Foreword	ν
Preface to Second Edition	vii
Preface to First Edition	viii
Introduction	ix
List of Tables, Figures and Plates	xv

UNIT I CARBOHYDRATES

2

xiii

1. Sugars

1.	Effect of temperature on solubility of sugar and determination of concentration at which solutions become seturated	ion 7
2.	Effect of sugar on boiling point of water	, 9
3.	Effect of heat on sugar solutions and their behaviour corresponding to the <i>cold water</i> and <i>thread</i> tests	11
4.	Crystallization of sugars through preparation of fondant, fudge, shakarpara and chenna murki	13
5.	Inversion, melting and caramelization of sugar	16
2. S	tarches	24
6.	Microscopic structure of food starches	30
6. 7.	Microscopic structure of food starches Gelatinization properties of starches	30 33
6. 7. 8.	Microscopic structure of food starches Gelatinization properties of starches Factors affecting gelatinization and setting quality of food starches	30 33 36
6. 7. 8. 9.	Microscopic structure of food starches Gelatinization properties of starches Factors affecting gelatinization and setting quality of food starches Gluten content of different flours	30 33 36 38
6. 7. 8. 9. 3. P	Microscopic structure of food starches Gelatinization properties of starches Factors affecting gelatinization and setting quality of food starches Gluten content of different flours ectins and Gums	30 33 36 38 43
6. 7. 8. 9. 3. P 10.	Microscopic structure of food starches Gelatinization properties of starches Factors affecting gelatinization and setting quality of food starches Gluten content of different flours ectins and Gums Testing pectin strength in fruit and	30 33 36 38 43
6. 7. 8. 9. 3. P 10.	Microscopic structure of food starches Gelatinization properties of starches Factors affecting gelatinization and setting quality of food starches Gluten content of different flours ectins and Gums Testing pectin strength in fruit and vegetable extracts	30 33 36 38 43 49

12.	Effect of varying the proportions of acid, sugar, temperature, pectin and cooking time on formation of guava jelly Preparation of toffee from fruit	53
	pulp or puree	55
4. C	elluloses	57
4. C 14.	elluloses Browning in fruits and vegetables	57 66
4. C 14. 15.	Browning in fruits and vegetables Effect of heat on fruits and vegetables	57 66 68
4. C 14. 15. 16.	elluloses Browning in fruits and vegetables Effect of heat on fruits and vegetables Effect of pH on cooking of vegetables	57 66 68
4. C 14. 15. 16.	Browning in fruits and vegetables Effect of heat on fruits and vegetables Effect of pH on cooking of vegetables and fruits	57 66 68 70

73

UNIT II PROTEINS

soup

5. Milk and Milk Products	80
18. Determination of relative density of	of milk
at different temperatures	89
19. Effect of heat on milk	91
20. Effect of heat and acid on proteins	6
of milk	93
21. Effect of added substances on stat	oility
of milk	95
22. Effect of fermentation on milk	
proteins	99
6. Eggs	101
23. Effect of cooking time on colour,	texture
	117
and acceptability of whole egg	11/
24. Effect of cooking method on	117
 and acceptability of whole egg 24. Effect of cooking method on coagulation property of eggs. 	117
 and acceptability of whole egg 24. Effect of cooking method on coagulation property of eggs. 25. Effect of different factors on the 	117
 and acceptability of whole egg 24. Effect of cooking method on coagulation property of eggs. 25. Effect of different factors on the gelation temperature and 	117
 and acceptability of whole egg 24. Effect of cooking method on coagulation property of eggs. 25. Effect of different factors on the gelation temperature and consistency of egg custard 	117

26.	Effect of temperature on the stability of a natural emulsion	123
27.	Effect of adding sugar and acid on	105
•••	the stability of milk emulsion	125
28.	Preparation of mayonnaise using different variations and determining the best method of preparing a	
	stable emulsion	126
29.	Effect of salt, acid, sugar and fat on the stability of egg white foam	130
30.	Demonstrate the effect of foaming on the volume and texture of omelettes	132
31.	Effect of foaming on the quality of he and cold souffles	ot 134
32.	Effect of volk contamination on the	
	volume and texture of angel cake	137
7. N	leats and Meat Substitutes	143
33.	Effects of pre-preparation techniques on meat tenderization	151
34.	Determination of the best method of cooking meat	153
35.	Acceptability of texturized food produ	uct
35.	Acceptability of texturized food produces and alternative to meat	uct 155
35. 8. C	Acceptability of texturized food produces and alternative to meat dereals, Pulses and Legumes	uct 155 157
35. 8. C 36.	Acceptability of texturized food produces as and alternative to meat Cereals, Pulses and Legumes Time, temperature and water required for sprouting whole	uct 155 157
35. 8. C 36.	Acceptability of texturized food produces as and alternative to meat Cereals, Pulses and Legumes Time, temperature and water required for sprouting whole pulses and legumes	uct 155 157 165
35. 8. C 36. 37.	Acceptability of texturized food produces as and alternative to meat Gereals, Pulses and Legumes Time, temperature and water required for sprouting whole pulses and legumes Effect of cooking on whole and split pulses and legumes	155 157 165 167
35. 8. C 36. 37. 38.	Acceptability of texturized food produces as and alternative to meat Cereals, Pulses and Legumes Time, temperature and water required for sprouting whole pulses and legumes Effect of cooking on whole and split pulses and legumes Effect of deep frying on batters from different flours	uct 155 157 165 167 169
 35. 8. C 36. 37. 38. 39. 	Acceptability of texturized food produces as and alternative to meat Cereals, Pulses and Legumes Time, temperature and water required for sprouting whole pulses and legumes Effect of cooking on whole and split pulses and legumes Effect of deep frying on batters from different flours Effect of different methods of making dough on the quality of Indian	uct 155 157 165 167 169
35. 8. C 36. 37. 38. 39.	Acceptability of texturized food produces as and alternative to meat Cereals, Pulses and Legumes Time, temperature and water required for sprouting whole pulses and legumes Effect of cooking on whole and split pulses and legumes Effect of deep frying on batters from different flours Effect of different methods of making dough on the quality of Indian bread like chapati	155 157 165 167 169 171
35. 8. C 36. 37. 38. 39. 40.	Acceptability of texturized food produces as and alternative to meat Gereals, Pulses and Legumes Time, temperature and water required for sprouting whole pulses and legumes Effect of cooking on whole and split pulses and legumes Effect of deep frying on batters from different flours Effect of different methods of making dough on the quality of Indian bread like chapati Development of gluten of fermented doughs	uct 155 157 165 167 169 171 173
35. 8. C 36. 37. 38. 39. 40. 9. N	Acceptability of texturized food produces as and alternative to meat Gereals, Pulses and Legumes Time, temperature and water required for sprouting whole pulses and legumes Effect of cooking on whole and split pulses and legumes Effect of deep frying on batters from different flours Effect of different methods of making dough on the quality of Indian bread like chapati Development of gluten of fermented doughs	155 157 165 167 169 171 173 175
 35. 8. C 36. 37. 38. 39. 40. 9. N 41. 	Acceptability of texturized food produces as and alternative to meat Gereals, Pulses and Legumes Time, temperature and water required for sprouting whole pulses and legumes Effect of cooking on whole and split pulses and legumes Effect of deep frying on batters from different flours Effect of different methods of making dough on the quality of Indian bread like chapati Development of gluten of fermented doughs Suts and Oilseeds Effect of roasting on nuts and oilseeds	uct 155 157 165 167 169 171 173 173 175 178
 35. 8. C 36. 37. 38. 39. 40. 9. N 41. 42. 	Acceptability of texturized food produces and alternative to meat Gereals, Pulses and Legumes Time, temperature and water required for sprouting whole pulses and legumes Effect of cooking on whole and split pulses and legumes Effect of deep frying on batters from different flours Effect of different methods of making dough on the quality of Indian bread like chapati Development of gluten of fermented doughs Muts and Oilseeds Effect of roasting on nuts and oilseeds Preparation of burfee using nuts as a major ingredient	Liss 155 157 165 167 169 171 173 173 175 178 180

UNIT III DIETARY FATS

10. Fats and Oils185

11. Fat Substitutes19845. Method of preparing peanut butter20446. Use of fat substitute in biscuit preparation206UNIT IV FOOD PRESERVATION12. Food Preservation21047. Preparation of fruit squash 48. Preparation of apple jam raw papaya21829. Preparation of papaya chutney from raw papaya223UNIT V FOOD ADULTERATION22713. Adulterants in Foods22714. Prevention of Adulteration turmeric23950. Detection of metanil yellow in turmeric23951. Detection of Rhodamine B in red chilli24052. Testing adulterants of coffee241	 43. Determination of smoking points of fat and oils 44. Determination of the best frying temperature for different fats and oils, and determine a household best for oil readiness 	194 196
45. Method of preparing peanut butter 46. Use of fat substitute in biscuit preparation20446. Use of fat substitute in biscuit preparation206UNIT IV FOOD PRESERVATION12. Food Preservation21047. Preparation of fruit squash 48. Preparation of apple jam raw papaya21829. Preparation of papaya chutney from raw papaya223UNIT V FOOD ADULTERATION13. Adulterants in Foods22714. Prevention of Adulteration turmeric23750. Detection of metanil yellow in turmeric23951. Detection of Rhodamine B in red chilli24052. Testing adulterants of coffee241	11. Fat Substitutes	198
preparation206UNIT IV FOOD PRESERVATION12. Food Preservation21047. Preparation of fruit squash21848. Preparation of apple jam22149. Preparation of papaya chutney from raw papaya223UNIT V FOOD ADULTERATION13. Adulterants in Foods22714. Prevention of Adulteration turmeric23750. Detection of metanil yellow in turmeric23951. Detection of Rhodamine B in red chilli24052. Testing adulterants of coffee241	45. Method of preparing peanut butter 46. Use of fat substitute in biscuit	204
UNIT IV FOOD PRESERVATION12. Food Preservation21047. Preparation of fruit squash21848. Preparation of apple jam22149. Preparation of papaya chutney from raw papaya223UNIT V FOOD ADULTERATION13. Adulterants in Foods22714. Prevention of Adulteration turmeric23750. Detection of metanil yellow in turmeric23951. Detection of Rhodamine B in 	preparation	206
12. Food Preservation21047. Preparation of fruit squash21848. Preparation of apple jam22149. Preparation of papaya chutney from raw papaya223UNIT V FOOD ADULTERATION13. Adulterants in Foods22714. Prevention of Adulteration23750. Detection of metanil yellow in turmeric23951. Detection of Rhodamine B in red chilli24052. Testing adulterants of coffee241	UNIT IV FOOD PRESERVATION	۲.
47. Preparation of fruit squash21848. Preparation of apple jam22149. Preparation of papaya chutney from raw papaya223UNIT V FOOD ADULTERATION13. Adulterants in Foods22714. Prevention of Adulteration23750. Detection of metanil yellow in turmeric23951. Detection of Rhodamine B in red chilli24052. Testing adulterants of coffee241	12. Food Preservation	210
48. Preparation of apple jam 221 49. Preparation of papaya chutney from 223 UNIT V FOOD ADULTERATION 13. Adulterants in Foods 227 14. Prevention of Adulteration 237 50. Detection of metanil yellow in turmeric 239 51. Detection of Rhodamine B in red chilli 240 52. Testing adulterants of coffee 241	47. Preparation of fruit squash	218
49. Preparation of papaya chutney from raw papaya 223 UNIT V FOOD ADULTERATION 13. Adulterants in Foods 227 14. Prevention of Adulteration 237 50. Detection of metanil yellow in turmeric 239 51. Detection of Rhodamine B in red chilli 240 52. Testing adulterants of coffee 241	48. Preparation of apple jam	221
raw papaya223UNIT V FOOD ADULTERATION13. Adulterants in Foods22714. Prevention of Adulteration23750. Detection of metanil yellow in turmeric23951. Detection of Rhodamine B in red chilli24052. Testing adulterants of coffee241	49. Preparation of papaya chutney from	
UNIT V FOOD ADULTERATION13. Adulterants in Foods22714. Prevention of Adulteration23750. Detection of metanil yellow in turmeric23951. Detection of Rhodamine B in red chilli24052. Testing adulterants of coffee241	raw papaya	223
13. Adulterants in Foods22714. Prevention of Adulteration23750. Detection of metanil yellow in turmeric23951. Detection of Rhodamine B in red chilli24052. Testing adulterants of coffee241	UNIT V FOOD ADULTERATION	1
14. Prevention of Adulteration23750. Detection of metanil yellow in turmeric23951. Detection of Rhodamine B in red chilli24052. Testing adulterants of coffee241	13. Adulterants in Foods	227
50. Detection of metanil yellow in turmeric23951. Detection of Rhodamine B in red chilli24052. Testing adulterants of coffee241	14. Prevention of Adulteration	237
turmeric23951. Detection of Rhodamine B in red chilli24052. Testing adulterants of coffee241	50. Detection of metanil yellow in	
51. Detection of knodamine B in red chilli 240 52. Testing adulterants of coffee 241	turmeric	239
52. Testing adulterants of coffee 241	51. Detection of Knodamine B in	
-		240

- 53. Testing for sugar in honey
 54. Testing for adulteration in fats and oils
 243
- 55. Detection of NaHCO₃ in flour 246

UNIT VI FOOD EVALUATION

15. Subjective Evaluation	249
16. Objective Evaluation	261
References	267
Glossary	270
Abbreviations	273
Annexure	275
Index	277

LIST OF TABLES, FIGURES AND PLATES

Tables

1.1	Temperature guidelines for syrup readiness	4
1.2	Effect of addition of sugar on boiling point of water	7
1.3	Solubility of sugar	10
1.4	Effect of heat on sugar solutions	12
1.5	Crystal formation in different foods	14
2.1	Identification of starches	31
2.2	Microscopic structure of starches	31
2.3	Changes on heating of starches	34
2.4	Gelatinization of starches	34
2.5	Factors affecting gelatinization of starches	37
2.6	Gluten content and water absorption	5.
2.0	capacity of different flours	39
3.1	Uses of gums and mucilages in food	
	processing	48
4.1	Effect of temperature on cooking of	
	fruits and vegetables	69
4.2	Effect of pH on cooking of vegetables	71
5.1	Relative density of milk	90
5.2	Effect of heat on milk	92
5.3	Effect of added substances to milk	97
6.1	Composition of egg as compared	
	to milk	101
6.2	Sensory quality of mayonnaise	128
6.3	Microscopic structure of mayonnaise	128
6.4	Effect of added substances on foam	
	formation	131
7.1	Approximate composition of meats	144
8.1	Composition of cereals, pulses and	
	legumes	158
9.1	Composition of commonly used	
	nuts and oilseeds	175
10.1	Dietary fatty acids	186
10.2	Classification of common fats and oils	187
10.3	Smoking points of fats and oils	195
10.4	Evaluation of fats for frying	197
13.1	Adulterants in foods	232
14.1	Some guidelines for consumers	238
15.1	Design for sample presentation	255
	in paired test	255

15.2	Triangle test evaluation card	256
15.3	Format for duo-trio test	257
15.4	Format for testing differences in food	
	samples by duo-trio test	257
15.5	Evaluating multiple food samples	258
15.6	Sample score sheet for numeric	
	scoring	258
15.7	Hedonic scale for food evaluation	259
15.8	Score card for composite evaluation	260
Figure	25	
1.0	Classification of carbohydrates	1
1.1	Structural representation of saccharides	2
1.2	Household test for sugar concentration	3
1.3	Stages for cold water test for boiling	
	syrups	3
2.1	Amylose and amylopectin linkages	25
3.1	Schematic representation of pectin	
	linkage	43
3.2	Stages of sheet test	47
4.1	Cellulosic structure of plant foods	58
5.0	Classification of food proteins	77
5.1	Approximate composition of milk	82
6.1	Egg white foams	105
6.2	Preparation of a souffle dish	135
7.1	Structural arrangements of protein	
	fibres	144
8.1	Longitudinal section of grain foods	157
10.0	Classification of dietary fats	183
10.1	Structure of fat molecule	185
12.1	Methods of food preservation	212
15.0	Criteria and methods of food	
	evaluation	247
15.1	Illustrated Hedonic evaluation scale	259

PLATES

B&W Plates

ons
ng
19
20
1
21

IV.	Microscopic view of shakarpara	
	crystals	22
V.	Microscopic view of chenna murki	
	crystals	23
VI.	A. Microscopic structure of raw and	
	cooked starches	40
	B. Microscopic structure of raw and	
	cooked starches	41
IX.	Microscopic structure of an emulsion	
	as seen in the preparation of mayonna	ise
	A. Effect of varying the method of	
	combining ingredients	139
	B. Effect of using different emulsifying	ng
	agents	140
	C. Effect of adding different fats	141
	D. Effect of temperature of	
	ingredients	142

Colour Plates

- VII. A. Effect of pH.
 B. Effect of pH. Facing page 70
 VIII. Applications of carbohydrates

 A. Food products using sugars
 - B. Starchy preparation
 - C. Fruits and vegetable dishes
 - D. Fruits and vegetable preparations

Facing page 72

- X. Applications of proteins
 - A. Milk and milk products
 - B. Judging egg quality
 - C. Judging egg quality
 - D. Egg preparations
 - E. Meat preparations
 - F. Meat preparations
 - G. Pulses, legumes and nuts

Facing page 164

XI. Applications of fats and oils—Food products containing fats

Facing page 164