
INGREDIENTS AND EQUIPMENTS

1.1 INTRODUCTION

Baking is no different from any other area of cooking, and as in other sectors only the best and the freshest raw material can guarantee good results. So selection of right kind of ingredients is of utmost importance.

Another basic need of a professional baker and confectioner is to purchase the equipment required. The design and size depends upon the volume of sale expected. So in this chapter we are going to learn about the ingredients and equipment required for running a bakery.

1.2 OBJECTIVES

After reading this lesson, you will able to :

- list the ingredients used in bakery;
- select the right quality;
- classify ingredients into perishables, semi-perishables and non-perishables;
- list the various equipments used in bakery;
- suggest suitable methods of storage for different types of ingredients used in bakery;
- select the equipment on the basis of capacity and power;
- maintain the equipment for proper functioning and longer life;
- list suppliers for the equipment.

1.3 WHAT DO YOU BAKE WITH?

You all know that a lot of things like fat, eggs, flour and sugar are used to prepare cakes and biscuits. But what are the other things apart from these? Let us now make a comprehensive list of ingredients commonly used in a bakery.

1. Flour
 - a) Wholemeal or whole wheat flour
 - b) Brown flour
 - c) White flour
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- d) Self raising flour
 - e) Strong flour
 - f) Soft flour
 - 2. Yeast
 - a) Fresh
 - b) Dry
 - 3. Chemical Raising Agents
 - a) Baking powder
 - b) Ammonium bicarbonate
 - c) Baking Soda
 - 4. Salt
 - 5. Comflour
 - 6. Milk
 - a) Liquid milk
 - } full fat
 - } low fat
 - } skimmed
 - b) Milk powder
 - c) Condensed milk
 - 7. Cream
 - 8. Shortening agents
 - a) Butter
 - b) Margarine
 - c) Hydrogenated fat/Vanaspati
 - d) Refined oil
 - 9. Egg
 - 10. Sugar
 - 11. a) Grain Sugar f) Treacle
 - b) Castor Sugar g) Liquid Glucose
 - c) Icing Sugar h) Milk Sugar
 - d) Brown Sugar i) Malt Sugar
 - e) Gold Syrup j) Honey
 - 12. Coco and Covering chocolate
 - 13. Coconut
 - 14. Coffee
 - 15. Nuts
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- a) Almonds
 - b) Cashewnuts
 - c) Walnuts
 - d) Peanuts
 - e) Pistachio nuts
16. meat and poultry products
17. Fresh fruits and vegetables
18. Candied fruits
- a) Lemon and Orange Peel
 - b) Tully Fruity
19. Tinned/Canned fruits
- a) Cherries
 - b) Pineapple
 - c) Peaches
 - d) Mango
 - e) Banana
 - f) Fruit Cocktail (mixed)
20. Spices and Aromatics
- a) Charmagaz
 - b) Cardamom - big and small
 - c) Cummin Seed
 - d) Poppy Seeds
 - e) Nutmeg
 - f) Mace
 - g) Corriander Seeds
 - h) Black pepper
 - i) Red chilli powder
 - j) Cloves
 - k) Cinnamom
 - l) Onion seeds
 - m) Sesame seeds
 - n) Mixed spices
 - o) Aniseed
 - p) Ginger
 - q) Garlic
 - r) Saffron
21. Alcohol
- a) Wines
 - b) Rum
 - c) Brandy - Cognac
 - d) Liqueur
22. Food Colours
23. Essences
- a) Vanilla
 - b) Strawberry
 - c) Orange
 - d) Pineapple
 - e) Lemon

1.4 SELECTION, STORAGE AND USE

The above ingredients can be classified into three categories depending upon their keeping quality, shelf life and the storage temperatures required.

- a) **Non-perishable** - Items that can be stored for more than a
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month at room temperature, e.g. flour, sugar, salt, spices, cocoa and coffee powders, colours and essences, canned products. They just require proper circulation of air in the storage area and protection from rodents and pests.

- b) **Perishable** - Items that can be stored for a couple of days at the most, at proper temperature, e.g. milk, cream, fresh fruits and vegetables, poultry and meat products.
- c) **Semi-perishable** - are those items which do not come under any of the first two categories, i.e. they require proper storage temperature. But the period of storage is more than that for perishables, e.g. butter and other fats, chocolates, tins/cans after opening, eggs. etc.

Let us learn something more about the ingredients above.

1. FLOUR

Flour is the most important ingredient without which production in a bakery or confectionery unit would be impossible. It is obtained by milling wheat. A wide variety of flour is available in the shops. Choosing the right one for the type of baking you are doing will ensure the best possible results. Here is a guide to help you choose.

To understand flour properly you must know something about wheat grain and its internal structure.

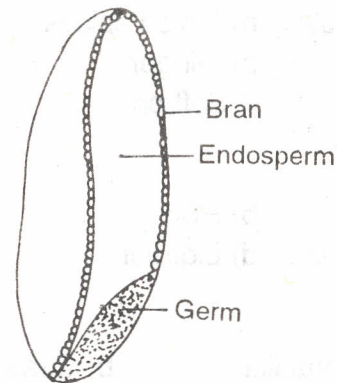


Fig. : A wheat grain revealed

During milling both bran and germ are removed. Bran has sharp edges which tend to cut the cell structure of loaf during proving, thereby affecting the volume of bread. Germ has more oil which affects the keeping quality of flour.

G. Orange Peel
 I. Yeas (fresh)
 K. Golden Syrup
 M. Corn flour
 O. Canned cherries
 Q. Rum

H. Fresh Vegetables
 J. Brown flour
 L. Butter
 N. Cashew nuts
 P. Cocoa powder

2. YEAST

Yeast is a unicellular micro-organism of plant origin. The biological name is *saccharomyces cerevisiae*. Under right conditions the yeast increases by division and it is this process which makes yeast useful for baking. It needs air, moisture, warmth and nourishment (in the form of sugar) to multiply and produce carbondioxide to raise the dough. Yeast is available both in the fresh as well as the dried form. Let us study how they are different from each other.

FRESH YEAST	DRIED YEAST
1. Available from bakers and speciality food stores	1. Available from food and provision stores.
2. Sold in ½ kg packs wrapped in butter paper.	2. Sold in small sachets.
3. It is pale beige in colour, firm but crumbly in texture and has a pleasant, fruity smell.	3. Available in granule form, colour is little darker than fresh yeast.
4. Should be stored in a refrigerator loosely wrapped in a cling firm, can be kept for a couple of weeks. But it can be frozen for several months.	4. Until the packet is sealed it can be stored in any well ventilated, cool cupboard for a few months. But after opening the packet this yeast should be used within a month.
5. Gives better products	5. Quantity used should be half as compared to fresh yeast as this is more concentrated.

3. CHEMICAL RAISING AGENTS

- a) **Baking Powder** - is a mixture of sodium bi-carbonate, cream of tatar (tartaric acid) and a separator, usually rice or potato or corn starch. Under the combined effect of air, moisture and warmth, carbon dioxide is produced from sodium bicarbonate which again causes fermentation. The separator prevents the two other ingredients from working prematurely by working as an insulator. The acid present neutralizes the left over soda so that no after taste is left in the product.
- b) **Ammonium bicarbonate** - This also gives off carbon dioxide on receiving moisture, air and warmth but along with that ammonia gas is also produced which is pungent in flavour and if left in the product, gives a off taste.
- c) **Baking Soda** — This is used frequently in commercial baking as it costs less. It contains sodium-bicarbonate which breaks into sodium carbonate, carbon dioxide and water. However residue of sodium carbonate leaves a bad taste and a dark colour which makes it not very suitable for most products except darker coloured chocolate cakes.

4. SALT

Chemical name of salt is sodium chloride. It contains 40% sodium and 60% chlorine. It is readily available in almost all parts of the world and is indispensable to cooking.

Used by the bakers, it confers flavour and also accentuates other flavours. It has a stabilizing effect on gluten and controls the speed of fermentation in yeast aerated goods. It also helps on retaining moisture.

5. CORNFLOUR

Chiefly produced from maize. It is white in colour and mainly contains starch which gelatinizes by mixing with water at a temperature above 170°F. Thus it is used as a thickening agent in custards and other confectionery items. It can also be used to dilute the strength of flour by mixing in suitable proportions.

6. MILK

It is a moistening agent and contains about 87% water. It is also an enriching agent depending on the amount used or whether it full fat, low fat or skimmed.

Dried milk powder is very popular in baking because it occupies less

space, keeps well if correctly stored, can be easily reconstituted or can be sieved with flour and used in dry form. Condensed milk is produced by evaporation of water under vacuum. It is generally sweetened.

7. CREAM

It is used in cakes, desserts and for decoration and makes the dish special. It is the skimmed milk fat and has a pleasant flavour. The creams vary in thickness and richness. The higher the butter-fat content the less likely cream is to fall after whipping.

Fresh milk and cream both need to be stored in the refrigerator and cannot be stored for more than a few days.

Different types of shortening agents

Butter	Margarine	Vanaspati Ghee	Refined oil
1. Made by churning milk fat.	1. It is a cheaper butter substitute made from hydrogenated oils.	1. Made by hydrogenating vegetable oils.	1. Consists of 100% fats with low melting point.
2. Contains about 85% fat and rest is water and milk protein.	2. Controls hydrogenated oils, ripened milk, colour and salt.	2. Contains mainly fats.	2. A liquid at room temperature it cannot be used for creaming.
3. Has a pleasant aroma and good for bakery due to this.	3. Has no aroma but rest of the physical characteristics similar to butter.	3. Has grainy texture and no aroma. Due to the grainy texture less suitable for baked goods.	3. Mainly used for frying and tin greasing.
4. Butter should be firm and it should not be stored at a temperature below 40°F.	4. Can be stored at room temperature.	4. Can be stored at room temperature.	4. Can be stored at room temperature.

9. EGGS

After flour, eggs are the second structure forming materials used by the baker. Both, egg white and yellow are of great importance. Egg white whisks easily and makes cakes and pudding lighter. During baking it solidifies to lock in the air. Egg yolk emulsifies well and is used as a glaze and also in ice-creams and cream desserts.

An average egg weighs around 45-50 g. A fresh egg sinks in water whereas a stale one floats. The yolk of the egg should be firm. Egg can be stored in the refrigerator for a week or two.

10. SUGAR

- a) **Grain Sugar** : This is the sugar we use normally at home. It contains 99% water soluble carbohydrates and 1% water.
- b) **Castor Sugar** : is a finer form of granulated sugar and is suitable for creaming in baking.
- c) **Icing Sugar** : It is a very finely powdered white sugar which is used for icing, glazes, dusting cakes after baking and for almond paste.
- d) **Brown Sugar** : These are the un-refined raw sugars, some having names that refer to country of origin, e.g. Barbados, Demerara, etc. All brown sugars confer colour and some flavour. These sugars are ideal for rich cakes.
- e) **Golden Syrup** : This amber coloured syrup is a by-product of sugar refining. It is used by the baker for ginger cakes and biscuits.
- f) **Honey** : It is a thick natural syrup obtained by bees from the nectar of flowers. It is used in fresh ginger breads, nuggets etc.
- g) **Treacle** : It is a syrup much darker in colour and with a more pronounced flavour than golden syrup. It is made by diluting and filtering molasses and then concentrating. Treacle can be used for ginger goods, dark heavily fruited cakes and christmas pudding. The treacle replaces some of the sugar in the mixture.
- h) **Liquid Glucose/Corn syrup** : It is made by boiling starch in water so that it is gelatinized. A weak acid is added to the gel to get sugar. It is used in cakes and biscuits and in sugar boiling.
- i) **Milk Sugar** : Milk sugar or lactose is obtained from fresh and skimmed milk. It is used to impart additional flavour and sweetness.
- j) **Malt Sugar** : Malt sugar or maltose is obtained from milk syrup and adds sweetness.

11. COCA AND CHOCOLATE

Both are obtained from cocoa beans. Cocoa powder is low fat and has no sugar whereas chocolate has some sugar, cocoa, butter and milk added in varying quantities. Both cocoa powder and chocolate are used considerably in confectionery products.

Cocoa powder can be stored in air tight containers in well ventilated places for months. Chocolate should be wrapped in polythene paper or aluminium foil and then refrigerated.

12. COFFEE

Coffee is an excellent flavouring for creams, fillings and icings.

13. NUTS AND DRIED FRUITS

These are of great importance in cakes, pastries and puddings. Walnut, pistachio nut, groundnut or peanut, cashewnuts, coconut and almonds, raisins, sultanas and currants are more frequently used.

14. MEAT AND POULTRY PRODUCTS

These are used as fillings for savoury items like patties, vol-au-vent, pizza, barquettes etc. They should always be fresh and of good quality. These need to be refrigerated, if stored for a couple of days.

15. FRESH FRUITS AND VEGETABLE

Fresh fruits and vegetables form an integral part of any bakery. They should be fresh when used.

16. CANDIED FRUIT

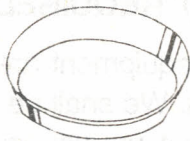
Orange and Lemon peel and tatty-fruity are used both in cakes and breads. They should always be washed, dried and chopped before using.

INTEXT QUESTIONS 1.2

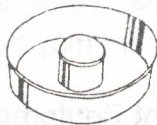
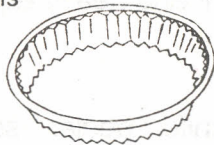
1. Tick mark (✓) the appropriate answers
 1. Fresh/Dry yeast gives better products.
 2. Baking powder/baking soda is more suitable for chocolate cakes.
 3. A fresh/stale egg floats on water.
 4. Castor/Brown sugar is unrefined raw sugar.
 5. Cocoa powder/chocolate is low in fat and sugar.
 2. Fill in the blanks.
 1. Dried milk powder is popular in bakery industry because it can be used in
 2. The colour of the yeast tells us whether it is fresh or
 3. Salt gives to the products.
 4. Cornflour is generally used as aagent in confectionery.
 5. Eggs form theof the baked products.
 6.is the finest form of sugar and is used forandcakes.
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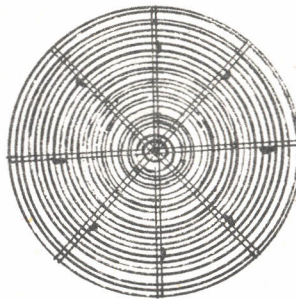
flan tins



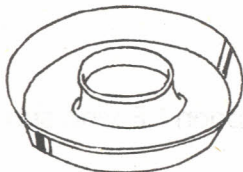
cake tin



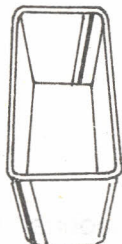
Savarin mould



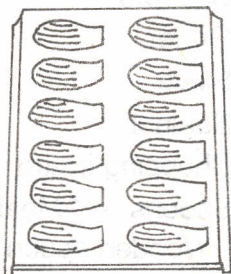
wire cooling tray



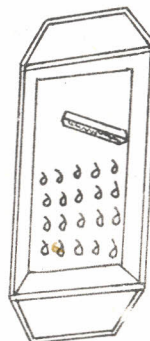
baba mould



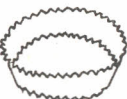
loaf tin



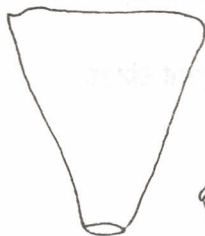
madeleines tray



graters



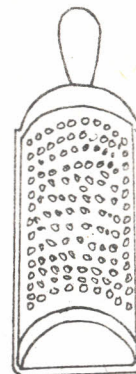
tartlet tins



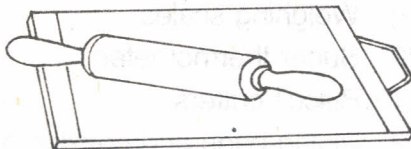
piping bag and nozzles



whisks



spatula



rolling pin and board



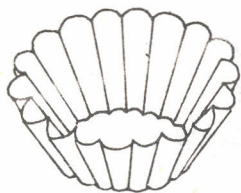
ice cream scoop



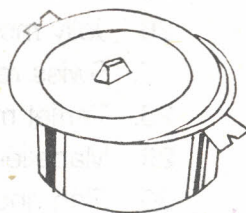
pastry wheel



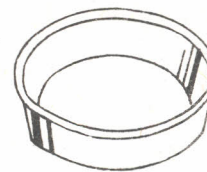
nutcrackers



brioche mould



charlotte mould



terrine

1.5 EQUIPMENT REQUIRED IN A BAKERY

Various types of equipment are needed and used to facilitate the process of baking. We shall be describing them later as we talk of their use. Here, let us just list them. Depending upon the use, equipment may be as light equipment and heavy equipment.

(i) Light Equipment

1. Knives - * peelliate knife * sharp knife * peeler * scraper/spatula
 2. Scissors
 3. Grater
 4. Sieve
 5. Strainer
 6. Chopping board
 7. Spoons — * Measuring spoons * Round spoon * Frying spoon
* Wooden spoon
 8. Rolling pin
 9. Whisks * Hand operated/balloon whisk * Electrical whisk
 10. Measuring jug/flask
 11. Enamel bowls of different sizes
 12. Degchi
 13. Saucepan
 14. Karahi
 15. Turntable
 16. Cake dummies
 17. Lemon squeezer
 18. Pastry brush
 19. Weighing scales
 20. Sugar thermometer
 21. Biscuit cutters
 22. Piping bags and nozzles of different shapes
 23. Cooling rack
 24. Steel thalis/trays
 25. Cake tins of various sizes and shapes
 26. Jelly mould
 27. Swiss roll tray
 28. Tartlet moulds
 29. Madeliene moulds
 30. Flan rings
 31. Bread moulds/tins
 32. Baking trays
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33. Muffin trays
34. Savarin moulds

(ii) **Heavy Equipment**

1. Oven
 - gas oven
 - coal oven/bhatti
 - electric oven
2. Proving chamber
3. Refrigerator
4. Dough mixer
5. Deep freezer
6. Work tables
7. Storage cabinet
8. Gas burners

1.6 SELECTION AND MAINTENANCE REQUIRED

1. Oven

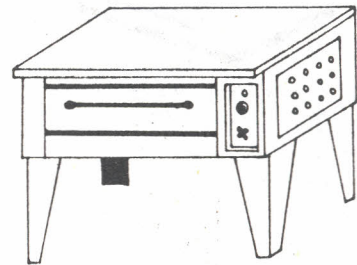
This may be heated by coal, gas, oil or electricity. The source of heat does not matter as far as the baking products are concerned. What matters is that heat should be equally distributed and the required temperature should be available for baking.

Depending upon the volume of baking, you can buy a single deck oven or a double or three deck oven. Oven can also have a proving chamber attached to it. Electric oven has a thermostat which makes temperature regulation easier and it should be possible to control top and bottom heating control top and bottom heating control from separate knobs. In other ovens exact temperature regulation is not possible so rely more on experience for checking of temperature.

Oven should be kept clean to prevent any spillage from becoming caked. Periodic checking by the electrician should be done. Ovens should be used 10-15 cm from ground to permit easy cleaning.

2. Proving chambers

These are cabinets with temperature and humidity control. These are used for keeping just fermented goods like bread, rolls, buns, etc., during the fermentation period so that ideal conditions can be provided for fermentation. They can be separate chambers or can be attached to the ovens. These are a must for good bakers. These



SINGLE DECK BAKING OVEN

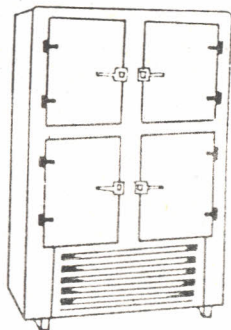
should be kept clean. Water should be removed and replaced after cleaning every few days.

3. Refrigerator

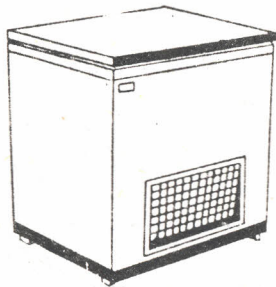
The capacity varies from 100 litres to 380 litres. The choice of a refrigerator, its overall size and the size of the frozen food storage compartment depends on the

- Size of the bakery
- Expected volume of sale
- Availability of other cold storage means.

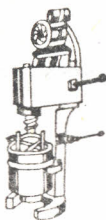
It is wise to choose a larger model as per the requirement because need keeps on increasing with time. A refrigerator should be defrosted weekly. Spills should be mopped up at once and the cabinet should be washed occasionally with soda bicarbonate or detergent and water.



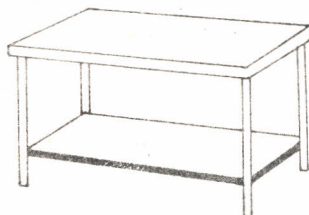
FOUR DOOR REFRIGERATOR



DEEP FREEZER/ICE CREAM CABINET/BOTTLE COOLER



Dough Mixer



WORK TABLE WITH BOTTOM SHELF

4. Deep Freezers

The capacity varies from 140 ltrs to 380 ltrs. It can be of three types:

- The chest type with top opening lid
- The upright type with front opening
- A combination type with both openings

Freezers should be defrosted at least once a month. Wash the insides with soda bicarbonate and water and dry before switching it on. Most freezers and refrigerators work for years unimpaired but the telephone number and address of the service agency should be kept handy.

5. Dough Mixer

It is generally made to order but available capacities vary from 25 kg. to 35 kg. Most commercial modules are heavy and should be fitted on sturdy rollers for easy movement. The stainless steel bowl and beater should be washed and cleaned after every use and the machine should be serviced regularly.

6. Work Tables

Steel preparation tables last for years. The table top could also be made from marble which is smooth, easy to keep clean and remains cool. There should be no unwanted cracks or joints and the design should be simple. Tables with open sides and without drawers are the best as dirt does not accumulate.

Work table should be maintained scrupulously clean as they can cause cross contamination. They should be scrubbed with plastic brush and detergent and washed and dried.

7. Storage Cabinets

These should be good sized food cupboards to store provisions and smaller equipments, some of them should have air-vents for proper ventilation.

These can be built-in types or made of metal-free standing style. But all cabinets should be kept clean and free from pests.

8. Grass Burners

One low pressure gas burner with a simple and easy to clean design is a must in a bakery. Preference should be given to stainless steel instead of enamelled metal.

Gas ranges should be periodically serviced to check on burners efficiency and they should be kept clean and free from obstruction.

INTEXT QUESTION 1.3

1. What is the difference between cocoa powder and chocolate?
 2. How would you check the freshness of an egg?
 3. Why is baking powder used more frequently as compared to baking soda and Ammonia bicarbonate?
 4. Tick mark (✓) the right answers.
 - a) The most important point to be considered while buying an oven is
 - i) The source of heat
 - ii) Distribution of heat in the cabinet
 - iii) The number of heating elements
 - b) Proving chamber is required for making
 - i) Cakes
 - ii) Biscuits
 - iii) Breads and buns
 - c) Work table tops in a bakery should be made of
 - i) Wood
 - ii) Plastic
 - iii) Marble
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- d) The gas burner required in a small bakery should be
- i) High pressure
 - ii) Low pressure
 - iii) Adequate

1.7 ANSWERS TO INTEXT QUESTIONS

- 1.1 1. (i) Bran, germ and endosperm
 (ii) Brown bread
 (iii) Liquid milk, milk powder, condensed milk
2. A—P G—NP M—SP
 B—P H—P N—SN
 C—SP I—P O—SP
 D—P J—SP P—NP
 E—SP N—NP Q—NP
- 1.2 1. 1. Fresh 2. Baking powder 3. Stale
 4. Brown 5. Cocoa powder
2. 1 dry 2. dried 3. flavour
 4. thickening 5. structure 6. Icing sugar,
 icing, dusting.
3. 1. Refer text
 2. By putting in a bowl of water — it is fresh if it sinks
 and stale if it floats.
 3. Refer text
 4. (a) (ii) (b) (iii) (c) (iii) (d) (ii)
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Appendix

List of suppliers for baking Equipment and Tools

1. **Continental Equipment**, E1/1, Jhandewalan Extension, New Delhi
 2. **Harijan Traders**, B-87, Radhey Shyam Park, Parwana Road, New Delhi-05
 3. **Hindustan Dough House**, 867/8, Joshi Road, Karol Bagh, New Delhi
 4. **Hotel Equipment**, 6548, Qutab Road, New Delhi
 5. **Mehta Bros**, 1482, S.P. Mukherjee Marg, Delhi-110 006
 6. **Moti Enterprises**, 60/42 Ramjas Road, Karol Bagh, New Delhi-05
 7. **National Steel**, Parel Industrial Area, Bombay
 8. **Paramount Industries**, Moti Ram Road, Shahdara, Delhi-32
 9. **Relief India**, 159, Kamla Market, Asaf Ali Road, New Delhi-2
 10. **Thakkan Equipment**, Okhla Industrial Estate, New Delhi
 11. **Vinsan**; Marketed by : **Anushree Kitchenware Pvt. Ltd.**, Delhi-110054
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