Woodhead Publishing Series in Food Science, Technology and Nutrition

# Soft Drink and Fruit Juice Problems Solved

Second Edition

Philip R. Ashurst Robert Hargitt Fiona Palmer





## Contents

Prefa	Preface		ix
1	Introductory		
	1.1	What are soft drinks?	1
	1.2	What are the main types of soft drinks?	2
		What are the principal ingredients required for soft drinks?	2
	1.4	What factors need to be considered if a soft drinks	
		business is started?	3
	1.5	Processing	4
		Packaging	5
		Processing	5
	1.8	What do powdered drinks contain?	5
2	Product Development		
	2.1	Initial issues affecting product development	7
	2.2	The marketing brief	13
	2.3		15
	2.4	Packaging issues	18
	2.5	0	20
	2.6	Shelf-life prediction	23
	2.7	Assessing consumer reactions to new products	26
3	Ingredients in Soft Drinks		
	3.1	Water as an ingredient	29
	3.2	Fruit materials as ingredients	32
	3.3	Carbohydrate sweeteners	36
	3.4	Intense sweeteners	41
		Flavourings	46
	3.6	Colourings	51
		Preservatives	56
	3.8	Nutraceutical or functional ingredients	60
	3.9	Miscellaneous additives	63

	<u> </u>
VI	Contents

#### 4 Manufacturing

4.1	Ingredient storage and sourcing	67
4.2	Manufacturing and compounding problems	72
4.3	Processing, pasteurisation, homogenisation and related issues	77
4.4	Filling operations	83
4.5	Secondary packaging	90
4.6	Finished product storage	91
4.7	Alternative processing systems	93

#### 5 Quality Issues

5.1	Ingredient quality	95
5.2	Ingredient interactions	98
5.3	Ingredient specifications	100
5.4	Problems and safety issues during manufacture	102
5.5	Colour and appearance changes	108
5.6	Flavour deterioration	112
5.7	Packaging interactions	118

### 6 Microbiological Problems

6.1	Why are microbiological problems of particular	
	concern in the production of soft drinks and fruit juices?	123
6.2	What makes one soft drink more susceptible	
	to microbiological spoilage than another?	123
6.3	How can microbial organisms be prevented	
	from developing?	124
6.4	What problems arise from yeast contamination?	125
6.5	What are the issues of mould contamination?	125
6.6	Are bacteria likely to cause many problems?	126
6.7	Examples of troublesome micro-organisms?	126
6.8	Can soft drinks become contaminated	
	with pathogenic organisms?	126
6.9	What are the early signs of microbial contamination?	127
6.10	How do I find the likely source of contamination	
	in a product?	127
6.11	What steps should be taken to minimise contamination	
	in manufacturing plant?	128
6.12	What value does a period of quarantine storage have?	129
6.13	An equipment breakdown causes a delay of several hours	
	before a product can be packed off. Does this situation	
	pose a serious threat to the microbiological condition	
	of the product?	129
6.14	What steps should be taken to remove viruses from	
	soft drinks and fruit juices?	130
6.15	Should a producer be concerned about	
	product contamination from fungal toxins?	130

7	Shelf-Life and Storage Issues			
		What does the term 'shelf-life of a product' actually mean? Can the shelf-life of a product be accurately predicted? What are the main factors affecting the shelf-life of a product? What other factors affect shelf-life? Should the shelf-life of products be monitored on a regular basis and if so how is this best carried out? Why do products need a long shelf-life and how can	131 131 132 133 134	
	,	this be maximised?	135	
8	Fruit Juices and Fruit Nectars			
	8.1 8.2 8.3 8.4	Fruit juice Fruit nectars Production and processing of fruit juice Quality and authenticity	137 140 141 142	
9	Bottled Waters			
	9.2	Water legislation Water extraction Water treatment and bottling Quality issues Storage and distribution	145 149 153 155 159	
10	Packaging, Storage and Distribution of Soft Drinks and Fruit Juice			
	10.1 10.2 10.3 10.4 10.5 10.6	Packaging and labelling issues Problems during filling and packaging operations Post-filling defects Storage conditions	161 168 172 176 180 183	
11	Handling Consumer Complaints, Food Incidents and Crisis Management			
	11.1 11.2	Recording and handling consumer complaints Traceability systems and crisis management	185 189	
12	Envi	ironmental Issues		
	12.1 12.2	consents apply to my business?	195	
	12.2	What are the likely major sources of waste from my business? Are all the necessary consents in place for me to	195	
		discharge effluent?	196	

	12.4	Am I discarding valuable ingredients	
		(such as sugar residues) and if so can I recover all or part?	196
	12.5	Am I meeting my obligations under the packaging	
		waste regulations?	196
	12.6	Is there anything I can do to recycle any of my	
		packaging components or to use recycled components?	197
	12.7	Can I use recycled PET?	197
	12.8	What is IPPC and does it relate to my business?	197
		What is the climate change levy and can I	
		claim an exemption?	198
	12.10	Is my business affected by WEEE?	198
		Do my containers have to be recyclable?	199
		Should I be concerned about ethical issues	
		relating to my products?	199
13	Regulatory and Statutory Issues		
	13.1	Product information and labelling regulations	201
	13.2		206
	13.3	How do I find out which additives are permitted	
		in soft drinks?	207
	13.4	How should compliance with legislation in markets	
		other than that for which the product was originally	
		designed be confirmed and how can such information	
		be kept up to date?	207
	13.5	What does a responsible manufacturer have to	
		do to ensure that he or she is up to date with	
		statutory requirements?	208
	13.6	What are the main statutory issues that	
		beverage manufacturers must comply with in the	
		United Kingdom?	209
		U U	
List o	f Acror	ivms	211
References and Further Reading			213
Index			215