Theory of COOKERY

Parvinder S. Bali

Corporate Chef, Learning and Development
The Oberoi Centre of Learning and Development
New Delhi

OXFORD
UNIVERSITY PRESS

OXFORD
UNIVERSITY PRESS

Oxford University Press is a department of the University of Oxford.
It furthers the University's objective of excellence in research, scholarship,
and education by publishing worldwide. Oxford is a registered trade mark of
Oxford University Press in the UK and in certain other countries.

Published in India by
Oxford University Press
YMCA Library Building, 1 Jai Singh Road, New Delhi 110001, India

First published in 2017

ISBN-13: 978-0-19-947444-8
ISBN-10: 0-19-947444-3

Typeset in Garamond
by Versatile PreMedia Services Pvt Ltd. Pune
Printed in India by Magic International (P) Ltd, Greater Noida

Cover image: Mixform design / Shutterstock

Preface

Is cooking an art or a science? Cooking is a domain that blends both art and science. The science of identifying and collecting basic ingredients, measuring quantities, and timing the whole process is the first step towards perfect cooking. The way of presenting a dish, pairing food, and understanding aroma is an art that is learnt by experience. Again, the process of transforming cereals and pulses, vegetables, and meat into delectable delights is an art perfected by science.

Globalization has changed the mind-set of many youngsters in India who wish to pursue a career in hospitality. With many international chains coming to India, more and more job opportunities are seen to have been created in the kitchen because of shortage of skilled culinary professionals. In fact, with this surge of good hotels in the country, it has become fundamental for students to develop a keen interest in understanding the subject; hence making it a much sought-after course.

Today a career in hospitality is chosen by many students also due to awareness created by media and promotional activities around food. Travel and leisure industries are offering lucrative deals and more people are travelling in search of unexplored destinations. With new destinations, new flavours and new ingredients are being popularised all across the world. Food tourism is another concept that many countries are promoting to boost their tourism.

ABOUT THE BOOK

The book is intended for students of diploma and food craft courses in hotel management, catering to the syllabus of National Council for Hotel Management and Catering Technology. It has been designed to give an introduction to cookery, organizational structure and layout of a professional kitchen, basic menu planning, aims and methods of cooking food as well as responsibilities of various chefs. It will help students to gain technical knowledge and skills of cooking as well as familiarize themselves with the day-to-day working atmosphere of the department.

It has been developed keeping in mind the changing trends in modern kitchen. As there are myriad differences in the commodities and technology used across the world, it is important that one should be aware of the dynamics of kitchen operations. The book also brings in my 24 years of experience with Oberoi Hotels and Resorts. This professional knowledge percolates down through chapters in the form of 'chef tips', which have been handed and circulated by chefs down the generations.

PEDAGOGICAL FEATURES

- Discusses roles of various commodities used in cooking along with different methods of cooking, such as sautéing, steaming, braising, microwave cooking, and more
- Includes detailed discussions on methods of cooking and various features of a professional kitchen

- Begins every chapter with learning objectives which give an introduction to the various topics discussed in the chapter
- Concludes chapters with a summary to help students gather all that they have studied in the chapter
- Provides important points (chef's tips) interspersed in the text to avoid accidents in the kitchen
- Explains practical aspects of cookery with photographs, tables, and figures
- Includes assessment tools such as objective type questions, review questions, and project assignments

STRUCTURE AND COVERAGE

The book is divided into nine chapters.

Chapter 1, *Introduction to Cookery,* provides a discussion on skills, attitudes, and behaviour required to work in a professional kitchen. Uniforms and safety procedures in handling equipments are also covered along with origin of modern cookery and culinary terms.

Chapter 2, *Organizational Structure and Layout of Kitchen,* gives an overview of the modern staffing in various category hotels, responsibilities and duties of chefs, and layout of a professional kitchen.

Chapter 3, *Basic Menu Planning,* discusses functions and types of menu. It also explains menu engineering grid, menu balancing, and pairing of food and wine.

Chapter 4, *Aims and Objects of Cooking Food,* explains objectives of cooking, and ways of controlling changes in texture and techniques used in pre-preparation. It also discusses role of fats, souring agents, colouring agents, thickening agents, and aromatic agents used in cooking.

Chapter 5, *Use of Vegetable and Fruits in Cookery,* elaborates on classification of vegetables and fruits along with their usage in cooking. Controlling changes in texture, flavour and nutrient loss of the vegetable and fruit is also covered in it.

Chapter 6, *Stocks, Sauces, and Gravies,* discusses classification of stocks, components of a sauce, and preparation of gravies. Mother and contemporary sauces, their derivatives, and modern trends of making sauce has also been elaborated upon.

Chapter 7, *Salads and Soups,* elaborates on the composition and types of a salad, as also emerging trends in salad making and salient features of preparing good salads. Classification, preparation, and trends of presenting soups have also been covered.

Chapter 8, *Meat, Fish, and Egg Cookery,* discusses properties, and types of meat, fish, and egg. Processing of a whole animal, common cooking methods used for seafood and cooking preparation for eggs are some of the highlights of the chapter.

Chapter 9, *Methods of Cooking Food,* explains different ways of cooking such as blanching, poaching, stewing, braising, poeing, roasting, grilling, sautéing, frying, baking, and many more. Microwave cooking is also discussed.

ACKNOWLEDGEMENTS

I would like to mention certain people and organizations who have either directly or indirectly contributed towards this book. First and foremost I would like to mention our Chairman Mr Prithvi Raj Singh Oberoi, our Managing Director and CEO, Mr Vikram Oberoi, under whose able guidance I have been able to collect all the knowledge pertaining to this book. I would like to thank Oberoi Centre

of Learning and Development for letting me use the resources for research. I would like special mention of all my colleagues and friends who have lent their encouragement and support in this venture of mine. I would like to thank the whole Oberoi Group for their support.

My acknowledgments would be incomplete if I did not acknowledge the academicians and the reviewers, who reviewed the book and gave corrective feedback that helped me frame the contents of the book. I would like to thank the editors and the team at Oxford University Press India for their constant follow-ups and all the support that motivated me to accomplish this project.

I would also like to thank all my near and dear ones and professionals in the industry who have in some ways influenced the development of this book.

Last but not the least, I would like to appreciate the support of my wife Shalini and my children, Ojas and Amora, who have shown immense patience whilst I compiled my fourth book.

Any suggestions for the improvement of the book in terms of content and presentation are welcome. Suggestions may be sent to the publishers or me at Parvinder.Bali@oberoigroup.com. I will be very happy to receive any feedback.

Parvinder S. Bali

Features of

CHEF'S TIP

- If oil falls on the floor and there is no time to clean, immediately sprinkle salt on it. The friction will prevent slips.
- If there are any spillages such as oil, water, or food substance, it should be cleaned up immediately.
- Signage should be put on wet floor while cleaning of kitchens.
- Proper storage should be available to keep floors clear.
- Ensuring that non slippery and covered footwear is worn by kitchen and the ancillary staff working in the kitchen.

Chef's tip
Important points that should be kept in mind appear as tips throughout the text for quick recapitulation.

Activities
Activities have been interspersed in the chapters to aid students in understanding the practical side of the subject.

ACTIVITY

Prepare vegetable stew observe and note the following: (1) time taken; (2) nutrients lost; (3) heat transference; (4) category; (5) temperature range; and (6) accompanied with?

OBJECTIVE TYPE QUESTIONS

1. How does heat affect the carbohydrates present in food?
2. Define the terms such as caramelization, dextrinization, and gelatinization?
3. What are vegetable fibres made up of and how do they react to heat?
4. What is the effect of acids on proteins? Give one example.

TO-DO ACTIVITY

42. In a group of four, critique a menu of a five star establishment and talk about the various textures on a plate. List down how you could improve the guest experience by altering the textures of the existing dishes.
43. In groups, prepare five to six snacks with different textures for a hi tea buffet. The food must complement each other with regard to colour and textures.

Exercises
A series of objective type questions as well as to-do activity highlight the major topics covered in the chapter. The questions enhance learning and can be used for review and classroom discussion.

the Book

Figures and Tables All chapters contain figures and tables to illustrate the topics discussed in the chapters.

Table8.2 Classification of beef

Bull/Cow	Steer	Heifer	Veal	Yearling bull/Cow
Male is called bull. Female is called cow after calving.	Castrated male bull.	Cow which has not calved yet.	Young cattle from 0–3 months.	Bull or cow under 12 months of age.

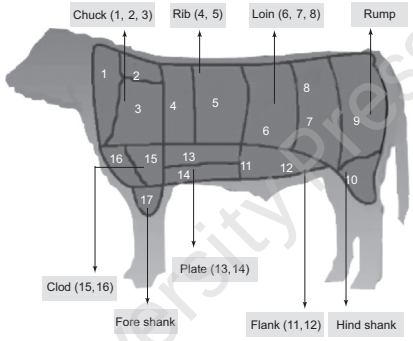


Fig. 8.2 Wholesale cuts of beef

Photographs Photographs have been added in the chapters to help readers understand concepts better.

Fig. 2.12 Show kitchen

Brief Contents

Detailed Contents

5 Use of Vegetables and Fruits in Cookery

LEARNING OBJECTIVES

After reading this chapter, you will be able to

- identify various types of vegetables used in the kitchen
- know the way a vegetable is processed
- figure out the selection and storage criteria of vegetables
- understand the pigments in the vegetables and the effect of heat on them
- list the cuts of vegetables and their uses in cookery
- identify various types of fruits used in the kitchens and classify them
- know the way a fruit is processed
- figure out the selection and storage criteria of a fruit commodity
- list out the advantages of using fruits in cooking

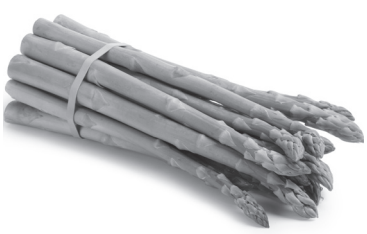
INTRODUCTION

In the previous chapters, we understood the basic work operation of the kitchen in terms of layouts, equipment, and fuels, and various kinds of menus. Now let us begin our journey to being professional chefs by understanding about various commodities used in the kitchen.

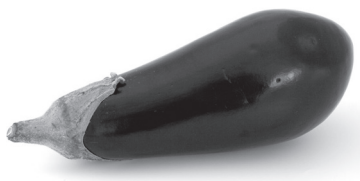
VEGETABLES

Any part of a herbaceous plant that can be eaten, either raw or cooked, is termed as vegetable. Vegetables contain more of starch than sugar unlike fruits and hence, they are used extensively in savoury dishes. Vegetables can be used in a variety of forms such as frozen, canned, cooked, mashed, dried, dehydrated, or fresh. However, only selected parts of some plants are eaten such as flowers, flower buds (globe artichoke), leaves (lettuce), leaf buds (brussels sprouts), shoots (asparagus), shoot buds (cabbage), stems (rhubarb), flower stems (cauliflower), seed pods (green beans), and immature seeds (broad bean); see Fig. 5.1 for figures of some vegetables.

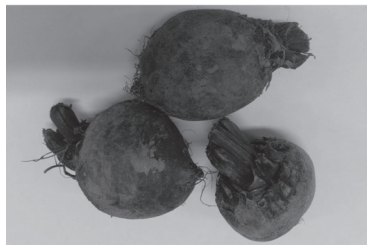
Vegetables are eaten in a variety of ways—as main courses or as snacks. Different vegetables have different types of nutrients in them including water-soluble vitamins such as vitamin B and C, and fat-soluble vitamins such as A, D, E, and K, and also contain minerals and carbohydrates. Since each



(i) Asparagus

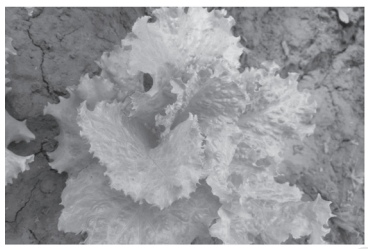


(ii) Aubergine

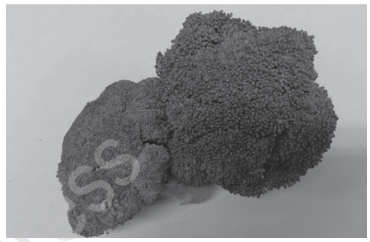


(iii) Beetroot

(iv) Bell pepper



(v) Bibbs lettuce



(vi) Broccoli

(vii) Cauliflower

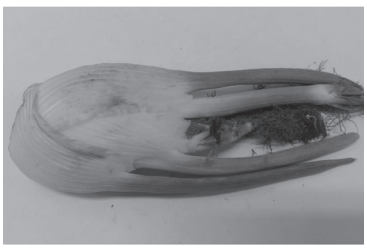
(viii) Celery

(ix) Cherry tomatoes

(x) Coriander leaves

(xi) Cos lettuce

(xii) Dragon fruit



(xiii) Fennel bulb

(xiv) French beans

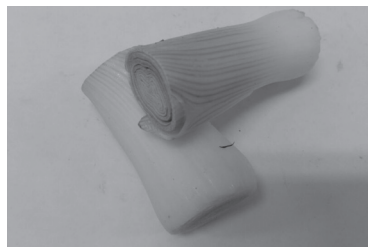
(xv) Green beans

Fig. 5.1 Vegetables *(Cont.)*

(*Source*: Thinkstock/OUP Picture Bank)

(xvi) Gooseberry

(xvii) Iceberg lettuce



(xviii) Leeks

(xix) Lettuce

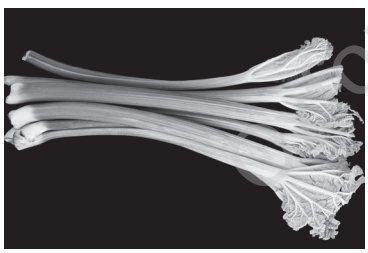
(xx) Onion

(xxi) Parsley

(xxii) Potato

(xxiii) Radish

(xxiv) Red sangria lettuce



(xxv) Rhubarb

(xxvi) Rocket lettuce

(xxvii) Thyme

(xxviii) Tomato

(xxix) Turnip

(xxx) Zuchinni

Fig. 5.1 Vegetables

(*Source*: Thinkstock/OUP Picture Bank)

Table 5.1 Classification of vegetables

Category	Description	Examples
Brassica	Brassica or the cabbage family consists of vegetables used for their head, leaves, or flowers and are mostly used in broths and braised dishes to accompany meats.	Cabbage, cauliflower, brussels sprouts, and bok choy
Fruit vegetables	These are the fruits of flowering plants. They also contain seeds.	Tomato, avocado, brinjal, and pepper
Gourds and squashes	The gourds are classified into summer squashes and winter gourds. There are over 750 varieties of gourds grown around the world. The long trailing vines of a complex root system bears this vegetable, adorned by large leaves and attractive flowers.	Bottle gourd, butternut squash, and ridged gourd
Greens	This refers to vegetables that are leafy and eaten cooked, with the exception of lettuce. Most of the greens are mildly spiced and slightly strong in flavour.	Spinach, watercress, and radicchio
Fungus	Although not a real vegetable, fungus is a plant that has no seed, stem, or flower and usually reproduces from the spores. It is commonly known as mushroom. One must be careful in selecting a mushroom.	Button mushroom, shitake, *portobello*, and *porcini*
Roots and tubers	Though roots and tubers are the same, however, scientifically speaking, tubers are fat underground stems whereas roots are the single bulbs, which extend into the ground that supplies the plant with nutrients. The tubers would be more starchy.	Root vegetables—carrots, radish, and onions. Tubers—potatoes, Jerusalem artichoke, and colocasia
Pods and seeds	In some vegetables, only seeds are eaten such as in case of peas, corn, and pulses whereas, in others, the plant is eaten as whole such as okra, snap peas, and French beans. They contain the highest source of proteins and carbohydrates.	Green peas, okra, snap peas, and pulses
Stems	Also known as stalk vegetables, they have the highest percentage of cellulose fibre and are usually eaten when they are young and tender.	Celery and rhubarb
Baby vegetables	This is a very modern classification of vegetables that include vegetables created with hybrid varieties or are picked up before maturity.	Tiny turnips, baby cauliflower, baby carrots, and baby squashes

category of vegetable responds to a particular method of cooking, it is important for us to know how they are categorized. Broadly speaking, vegetables are put into the categories discussed in Table 5.1.

PIGMENT AND COLOUR CHANGES

It is important for chefs to know the various kinds of pigments present in food and how they react to heat and various acidic and alkaline medium, as this would largely impact the style of cooking them. Pigment is the colouring matter within the cells and tissues of the plant. The various types of pigments are affected differently by heat, acid, alkali, and other elements involved in cooking. To maintain as

ACTIVITY

Name common acid and alkali ingredients used in our day-to-day cooking. Which dishes do we use them in?

much colour as possible in cooked vegetables, one needs to know about these pigments. Each vegetable has trace amount of acid present in it and we shall see how this acid could be used favourably.

Table 5.2 summarizes the effect of various factors on the colour of plant pigments.

Table 5.2 Effects on the pigments of vegetables

Name of the Pigment	Colour	Solubility in Water	Effect of Acid	Effect of Alkali Heating	Effect of Prolonged Ions	Effect of Metal
Chlorophyll	Green	Slightly soluble	Changes to olive green	Intensifies green	Olive green	Changes to olive green in iron
Carotenoids	Yellow and orange; some are red or pink	Slightly soluble	Less intense colour	Little effect	Colour may be less intense	None
Anthocyanins	Red, purple, and blue	Very soluble	Red	Purple or blue	Little effect	Violet or blue with tin or iron
Betalains	Purplish red; some are yellow	Very soluble	Little effect	Little effect	Pale	None
Anthoxanthin	White or colourless	Very soluble	White	Yellow	Darkness	Dark with iron, bright yellow with aluminium
Flavones	White	Slightly soluble	White	Yellow	Overcooking will also turn these vegetables yellow or grey. This reaction is not reversible.	Adding acid to yellowed white vegetables will not make them retain their original white colour.

CHEF'S TIP

To retain the original white colour of the flavones pigment, one must cover the white vegetable while cooking. This allows the acids released from the vegetable during cooking to blend with the vegetable. Use short cooking time and add a small amount of lemon juice, cream of tartar, or vinegar to the cooking liquid to create a slightly acidic medium.

CHEF'S TIP

To retain as much of the natural green colour as possible do as follows:

- Cook vegetables uncovered to allow the volatile acids to escape.
- Cook them quickly until just *al dente*.
- Extended exposure to heat will destroy the colour and leach out nutrients.
- After boiling, plunge the vegetables into cold water to arrest cooking. This helps to brighten the colours and is known as shocking or refreshing.
- Cook the vegetables in small batches; this reduces the cooking and holding time.
- Do not hold for long periods of time.
- Steam the green vegetables whenever possible. This shortens the cooking time, allows far less acid build up, and retains more colours.

CHEF'S TIP

If beets are not peeled and one or two inches of the stems are left intact, they may be cooked in boiling water, without loss of pigment and colour. They can be peeled after cooking.

EFFECTS OF HEAT ON VEGETABLES

Cooking is the application of heat to food in order to make it safer to eat, digestible, and more palatable. Heat breaks down the cellulose and the starches present, changes and blends flavours within the food, and also destroys bacteria in order to make food more digestible for humans.

Vegetables and other foods are composed of proteins, fats, carbohydrates, water, and also small amounts of minerals, vitamins, pigments (colouring agents), and flavour elements. Let us now look at how these are affected because of heat.

Carbohydrates

Both sugar and starch are carbohydrates and are present in many forms in vegetables, fruits, grains, beans, and nuts.

Heating food rich in carbohydrates leads to caramelization and gelatinization. Where caramelization refers to browning of sautéed vegetables, gelatinization refers to when starch absorbs water and swells.

Vegetable Fibres

Fibres are a group of complex substances that give structure and firmness to plants. They cannot be digested. The softening of vegetables on application of heat is a result of breaking down of fibres. Vegetables should never be cooked with alkalis, as this would make them mushy and lose the essential vitamins.

Minerals, Vitamins, Pigments, and Flavour Components

Minerals and vitamins are most important for the nutritional quality of the food, whereas pigments and flavour components are important to food as far as the appearance and taste are concerned. Pigments and flavours may also determine whether the food is appetizing enough to eat or not. So it becomes very important to preserve all these elements. On application of heat, all these components may be leached out and dissolved away from food during cooking. Vitamins and pigments may also be destroyed by prolonged cooking.

Proteins

Proteins are present in smaller extent in vegetables as compared to meat, fish, and poultry. When heat is applied to proteins they become firm or they start to coagulate. With an increase in temperature, proteins become even firmer and start shrinking. On being exposed to very high heat, proteins become tough and dry. In short, it can be said that heat affects the texture, flavour, colour, and nutrients of the vegetables.

Let us see, how each of the above four things can be used to the advantage of the chef preparing the vegetables.

CONTROLLING THE CHANGES IN TEXTURE

The changes in texture while cooking vegetables need to be controlled. This can be done by various methods as discussed in this section.

Fibre

Fibre structure in vegetables, including cellulose and pectin, gives shape and firmness to the vegetables. Cooking helps in softening some of these components.

Acids present in lemon juice, vinegar, and tomato products make fibre firmer and also increase the cooking time.

Sugar also strengthens the cell structure and makes the fibre firm.

Fibre is softened by heat, which means the longer one applies heat to vegetables, the softer it becomes. Although vegetables become softer on addition of alkalis such as baking soda, this should be avoided as it makes the vegetables mushy.

Starch

Starch is another component that affects the texture of a vegetable. Dry starchy foods, must be cooked in sufficient amount of water so that starch granules can absorb moisture and can soften.

Moist starchy vegetables have enough moisture of their own, but still they must be cooked until the starch granules soften.

Doneness

A vegetable is said to be 'done' when it reaches a desired degree of tenderness; this varies from vegetable to vegetable and most of the vegetables taste best when they are still firm, which is known as *al dente* in Italian cuisine. At this stage of tenderness not only do the vegetables get the most pleasing texture but also retain maximum flavour, colour, and nutrients.

For proper doneness, some rules must be followed:

- Do not overcook.
- In case vegetables have to be precooked, they should be undercooked, refreshed in cold water, and refrigerated. Then they should be reheated and served.
- Cuts of vegetables should be uniform in order to cook them evenly.

CONTROLLING CHANGES IN FLAVOUR

Many flavours are lost during cooking, more so if cooked longer. Flavour loss can be controlled by:

- cooking for short time;
- adding salt in boiling water;

CHEF'S TIP

In some strong flavoured vegetables, it is important to dilute the flavours by cooking them uncovered in large amount of water. Examples of them are vegetables from onion family, cabbage, sprouts, cauliflower, turnips, parsnips, etc.

- using as less liquid as possible; and
- steaming.

Overcooking produces flavour changes, which are undesirable and results in strong and unpleasant flavour. Younger vegetables have more amount of sugar that changes to starch as and when they ripen during storage.

CONTROLLING THE COLOUR OF THE VEGETABLES

It is a challenge for the chefs to ensure that the colour of the vegetables is appetizing, even when the vegetables are fully cooked. Application of excessive heat can have adverse effects on the colour of the vegetables. The knowledge of pigments and the effect of alkali or acid on a particular vegetable help the chef to decide how to cook the vegetable to ensure that the colour is retained or is brightened to enhance the appearance without compromising on the texture and flavour of the ingredient.
Few things that the chef can keep in mind to control the colour of the vegetables while cooking are:

- Cook vegetables, keeping in mind the pigments they contain and how the pigments react in the presence of heat, alkali, and acidic medium. For example, cook spinach uncovered as we want the acids to evaporate out and not discolour the chlorophyll pigment present in spinach.
- Cook the vegetables in hot salted water for a brief time and wherever possible, drain and refresh in cold water to brighten the colour.
- Blanch the vegetables first before applying methods of cooking such as sautéing, frying, or grilling.
- Cut the vegetables into smaller pieces to ensure that the cooking period is brief. This helps in retention of the colour of the vegetables.

CONTROLLING NUTRIENT LOSS

Factors responsible for nutrient loss are:

- high heat or temperature;
- longer duration of cooking;
- too much of liquid that causes leaching; and
- use of alkalis (baking soda, hard water).

Some nutrient loss in vegetables is inevitable. Some tips for reducing nutrient loss are as follows:

- Use of pressure steam reduces cooking time but at the same time, high heat causes some nutrient loss.
- Braising uses low heat but extends the cooking time.
- Boiling is faster than simmering; but high heat can destroy the vegetable. Avoid adding too much liquid or alkali (baking soda, hard water).

CHEF'S TIP

Cutting vegetables in small pieces reduces cooking time but increases leaching of flavours because of more exposed surface area.

ACTIVITY

Prepare potato veggie with i) potato cut in different shapes and sizes ii) gravy and dry compare and contrast the texture, flavour and colour of the final dish.

Fig. 5.2 Various cuts

CUTS OF VEGETABLES

Vegetables are cut in various sizes and shapes for various cooking purposes, creating different textures, tastes, and mouthfeel. Different cuts cook differently and create a different flavour. For example, shredded cabbage will taste different from diced cabbage in a salad and boiled mashed potato will taste different from boiled chateau potato.

Before understanding the cuts of vegetables, a cook must know the following things. Figure 5.2 shows different cuts that are used across the world. These cuts have been also shown individually in Fig. 5.3.

Know one's vegetables **The shape, size, and the texture, etc. are different for different vegetables, so the ways of cutting and processing will also be different.**

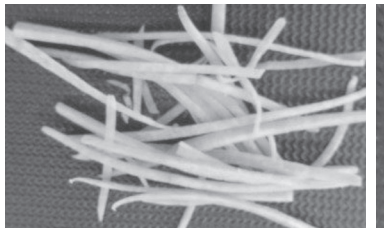
Know your equipment **Equipment are very essential in the processing of vegetables. Knives, peelers, shavers are required to be in prime condition, to obtain neater cuts and prevent wastages and injuries.**

Know the purpose **Vegetable cut for one purpose may not be suitable for another. Using shredded vegetables or not will depend on the final dish.**

Know the effect of heat **Heat needs to be controlled during the cooking process depending upon the cuts of the vegetables.**

A group of internationally accepted cuts of vegetables are termed as 'classical cuts'. The most common among them are *julienne*, *chiffonade*, baton, *brunoise*, dice (small, medium, and large), slice, chop and mince, *emincer*, and shred.

(i) Julienne cut



(ii) Jardiniere cut

(iii) Brunoise cut

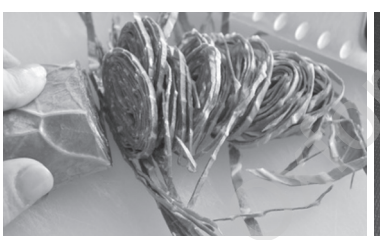
(iv) Mincing

(v) Turned

(vi) Slicing cut

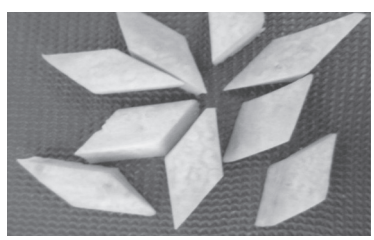
(vii) Paysanne cut

(viii) Macedoine cut



(ix) Chiffonade cut

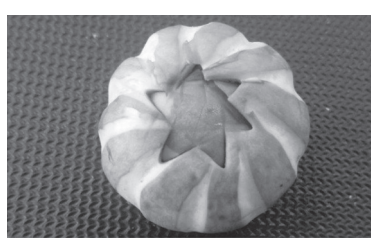
(x) Pairing cut



(xi) Lozenge cut

(xii) Tourne cut

(xiii) Segments



(xiv) Fluting cut

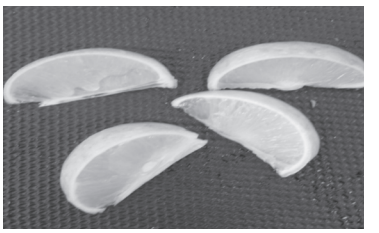
Fig. 5.3 Cuts shown separately *(Cont.)*

(xv) Matignon

(xvi) Chopping

(xvii) Shredded

(xviii) Parisienne



(xix) Wedges

Fig. 5.3 Cuts shown separately

Fig. 5.4 Indian cuts of vegetables

SOME INDIAN CUTS OF VEGETABLES

There are various kinds of cuts that are typically used for certain vegetables in Indian kitchens. Some of the prominent cuts of vegetables in Indian cooking are discussed in Table 5.3. Figure 5.4 shows cuts of drumsticks, jackfruit, baby brinjal, and green chillis as used in Indian cooking.

Table 5.4 discusses various kinds of common vegetables used in professional kitchens. Each vegetable listed below is described with its English name, scientific name, and Hindi name. Some of these vegetables are of Western origin and are not cultivated in India and hence, they do not have Hindi names.

Table 5.3 Indian cuts of vegetables

Vegetable	Type of Cut	Use
Okra	Trim from head and tail and slit open lengthwise without cutting through	Used for preparing stuffed okra as in *aamchoor masala bhindi*
Baby brinjal	Slit into four, keeping the stem intact	Used for stuffed brinjals/ *bharwan masala baingan*
Bitter gourd	Scrape the bitter gourd and keep scrapings for stuffing, slit open without cutting through, and remove seeds and inner flesh	Used for stuffed bitter gourd/ *bharwan karela*
Jackfruit	Cut into quarters, remove the skin not wasting too much, remove the centre pith and cut into quarters	Used for kofta, curries, biryani, etc.
Drumsticks	String the drumsticks and cut into batons	Used for sambar
Banana flower	Peel the banana flower to obtain small florets; remove the hard woody style inside the flowers	Used for stir-fry and kofta
Bamboo shoot	Peel till the white pith is visible and cut into desired shapes	Used for curries
Chilli	Slit the chilli lengthwise, taking care not to cut through	Used for stuffed peppers, pakoras
Lotus root	Peel and wash very well to ensure that it is free from sand and mud; cut into one-inch chunks or lozenge	Used for curries and kofta

Table 5.4 Common vegetables

Vegetable	Scientific Name	Hindi Name	Selection	Storage
Broccoli	Brassica italica	Hariyali Gobi	Bright green Firm cluster bud	Refrigerated at 4 to 5 °C
Cabbage	Brassica oleracea	Bandh Gobi	Heavy for its size Firm	Refrigerated at 4 to 5 °C
Carrot	Daucus carota	Gajar	Bright in colour Firm	Refrigerated at 10 to 12 °C
Zucchini	Cucurbita pepo	Petha	Firm Glossy skin	Refrigerated at 4 to 5 °C
Garlic	Allium sativum	Lahsun	Dry and firm Bulb not sprouted	Room temperature at 24 °C *Once peeled-* Refrigerated at 4 to 5 °C
Onion	Allium cepa	Pyaaz	Dry, pink skin Firm bulbs	Room temperature at 24 °C
Spinach	Spinacia olreacea	Palak	With tender narrow stems	Refrigerated at 4 to 5 °C
Avocado	Persea americana	Makhanphal	Green colour Firm – The avocadoes are unripened when they are firm, but it is advisable to buy raw and then store in brown paper until ripened.	*Wrapped in newspaper-* Room temperature at 22 °C *Once ripened-* Refrigerated at 10 to 12 °C

Contd. …

Table 5.4 Common vegetables *(Cont.)*

Vegetable	Scientific Name	Hindi Name	Selection	Storage
Cucumber	Cucumis sativus	Kheera	Straight and even long shape—crooked shaped could be bitter Smooth surface	Refrigerated at 5 to 6 °C
Colocasia	Colocasia esculenta	Arbi	Fresh and firm Dry surface	Room temperature at 24 °C
Aubergine	Solanum melongena	Baigan	Uniformly dark purple Soft sheen Heavy and pulpy. Do not buy aubergines with holes as they indicate insects inside them	Refrigerated at 5 to 6 °C
Snake Gourd	Trichosanthes cucumeriana	Chichinda	Pale green Tender and snap crisply	Refrigerated at 5 to 6 °C
Bell Pepper/ Capsicum	Capsicum annum	Simla Mirch	Bright colour Waxy sheen	Refrigerated at 5 to 6 °C
Round Gourd	Praecitrullus fistulosus	Tinda	Light green Firm, crisp skin	Refrigerated at 5 to 6 °C
Asparagus	Asparagus officinalis	Shatwaar	Bright green Sharp tips Snap when bent	Refrigerated at 5 to 6 °C
Artichokes	Cynara ficilolia	Hathi Chak	Bright green, tinting purple at the tip Firm leaves	Refrigerated at 5 to 6 °C
Radish	Raphanus sativus	Mooli	8 to 10 inches in length Supple tips	Refrigerated at 5 to 6 °C
Tomato	Lycoperican esculentum	Tamatar	Firm and even shape Smooth skin Even red colour and without any holes	Refrigerated at 5 to 6 °C
Potato	Solanum tuberosum	Aloo	Uniform shape Dry and heavy for their size Firm and smooth skin Do not buy potatoes with green shades	Room temperature at 24 °C
Beetroot	Beta vulgaris	Chukandar	Dark crimson Smooth tender surface	Refrigerated at 10 to 12 °C
French Beans	Phaseolus vulgaris	Phalli	Light green Long and crisp Snap when bent	Refrigerated at 5 to 6 °C
Mushroom	Agaricus bisporus	Khumb	White, unbleached stems Firm underside of the cap	Refrigerated at 5 to 6 °C
Turnip	Brassica rapa	Shalgum	Firm and well formed Smooth and tender skin	Refrigerated at 5 to 6 °C

Contd. …

Table 5.4 Common vegetables *(Cont.)*

Vegetable	Scientific Name	Hindi Name	Selection	Storage
Ginger	Zingiber officinale	Adrak	With large-sized bulb Snap at the joints	Room temperature at 24 °C
Drumstick	Moringa oleifera	Sajna Phalli	Tender with no strings 12-15 inches in length	Refrigerated at 5 to 6 °C
Okra/Lady's Finger	Abelmoschus esulentus	Bhindi	3 to 4 inches in length Bright green, tender Snap when bent	Refrigerated at 5 to 6 °C

Note: All fruits and vegetables should be stored in a perforated basket to allow circulation of air. And they should not be piled too many in a basket as they might get damaged.

FRUITS

In this section, we shall talk about fruits, their classification, and usage. In the last section, we saw that there are certain vegetables that are scientifically categorized into fruits; but, here, we shall focus on the real fruits that are eaten as a part of dessert.

Fruits are rich source of vitamins and minerals and give the necessary nutrition to our body. Fruits are generally eaten raw, but many of them can be cooked to serve as accompaniments, sauces, or compotes. Some fruits are rich in 'pectin', an enzyme that helps in setting of jams and marmalades. Fruits have been paired with food since time immemorial.

Why Eat Fruits?

Fruits have a very positive effect on the brain; the most important substance that fruits contain are water (80 per cent) and natural sugars. Natural sugars help to stimulate the brain so we can think faster and recall information more quickly. Fruits do not contain any amount of bad cholesterol; therefore, they are amongst the healthiest foods available. Fruits are rich in fibre and vitamins such as vitamin C.

CLASSIFICATION OF FRUITS

In botanical terms, a fruit is the ripened ovary of a flowering plant. A fruit usually contains the seeds of the plant that bears it. A number of fruits are also termed as vegetables by some, as there is no single terminology that can accurately fit the variety that can be found among plant fruit. Fruits can be broadly segregated on their composition, nutritional value, shape, and flavour. They could be sweet or sour, depending on the variety. Some are fleshy, some are dry, and some are heavy. It is to be noted that as per culinary terminology, a fruit is defined as a product that has a sweet taste. Fruits generally contain water soluble vitamins such as vitamins B and C. They also have generous amount of antioxidants present in them. It is for this reason that fruits discolour once cut, as the exposure to oxygen instigates chemical reaction with the antioxidants.

Some fruits, known as 'pseudo-carp', are accessory fruits, for example, figs. They are not the ripened ovary, but are attached to the plant embryo. Certain fruits are produced without the fusion of the ovary and the embryo. They are artificially produced by a method called 'parthenocarpy', in which pollination

is omitted. These fruits are seedless. Plants that are non-fruit producing are known as 'acarpous'. Fruits are widely used in various ways such as cooked, raw, canned, pureed, and squashed.

On Basis of Texture and Flavour

Fruits are classified on the basis of their texture and flavour and can be classified into:

- Soft fruits — Papaya, banana, melons, etc.
- Stone fruits — Peaches, nectarines, mango, etc,
- Apple and pear family — All apples and pears
- Citrus fruits — Oranges, sweet lime, pineapple, etc.

On Basis of Appearance and Flesh Content

Fleshy fruits

These are fruits that have supple flesh around the seed. They can be subdivided again into those formed from a single flower and those formed from a group of flowers. Those formed from a single flower are classified as berry, drupe, aggregation of drupes, *pomme*, and hesperidium. Fruits that grow from a group of flowers and generate only a single seed are sorosis (e.g., mulberry), syconium (e.g., fig), and coenocarpium (e.g., pineapple).

Dry fruits

Dry fruits are seeds of a fruit confined in a nut. So all nuts such as pistachio, cashew, almonds, and walnuts are dry fruits. Not all seeds of fruits are edible and only a few can be eaten as dry fruits. Many people also dehydrate fresh fruits for preservations and these should not be confused with dry fruits. The dehydrated fruits are simply known as dried fruits.

Let us discuss the properties of a few fruits and their usefulness in the Table 5.5.

Table 5.5 Common fruits

Fruits	French Name	Hindi Name	Selection	Storage	Remark
Apple	Pomme	Saeb	Firm Free of scars	Refrigerated at 4 to 5°C	
Banana	Banana	Kela	Firm Even yellow		To be stored in cool room temperature. Storing in fridge will make the skin black
Cherry	Cerise	Glass	Firm to touch with an even red to maroon colour	Refrigerated at 4 to 5° C	The stem attached to the cherry determines the freshness of the same. The bright green colour of the stem indicates freshness. Pulpy cherries are prone to insects.

Contd. …

Table 5.5 Common fruits *(Cont.)*

Fruits	French Name	Hindi Name	Selection	Storage	Remark
Fig	Fig	Anjeer	Light green with purplish streaks	Refrigerated at 4 to 5°C	
Grape	Raisin	Angoor	Compact and heavy for their size Bright colour	Refrigerated at 4 to 5°C	
Gooseberry	Physalis	Ras Bhari	With parchment cover Bright yellow to orange	Refrigerated at 4 to 5°C	
Orange	Orange	Santra	Firm and heavy for their size Smooth and shiny skin	Refrigerated at 4 to 5°C	There are two types of oranges—table and juice. The table oranges have a thin skin and the table orange have a thicker skin and hence are sweeter
Peach	Peche	Aadoo	Firm Even orange colour	Refrigerated at 4 to 5°C	
Watermelon	Watermelone	Tarbooz		Room temperature for about 2 weeks; Refrigerated at 4 to 5°C	
Apricot	Abricot	Kumani, Khoobani	Even orange colour Firm to touch	Refrigerated at 4 to 5°C	
Cranberry	Canneberges	–	Difficult to find in India	Refrigerated at 4 to 5°C	Usually available dried, in which case they should be stored in cool room temperature
Date	Date	Khajoor	Difficult to find fresh in India Available dried and packed	Refrigerated at 4 to 5°C	
Grapefruit	Pamplemousse	Chakotra	Firm and heavy for its size Smooth and shiny skin Even colour	Store well at room temperature. Advised: Refrigerate at 4 to 5°C	
Guava	Goyave	Amrood	Even yellow colour Free from blemishes	Refrigerated at 4 to 5°C	

Contd. …

Table 5.5 Common fruits *(Cont.)*

Fruits	French Name	Hindi Name	Selection	Storage	Remark
Mango	Mangue	Aam	Soft yet firm Even yellow/green	Refrigerated at 4 to 5°C	
Pineapple	Ananas	Ananas	Clean and waxy skin Heavy for their size Light yellow	Refrigerated at 4 to 5°C	
Papaya	Paw paw	Papita	Oval and slender Yellow skin with traces of orange When shaken, seeds should rattle	Refrigerated at 4 to 5°C If raw: Wrap and store in newspaper for a day or two.	
Melon	Melone	Kharbooza	Sweet smelling Fairly resilient and even skin	Refrigerated at 4 to 5°C	There are many varieties of melon available and is a seasonal fruit
Pomegranate	Pomegranate	Anaar	Bright firm, red, and thick	Refrigerated at 4 to 5°C	
Sapodilla/ Mud Apple	–	Chikoo	Mud brown colour Thin, firm skin Heavy for its size	Refrigerated at 4 to 5°C	
Dragon Fruit	Poire de chardon	–	Shiny skin Should depress when slightly pressed	Refrigerated at 4 to 5°C	
Kiwi Fruit	Kiwifruit	–	Mud brown and paper thin skin Firm	Refrigerated at 4 to 5°C	

Note: All fruits and vegetables should be stored in a perforated basket to allow circulation of air. And they should not be piled too many in a basket as they might get damaged.

Some of these fruits have been shown in Fig. 5.5.

A study conducted by Dr Paul Lachance of Rutgers University, New Brunswick, New Jersey, USA, evaluated the nutritional value of fruits to determine which fruit provides the highest nutrition. The analysis determined the nutrient density of the 27 most commonly consumed fruits. The study found kiwi fruit to be the most nutrient-dense of all fruits, followed by papaya, mango, and orange. Kiwi fruit, orange, and papaya are fruits most appropriate for weight control. Kiwi fruit has the highest level of vitamin C, almost twice as that of an orange, and magnesium. It is important for cardiovascular health.

It is good to know the nutritional value of various fruits as they can be mixed and matched according to one's deficiencies.

ACTIVITY

Do a market survey and make observations of the following: i) Range and availability of fruits (seasonal); ii) Quality, texture, and flesh content selection criterion.

(i) Apple

(ii) Melon

(iii) Mud apple

(iv) Orange

(v) Papaya

(vi) Peaches

(vii) Pineapple

Fig. 5.5 Fruits

(*Source*: Iconotec/OUP Picture Bank)

FRUITS IN COOKING

The use of fruits in cooking dates back hundreds of years. Although fruits are most commonly used in desserts, they can also form part of savoury dishes. Fruits are also found in foods such as cookies, muffins, yoghurt, ice cream, and cakes. Fruits are not only used in preparing a variety of dishes, but they also help keep certain foods fresh and help preserve their colour. There are various ways to cook fruit, and certain considerations should be made beforehand as fruit tends to be delicate and can disintegrate easily. They are discussed as below:

1. Boiling is too harsh a method for most fruits; gentle simmering preserves the texture and shape of fruits. When cooking soft and stone fruits, simply warm them by placing them in a pan of boiled water,

2. Poaching is a similar method, and is a common way to cook fruits such as pears. Bring the water to a simmer and then gently lower the fruit into the pan with a spoon. Immediately reduce the heat so the liquid is barely bubbling, and cook until the fruit is tender.
3. Stew fruit, where the saucepan is covered and the fruit is cooked in just enough liquid to cover it. This not only helps keeping the moisture, but helps to avoid expelling of nutrients and be left with only the fibrous part. Use just enough moisture to cook the fruit. As with cooking vegetables, it is important to retain the crunch while cooking fruits.
4. Barbecuing and grilling fruit leads to very sweet, strong flavours; this is due to the intense heat that caramelizes the sugars. Grilled or barbecued fruits make fantastic desserts, side dishes, or appetizers.
5. Once cut, the fruit should be soaked in water to maximize the amount of liquid inside. This prevents the fruit from drying out on the grill. Adding 1tsp of lemon juice to the water will help the fruit preserve its colour. It is also a good idea to try grilling bananas, tangerines, and pineapples in their skin. In general, leaving the skin or peel on the fruit helps to maintain its structural integrity as it cooks.
6. Sauces of fruits are used to marinate the fruits before grilling them and they can also be served with the fruits after grilling.
7. Drying is also a good way of preserving fruits and it intensifies their flavours. Most fruits can be dried effectively.

Fruit can be made into jams, jellies, pickles, and chutneys, or can be bottled whole. The most suitable method of preserving depends on the type of fruit and its quality and ripeness. Underripe fruit is fine for chutneys, jams, and jellies but overripe fruit is only good for making chutney and should not be used for making jam.

ACTIVITY

You are to prepare a dessert (preserving value) using fruits and dry fruits. Which points will you have to keep in mind?

CHEF'S TIP

- Cooking fruit will destroy bacteria and stewing is one of the best methods of cooking that can be used for fresh fruit. Fruit should be very ripe for stewing as maximum flavour is produced.
- Dried fruit can be reconstituted in hot water to soften the fruit and fasten the cooking process, as it will return the dried fruit back to its normal size.
- Fruit may be soaked in alcohol or natural juices to enhance flavours. This is when it is acceptable to keep fruit in a liquid for a long period of time. Avoid soaking fruit for long periods of time in water prior to cooking.

SUMMARY

Detailed coverage on the use of vegetables and fruits in cookery has been provided in the chapter. Selection and storage criteria of vegetables and fruits have been clearly specified. Pigmentation and effect of heat on them have also been provided. Methods of controlling texture, flavour, nutrient loss, and colour of vegetables will help readers while cooking. Different cuts of vegetables suitable for cooking a range of Indian and Western cuisines have also been provided.

OBJECTIVE TYPE QUESTIONS

1. How are vegetables and fruits classified?
2. Which mushroom is extremely used in Chinese cooking and Italian cooking?
3. Why does spinach change colour in iron pot?
4. Why does cauliflower turn yellow when boiled in aluminium container?
5. List the various cuts of vegetables.
6. Where does broccoli gets its name from?
7. What is parthenocarpy?

ESSAY TYPE QUESTIONS

8. Name the pigment present in potatoes? What is the effect of acid and alkali on it?
9. Why are green vegetables not covered while cooking?
10. Discuss the four effects of heat on vegetables.
11. Is it advisable to use just enough water to cook vegetables? Why?
12. Why should onions be dry while selecting?
13. How would you remove bitterness from bitter gourd?
14. What are the medicinal values of banana? Why should the bananas not be stored in the refrigerator?
15. What are the selection criterion for oranges and apples?
16. What method of cooking is usually applied to fruits? List at least five points to be kept in mind while cooking fruits?
17. How do fruits react to grilling?

TO-DO ACTVITY

18. In a group of four, visit a vegetable market. Conduct a survey and make a list of all vegetables you see there. Classify them in families and record your observations based on seasonal availability and the price range.
19. After reading the chapter, you would have got an idea about the reaction of acid, alkali, and metals on the pigments of vegetables. Do this practically and record your observations. Also use metals that are not listed in this chapter and critique the results.
20. In a group of three, choose a family of vegetables and fruits (separately) and do yield tests for the same. To do this, process it from raw to calculate usable weight. Then boil the vegetable, and record the cooking loss. Record your observations and analyse.
21. Research and find at least three classical preparations of fruits such as apples, mangoes, raspberries, peaches, apricots, and cherries.