

Contents

Foreword	iii
Preface	xi
Acknowledgments	xiii
About the authors	xv
Chapter 1. Table olive perspectives	1
Introduction	1
Historical aspects of table olives	2
Historical aspects of Australian table olives	4
Cultural perspectives regarding table olives.....	7
International table olive trade	7
Australian table olive trade activities	8
Australian table olive perspectives	9
Table olive activities in Australia.....	10
Australian table olive trade	10
Activities undertaken by Australian table olive growers/processors	11
Australian table olive production	12
Australian table olive imports	12
Australian table olive exports	13
Australian table olive consumption	13
Olive growing in Australia.....	14
Conceptual approach to the Australian table olive industry	15
Chapter 2. The olive tree <i>Olea europaea</i>	17
The olive tree.....	17
Natural history of the olive tree	18
Natural history of olive production	20
Principal components of the olive tree.....	21
Olive leaves	21
Olive roots.....	24
Olive trunk, branches and stems.....	24
Olive suckers.....	25
Annual olive events.....	25
Critical water requirements.....	26

Vegetative growth in the olive	26
Reproductive development in the olive	28
Olive flower fertilisation and fruit set.	31
Olive fruit development and growth	33
Stages of olive fruit growth	34
Biennial bearing (alternate bearing) and the olive tree.	36
Olive fruit	37
Description of olive fruit	38
Olive fruit shape and size.	39
General physical features of olive fruit	40
Olive exocarp (epidermis and cuticle)	40
Olive fruit flesh (mesocarp).	41
Olive endocarp and embryo	42
Moisture content of raw olives	42
Flesh to stone ratio of olives	43
Oil content of raw olive flesh.	43
Carbohydrate levels in raw olive flesh.	45
Phenolic substances in raw olive flesh	46
Protein levels in raw olive flesh	48
Pigments in raw olive flesh	48
Mineral content of raw olive flesh.	49
Further components in raw olive flesh.	50
Natural microbiological flora on olive fruit.	50
Changes in olive flesh resistance during maturation.	50
Internationally important table olive varieties	51
Important table olive varieties.	52
Selected characteristics for table olive varieties	53
Additional table olive varieties grown in Australia	64
Chapter 3. Producing quality raw olives	67
Introduction	67
Basic requirements of raw olives.	68
Planning for table olive production	69
Starting to grow table olives	70
Planning the table olive orchard	70
Local government and agency requirements for growing olives	70
Climatic considerations.	70
Chilling hours.	72
Heat degree-days and radiation	72
Frost prone areas and extremely low temperatures.	72
Hot dry areas	73
Water availability	73
Site requirements	74
Other considerations	75
Varietal considerations for table olives.	76

Olive pollinating varieties	78
Olive varieties and table olive processing	78
New varietal considerations for table olives in Australia	79
Establishment of the table olive orchard	81
Olive orchard design	81
Soil requirements	82
Olive tree maintenance for quality olive production	90
Soil management	90
Fertilisers and manures	92
Organic manures	93
Nitrogen fertilisers	95
Potassium fertilisers	96
Phosphate fertilisers	96
Olive orchard nutrition specifics	97
Trace elements for olive trees	102
Fertiliser requirements and monitoring nutritional status	104
Irrigation requirements for olive production	106
Olive productivity	109
Maintenance of the olive tree	110
Pruning tips for olive trees	112
Stress factors and diseases that can affect olive trees	112
Pests and disease management	113
Integrated pest management	120
Maturation states for table olive production	122
Harvesting for table olive production	123
Post-harvest handling of raw olives	126
Undesirable qualities of raw olives for table olives	127
Concluding remarks	129
Chapter 4. Table olive processing: general aspects	131
Introduction	131
Table olive processing methods and varieties	132
Good Manufacturing Practice (GMP) and table olives	133
Water requirements for table olive production	134
Planning table olive processing facilities	135
Functional table olive processing facility	136
General facilities and equipment required	153
Protocol for cleaning and sanitising equipment	155
Protocol for cleaning and sanitising food contact surfaces	155
Table olive processing	157
Table olive methods and styles	160
Raw olives used for table olive production	161
Common trade preparations of table olives	161
Specialty table olive products	164
Table olive styles	165

Common table olive methods and products	167
Primary processing specifications for table olives	167
Secondary table olive processing specifications	168
Finished table olive product specifications	169
Generic processing protocol for table olives	169
Acceptance of raw olives by processors	170
Correct storage of raw olives at the processing facility	171
Raw olives enter the table olive processing line	172
Placement of table olives into processing tanks	174
General methods for processing table olives	175
Microorganisms relevant in table olive processing	177
Manipulation of microbial activity	179
Fermentation and table olives	182
Anaerobic fermentation	183
<i>Environmental considerations with table olive processing</i>	185
Common methods of preservation for table olives	186
Packaging of table olive products	187
Pasteurisation of table olives	188
Alternative procedures	189
Chapter 5. Specific table olive processing methods	191
Processed table olives available in Australia	191
Wholesale table olive trade in Australia	192
Sale of loose table olives in Australia	193
Packaged table olive products in Australia	194
Processing olives with water (water-cured)	196
Step-by-step procedure for water-cured olives	197
Processing olives with brine (brine-cured)	198
Naturally black-ripe olives processed in brine	198
Features of anaerobic conditions	199
Green-ripe olives processed in brine	203
Turning colour olives processed in brine	203
Step-by-step method for processing untreated olives in brine under anaerobic conditions	203
Bruised/cracked olives processed in brine	205
Processing Kalamata-style table olives	206
Traditional short method for processing Kalamata-style olives	207
Long method for processing Kalamata-style olives	207
Processing olives with lye (sodium hydroxide)	209
Processing tips for treating green-ripe olives with lye	213
Step-by-step method for processing green-ripe olives with lye	213
Potential problems: stuck fermentations and corrective actions	214
Stuck fermentations and their management	214
Lye treated green-ripe olives without fermentation	217
Step-by-step procedure for lye treated green-ripe olives without fermentation	217

Step-by-step method for <i>Olive de Nimes</i>	218
Californian/Spanish-style black olives	219
Step-by-step method for preparing Californian/Spanish-style black olives	220
Lye treatment 1	220
Lye treatment 2	220
Lye treatment 3	220
Washing step	221
Colour enhancing step	221
Brining step	221
Further steps	221
Processing dried table olives (shrivelled olives)	223
Salt-dried olives	223
Step-by-step method for preparing salt-dried black olives	223
Heat-dried table olives	225
Step-by-step method for preparing sun/heat-dried olives	225
Ferrandina-style table olives	226
Step-by-step method for processing <i>Ferrandina</i> olives	226
Post-processing table olive operations (secondary processing)	227
Packing solutions for table olives	227
Secondary table olive processing	228
Adding vinegar and olive oil	228
Recipe for packing solutions with brine, vinegar and olive oil	228
Adding herbs, spices and marinades to table olives	229
Recipes	232
Antipasto	234
Oil cured olives	234
Pitting and stuffing table olives	234
Step-by-step method for stuffing table olives	235
Olive pastes	235
Tapenade	237
Step-by-step method for making tapenade	238
Final table olive products	240
Chapter 6. Quality and safety	243
Introduction	243
General qualities of packed table olives	244
Quality and safety evaluation of processed olives	245
Physical testing/evaluation of processed table olives	245
Physical quality criteria for table olives	248
Description of physical defects for processed table olives	249
Chemical quality criteria for table olives	250
Brine analysis	250
Clinistix™ and Diastix™ test strips	251
Clintest™ tablets	251
High pressure liquid chromatography	251

Salt refractometer	252
Salometer	252
Volhard titration method for sodium chloride estimation	253
Accurate pH measurements using a pH meter	254
Titration method with colour indicator (phenolphthalein)	254
Titration method with pH meter	254
Evaluation of table olive brines	255
Table olive flesh analysis	256
Carbohydrate and sugar levels in processed olive flesh	258
Mineral content of processed olive flesh	259
Microscopic examination of fermentation brines	260
Microbiological evaluation of table olives	260
Microbiological analysis of processed olive flesh and brines	262
Organoleptic evaluation of table olive products	263
Proposed IOOC organoleptic assessment of table olives	270
Table olive spoilage and deterioration	273
Malodorous deterioration of processed olives	277
Packaging and labelling olive products	279
Food-borne disease and table olives	286
Physical contaminants: foreign matter	288
Chemical contaminants	288
Microbial contaminants	289
Final table olive products	294
Bibliography and additional reading	297
Index	322