.3%	30.0%	4.0%	400g / Rs 62

Comments:

- Saras Sterilize Wheat Milk Dessert, FSSAI License Number is declared on the label.
- Saras Sterilize Wheat Milk Dessert packet was observed to have bloated after incubation at 55° C for 7 days indicating presence of gas formers.

Non- Vegetarian:

	Boneless chicken	Protein	Fat	Gram / Price
Kitchens of India Murgh Methi	39.5%	13.7%	15.2%	285g / Rs 130
Kitchens of India Chicken Darbari	25.6%	11.9%	Not Declared	285g / Rs 130
Kitchens of India Chicken Chettinad	37.9%	10.9%	11.6%	285g / Rs 130

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