TECHNOLOGY OF

Reduced Additive Foods

JIM SMITH

Second Edition



Contents

1		v animal-derived ingredients	1		
		ITH G. ANDERSON			
	1.1		1 3		
		Mechanical upgrading of underutilised carcass meat Surimi	6		
	1.5	1.3.1 Surimi from fish	6		
		1.3.2 Red meat and poultry surimi	7		
	1.4	Upgrading of meats using fractionation techniques	14		
		Ingredients from blood	19		
		Egg and other products	20		
	1.7	Potential techniques for the production of animal-derived ingredients	21		
		1.7.1 Ultrafiltration	21		
		1.7.2 Membrane and membraneless osmosis	21		
		1.7.3 Solvent extraction	22		
		1.7.4 Supercritical extraction	22 23		
		1.7.5 Enzyme modification 1.7.6 Spray drying	24		
		1.7.7 Fluidised-bed drying	24 25		
		1.7.8 Thermoplastic extrusion	25		
	1.8	Conclusions	25		
		erences	26		
2	Nev	New marine-derived ingredients			
	TO	RGER BØRRESEN			
		Introduction	30		
		Additive or ingredient?	30		
		The basis for new marine-derived ingredients	31		
		Specific marine-derived compounds	31		
	2.5	New marine-derived ingredients 2.5.1 Antioxidants	32 32		
		2.5.2 Taste-adding substances	33		
		2.5.3 Water-binding agents	34		
		2.5.4 Compounds active against microbes	34		
		2.5.5 Enzymes	35		
	2.6	Marine-derived ingredients being an integral part of the food	35		
		2.6.1 Carbohydrates	36		
		2.6.2 Proteins	39		
		2.6.3 Lipids	41		
	2.7	0	42		
	Ref	erences	43		
3	The technology of reduced additive breadmaking				
	TE	TERRY SHARP			
	3.1	Introduction	46 46		
	3.2	Why are additives used?	40		

	3.3	Key steps in breadmaking 3.3.1 Inclusion of air	47 47			
		3.3.2 Expansion of bubbles 3.3.3 Retention of gases	47			
	3.4	Compensating for raw material variation	47			
		Improvement of dough-handling characteristics	48			
		Extending the shelf-life of bread	51 53			
		3.6.1 Organoleptic changes	53			
		3.6.2 Microbial changes	55			
	3.7	Conclusions	59			
		erences	59			
4	Novel food packaging 61					
		CHAEL L. ROONEY and KIT L. YAM	•			
	4.1	Introduction	61			
	4.2	F	61			
		4.2.1 Food degradation processes	61			
		4.2.2 Characteristic needs of foods	62			
		Properties of packaging materials	65			
	4.4		65			
		4.4.1 Gas atmosphere treatments 4.4.2 Thermal treatments	66			
	4.5	Active packaging technologies	68			
	7.5	4.5.1 Oxygen scavengers	70 70			
		4.5.2 Carbon dioxide control	70 74			
		4.5.3 Water vapour control	74			
		4.5.4 Ethylene scavenging	75			
		4.5.5 Antimicrobial food packaging	75			
		4.5.6 Antioxidant-releasing packaging	78			
	4.6	Future opportunities	79			
	Refe	erences	80			
5	Ant	Antimicrobial preservative-reduced foods 84				
		KKI BEALES and JIM SMITH				
	5.1	Introduction	84			
	5.2	Control of microorganisms	85			
		5.2.1 Antimicrobial preservatives in foods	85			
		5.2.2 Hurdle concept	87			
		5.2.3 Formulations	88			
		5.2.4 Processing environment	89			
		5.2.5 Processing methods	90			
	5.3	5.2.6 Packaging methods	92			
	3.3	Alternatives to antimicrobial preservatives 5.3.1 Nitrite alternatives	93			
		5.3.2 Sulphite alternatives	93			
		5.3.3 Low sodium products	94			
	5.4		95 95			
		5.4.1 Natural antimicrobials found in animals and animal products	95 96			
		5.4.2 Natural antimicrobials from microorganisms	96 96			
		5.4.3 Natural antimicrobials from plants	99			
	5.5	Combinations of existing preservative mechanisms and	//			
		natural preservatives	100			
	5.6	Conclusions	100			

CONTENTS	
----------	--

хi

	Referenc		101
	Further re		105
	I dittioi i	ading	
6	New pla	nt-derived ingredients	106
•	-	UL HAQ	
		-	106
	6.1 Intr		107
		h protein species	110
		its and nuts	116
		inary herbs and spices ential oils	119
		erages and drinks	120
		ars and sweeteners	121
	6.7 Sug	ns and starches	122
		v technology	122
	6.10 Co		123
		edgements	123
	Reference		123
	Further r		124
		-	
7		l additive brewing and winemaking	125
	CREIN	A S. STOCKLEY, T. NIGEL SNEYD and	
		H. LEE	
	7.1 Int	oduction: quality is a perception rather than a measurable parameter	125
		1 Winemaking	126
		2 Brewing	126
		3 Definition of an additive	128
		rimicrobial agents	129
		1 Microbial spoilage in brewing	129
	7.2	2 Microbial spoilage in winemaking	135
	7.2	3 Addition of SO ₂ in winemaking	136
	7.2	4 Alternative additives to SO ₂ in winemaking	140
	7.2	5 Technological methods to reduce the amount of SO ₂ added	143
		6 Use of nisin in brewing	146
		tioxidants	148
		1 Oxidation in brewing	148
		2 Oxidation in winemaking	150
		edgements	156
	Reference	- -	156
	Further		161
			1/0
8		om supplement-fed animals	162
		RON FAUSTMAN	
		roduction	162 162
		amin E supplementation	162
	8.2		163
	8.2		165
	8.2		165
	8.2		169
	8.2		171
	8.2		171
	8.2		171
	8.2		173
	8.2	.9 Cholesterol oxide formation and vitamin E	1/3

		8.2.10 Exogenous addition of vitamin E to meat products	17
		8.2.11 Potential for vitamin E toxicity in meat-producing animals	17:
	8.3	***************************************	17
		8.3.1 Introduction	17-
		8.3.2 Carotenoid supplementation in fish husbandry	17:
		8.3.3 Carotenoid supplementation in fish – food science concerns	17
		8.3.4 Carotenoid supplementation in poultry	178
	8.4		178
		Cholesterol reduction	180
	8.6	Alteration of fatty acid profile	180
		Competitive exclusion	182
	8.8	- ··	184
		nowledgements	184
	Refe	erences	184
9	Sta	rter cultures	191
	GU	NNAR MOGENSEN	
		Introduction	191
	9.2	Dairy products	191
		9.2.1 Additives used in dairy products	191
		9.2.2 Starter cultures for dairy products	192
		9.2.3 Starters as substitutes for additives	193
	0.2	9.2.4 Future aspects	198
	9.3	Meat products	198
		9.3.1 Additives used in fermented meat products	198
		9.3.2 Starter cultures for meat products	200
		9.3.3 Starter cultures as substitutes for meat additives	201
	0.4	9.3.4 Future aspects	202
	9.4	Bread products	203
		9.4.1 Additives used in wheat bread products	203
		9.4.2 Additives used in rye bread products	204
		9.4.3 Microbiology applied in bread production9.4.4 Starter cultures as substitutes for bread additives	204
		9.4.5 Future aspects	204
	0.5	Genetic stability of lactic acid bacteria	206
	9.5	Possibilities in classical and modern biotechnology	206
	Ack	nowledgements	207
		rences	208
	MUIC	TORCO	208

Index