Index

a
AAS, atom absorption spectrometry 587
Absolue 248
Acetaldehyde 279
Acetic acid and acetates 277, 385
Acetoin 162
5-Acetyl-2,3-dihydro-1,4-thiazine 279, 281
N-Acetylglucine (NAG) 558
2-Acetyl-1-pyrroline 281
2-Acetyltetrahydropyridine 281
Acrylamide 292
Activity coefficient 25, 72
Adenosine monophosphate, AMP 356
Adenosine triphosphate, ATP 358
Adjuncts 640
Affinity 24
Agar-agar 443
Agitated extraction tower 42
Alanine 278f, 287, 290
Alapyridaine 287
Alcoholic beverages 487-514
Alfa-Laval extractor 38
Algae 124, 744
Alginate 439
Allspice 241
Almond 306, 412
Amadori rearrangement 277
– compounds 276-279, 287
– degradation of A. compounds 277f
Ames test 291
Amino acids 268, 278, 459
– interactions with free A. 449f
AMP, adenosine monophosphate 356
Amplification column 76
Amylopectin 439
Amylose 443
Analytical methods 587-743
Angelica 216
Angelina bark 216
Animal fats 543
Anise 217, 624
Anthocyanins 473
Anti-aging 7
Antioxidants 373-376
Apple 166f, 412, 679
– aroma 723
– juice 167f, 171ff
Apricot 413
Aquavit 493f
Aqueous essences 187
Arabian Standardisation and Metrology Organization, ASMO 784
Arachidonic acid 283f
ARD extractor 43f
Argentina, legislation 781
Aroma 576, 578
– analysis 704-743
– changes 737
– chemicals 5, 140
– compound 140
– reconstitution 729
– recovery 166, 175, 177
Aroma extract concentration analysis, AECA 706
Aroma extract dilution analysis, AEDA 705
Aroma model 710
– baguette crust 710
– camembert cheese 717
– grapefruit juice 722f
– gruyere cheese 717
– olive oils 718ff
– orange 720ff
– reconstitution 729
– roasted coffee 710
– strawberry juice 724
– Swiss cheese 716
– wine 735
Aroma value, definition 704
Aronia 470
ARP, Amadori rearrangement products 277
Arrack 491
Artificial compounds 159
Artificial flavouring substance 139, 158, 755, 757
Artificial flavourings 775
Artificial sweeteners 470, 476, 522
Ascorbic acid 374, 472
Ascorbyl palmitate 374
Asia, legislation 784-800
ASMO, Arabian Standardisation and Metrology Organization 784
Asparagine 233
Asparagus 431
Assessor 579f
Atom absorption spectrometry, AAS 588
Atomisation 98, 307
Atomiser 98f
– centrifugal a. 99
– nozzle a. 99
ATP, adenosine triphosphate 358
Australia, legislation 801
Authenticity control 619, 684f
Autoxidation 282ff
Azeotrope distillation 81
Azeotrope, maximum 73, 81
Azeotrope, minimum 73, 81

b
Bacteria 109, 145, 744
Baguette crust, aroma 705
Baked goods 531
Banana 413
– puree 174
Bärenfang 503
Base notes 429, 557
Basil 218
– aroma 731f
Beef 263, 287f, 559
– aroma 711f
– broth 287
– boiled 711f
Beer 345f, 474, 506-511
– flavour 270
– types 510
Benzaldehyde 1, 158, 444, 602, 623f
Benzene in beverages 386
Benzo[a]pyrene 290
Benzoates 382ff
Benzoic acid in foods 373
Benzpyrene 311f
Bergamot oil 191
Berl saddles 93
Berries, juice 171
Beta-carotene 473
Beverage emulsions 471
Beverage industry 4
Beverages 333, 466, 473ff, 733ff
BHA, butyl-hydroxyanisole 373
BHT, butyl-hydroxytoluene 373
Billberry 417
Binodal curve 28
Binomial distribution 580
Biocatalysts 123, 148, 263
Bioreactors 120
– cell culture reactors 129
Biotechnological processes 120-134, 142, 260
Biotechnology 120, 260
Biotransformation 121, 143ff
– by microorganisms 145
– of flavour precursors 128
Biscuits 290, 531
Bitter 578
– almond oil 219, 623
– blockers 11
– orange oil 204
Bitters 495
Black currant 413
– buds 219
Black mustard 236
Blackberry 418
Blended flavourings 391-435
Blessed thistle 219
Blood orange
– oil 204
– essence oil 207
Blue Book 758
Blueberry 417
Bollmann extractor 21
Bone-stock 557
Bonito 353
Bonotto extractor 22
Borage 220
Bouillon 552, 558ff
– cubes 549
Brambles 418
Brandies 488ff
Brazil, legislation 779ff
Bread 274, 282, 292, 327ff, 531
Brewing 345, 506ff
– process 509
Bromelain 335
Brominated vegetable oil, BVO 776
BROWN extractor 166f
Bubble
– flow 57
– gum 522
– b.-cap plates 93
Buchu leaf oil 220, 685ff
Buddhist conform 292
Bunscape 533
2,3-Butanedione 277, 279, 707
Butter 284, 718
Butterfat 265
Butyric acid 161, 385
BVO, brominated vegetable oil 776
c
C₃-plants 606
C₄-plants 606
Cakes 531
Calamus 62
Callus cultures 130, 263
Calories 7, 465
Camembert cheese 717
Camomile 61f
CAM-plants (crassulaceam acid metabolism) 606
Canada, legislation 775ff
Cape Gooseberry 418
Capers 220
Caramel 289, 521f
– colours 474
Caraway 221
Carbohydrate-based replacer 456f
Carbon Dioxide, CO2 50, 52
Carbonyl fragments 277
Cardamom 60, 221
Cardboard odour 283
Carmine 473
Carrier
– bound enzymes 128f
– distillation 79
– material for spray drying 97
– matrix for freeze dried products 114f
– permitted c. solvents 317-321
– permitted c~s 317-321
– sugars as c~s for flavours 438
Carrot seed oil 222
Carry-through effect 376
Carvone 162, 636
β-Caryophyllene epoxide 163
Cascarilla 222
Cassia cinnamon 224, 556
Cayenne pepper 242
CCFAC, Codex Committee on Food Additives and Contaminants 160, 756
CEFS, Committee of Experts on Flavouring Substances 761
Celery 223
Cell cultures 121, 271
– flavour manufacturing from c. c. 271
– immobilized cultures 143f
– plant c. c. 130, 261, 271
– plant tissue cultures 143
– reactors 129
– suspension cultures 143
– tuber melanosporum cells 272
Cell tissue cultures 143, 271
Cellulose 439
Centaury 223
Centrifugal
– atomizer 99f
– evaporator 88f
– extractor 37
Centrifuge 23, 167, 170, 177, 180ff
– decanter c. 180ff
Cereal malt 335
Ceylon cinnamon 224
Character impact compounds, CIC 396, 411ff
Charm analysis 705f, 708
Cheese 282, 292
– aroma 716-718
– enzymatic modified c. 264, 349
– flavour 269
– fresh c. products 545
– ripening 348f
Chemaesthetic stimulation 579
Chemical groups 161, 790
Chemical ionisation, CI 595
Chemical potential 71
Cherimoya 418f
Cherry 413f
Chervil 223
Chewing gum 522f
Chicken 263, 268, 284, 288, 551, 559
– aroma 713f
– boiled c. aroma 713
– roasted c. 713
Chico 418
Chile, legislation 782f
Chill proofing enzymes 346
China, legislation 787
Chinese Gooseberry 422
Chinese Restaurant Syndrome 356, 554
Chips 307
Chiral
– resolution, cRs 664
– separation 665
– stationary phases 696
– sulphur compounds 686
Chlorophyll 272, 474
Chloroplasts 272
3-Chloro-1,2-propanediol 292
Chocolate 282, 289f, 426, 526ff, 537
Cholesterol 7, 453
Chromatography 590ff
– absorption c. 591
– affinity c. 591
– c. of terpenes 190
– ion exchange c. 591
Chymosin 335
CI, chemical ionisation 595
CIC, character impact components 396, 411ff
Cinchona bark 223
1,8-Cineol 163
Cinnamic aldehyde 141, 158, 163, 623
Cinnamon 224f, 624
Citral 161, 414, 635
Citrus
- aqueous essences 187
- auranitifolia 196f, 414
- auranium 191f, 204
- essence oil 187
- juices 167, 176ff
- latifolia 196f
- limon 194f, 414
- oils 187-211
- paradisi 192f, 415
- peel oil 167f, 176, 187, 468, 635
- recovery, taste oil 187
- reticulata 199f, 415
- sinensis 201f, 414

Clary sage 225
Clear soft drinks 468f
Cloudberry 424
Clouding soft drinks 469f
Cloudy concentrates 470
Cloves 225
CO₂, Carbon Dioxide 50-65
- fixation 606
Cocoa 274, 287, 290, 426, 498
- liqueur 498
Coconut 415, 674
Code of Federal Regulations 159
Cofactor 149, 151
Coffee 282, 289, 425, 498
- freeze dried 114
- liqueur 498
- brew 737
- roasted 733
- aroma model, omission test 733
- aroma reconstitution 733
Cognac oil 226
Cola 433
Cold pressed oil 187
Colour shade 472ff
- red 473
Colours 466
Colours for soft drinks 472
Colombia, legislation 682f
Column characteristics
- loading range 40
- throughput maximum 39
Column fillings 93
- Berl saddles 93
- Grating rings 93
- Intralox rings 93
- Pall rings 93
- Raschig rings 93
Columns
- amplification c. 76ff
- pulsed packed c. 40
- Scheibel c. 41
- sieve plate c. 91
- static sieve tray c. 40
- stripping c. 76f
- tray c. 93
Combustion 608
Compressed tablets 524
Confectioneries 515-530
Consumption ratio 759
Contacting, stage-wise or differential 32
Contaminants 386
Continuous distillation 75ff
Continuous phase 26
Continuous rectification 76, 90f
Convenience food 7, 138, 274, 549ff
Cooler 505
Cooling table 517, 522
Coriander 226, 693
Cornmint oil 240
Coumarin 158
Council of Europe 759
Countercurrent distillation 90
Countercurrent rectification 20
Cow shed smell 545
Crackers 307
Cranberry 417
Creatinine 291f
Cross-current extraction 30
Culinary aroma 561ff
Culinary products 274, 549
Curacao 497
Curculin 369
Custard apple 418
Cut-back juice 177
Cyclodextrins 348, 443, 670
Cyclopentenolones 317
Cyclotene® 290, 366
Cysteine 279, 284, 288f

d
Da Vinci Principle 10
DAD, diode array detection 592
Dairy products 542-552
Dalton’s law 71, 81
Dangerous preparations 769
Dangerous substances 769
DATEM, diacetyl tataric acid esters of monoglycerides 328f
Davana oil 227
De novo biosynthesis 143f
DEAE-cellulose 271
2,4(E,E)-Decadienal 283
2,4(E,Z)-Decadienal 283
Decaffeination 51
γ-Decalactone 162
Decanal 283
Decanter 22
2(E)-Decenal 283
Dehydrated convenience food 549-572
Dense gas extraction 50ff
Deoxyglycosones 276f
Deterpenisation 189
Deuterium spectrum 616
Dextrins 473
Diacetyl 162
Dichloropropanols 264
Dielectric constant 25
Difference point or pole 33
Digeration 513
Digestion 18
Diketopiperazines 287
Dill 227, 730
Diluent 26
4,5-Dimethylthiazol 285
Diode array detection, DAD 592
Dipole moment 25
Discontinuous rectification 91
Disodium 5'-guanylate 353
Disodium 5'-inosinate 353
Dispersed phase 26f, 35f
Dispersion mode 41
Distillation 66-96
– azeotrope d. 81f
– carrier d. 79f
– continuous d. 83f
– countercurrent d. 90
– distillative separation of terpenes 190
– extractive d. 82f
– high vacuum d. 87f
Distillation-extraction process 30
Distilled lime oil 188
Distilled spirits 487
Distribution coefficient, K 24
Distribution curve 29
2,6(E,Z)-Dodecadienal 284
Double jacket 85
Dough 531
Dry product 556
Drying 109-119
– chamber 110
– methods 109ff
– spray d. 97ff
– thermal d. 109f
– vacuum d. 109
DUO tests 582
DUO-TRIO tests 582
Durian 424
Dust explosion 103
e
EC Directive 88/383 765
EC Flavour Directive 762
ECD, electron capturing detector 594
ECP, ethyl-2-cyclopentene-2-ol-1-one 366
EFFA, European Flavour and Fragrance Association 765
Effervescent tablets 525
EFSA, European Food Safety Authority 160, 763
Egg 289, 804
Egg yolk 284, 289
EI, electron impact 595
Elderberry 470
Electric discharge treatment 20
Electrochemical-detection 592
Electron impact, EI 595
EMC, enzyme modified cheese 264, 349
Emulsifiers 322-330, 456, 539
Emulsion stabiliser 330
Emulsions 470
Enantio cGC 664
Enantio-IRMS 692f
Enantio-MDGC, enantioselective multidimensional GC 665f
Enantiomeric excess, ee 669
Enantiomeric purity 669
Enantioselective analysis 664-703
Enantioselective cGC-IRMS 693
Encapsulation 97ff, 532, 565
Energy drinks 468
Enhancement 557
Enhancer 11
Entrainers 54, 83
Enzymatic activities 261
Enzymatic reactions 261f
Enzyme
– classification 148f, 336
– production 121, 337
– reactors 123
Enzyme modified cheese, EMC 264, 349
Enzymes 148f, 335-350
– carbohydrases 343
– endopeptidases 339
– exopeptidases 339
– for brewing 345f
– for cheese ripening 348f
– for clarification of fruit juices 173f, 179, 347
– hemicellulases 266, 338, 342
– in the baking industry 342ff
– industrial e. 337ff
– lipases 264f, 340
– lipoxygenases 121, 341
– origin of e. 337
– oxidoreductases 336, 341
– pectinesterases 266
– pectintranseliminase 266
– pectolytic e. 266
– polygalacturonases 266
– proteases 107, 263, 266, 339
– proteinases 342
– -glycosidases 267
Epithelium 576
Equation, Clausius-Clapeyron 74
Equation, Gibbs-Duhem 73
Equation, Langmuir-Knudsen 87
Equation, Prausnitz 73
Equation, Redlich-Kwong 73
Equilibria, ideal-nonideal 71
Equilibrium curve 27, 32
Equilibrium phase diagrams 73
Equipment, continuous distillation 83
Equipment, countercurrent distillation 90
Essence oils 187
Essential oils 5, 137, 453, 456
Ethnic foods 12
Ethyl butanoate 161
Ethyl maltol 362
N-Ethyl-p-menthane-3-carboxamide 163
Ethyl vanillin 159, 368, 528
Ethylene oxide 748
Eucalyptus oil 228
Eugenol 58f, 163
European Food Safety Authority (EFSA) 160, 763
European Union, legislation 762-771
Evaporator 83-89, 166-178
– ALFA-LAVAL e. 167, 175
– centrifugal e. 81
– circular e. 86f
– falling-film e. 83f
– forced circulation evaporator 85f
– LUWA e. 86
– rotatory e. 85
– SAKO e. 86
– Sambay thin-film e. 79
– TASTE e. 166, 174
– thin-film e. 86
Exposure level 758

Extract 23
Extracting agent 82
Extraction 17-48
– batteries 36f
– battery with decanter 22f
– countercurrent e. 20ff
– cross current e. 30ff
– e. tower with mechanical agitation 40
– e. tower without mechanical agitation 39
– liquid-liquid e. 24
– maceration 18
– membrane e. 178f, 271
– multistage e. 30-35
– single-stage e. 27-30
– selectivity 26
– solid-liquid e. 17f
– solvents 26, 314ff
– soxhlet e. 20
– stages 23
– tower 38-46
– water e. 170
– with CO2 50ff
Extractive concentration of citrus oils 190
Extractive distillation 82
Extractive methods 190
Extractors 20-46
– citrus juice e., Brown 166f
– citrus juice e., FMC 166f, 177
– juice e. 166ff
Extrusion 291

f
Falling film evaporator 83f
FAO, Food and Agriculture Organization of the United Nations 761f
Fat 7
Fat degradation 274
Fat replacer 12, 455ff
– interactions of volatiles with f.-r. 455-459
Fatty acids 282
FD factor 705
FDA, Food and Drug Administration 771
FEMA, Flavour and Extract Manufactures’ Association 160, 760
Fennel 229, 624
Fenske method 76
Fenugreek 229
Fermentation 121, 145, 260
– in-situ-f. 121
– microbial f. 267f
– of cell cultures 129
– spontaneous f. 121f
Index

– submerged f. 125f
– surface f. 124
Fermenter 125f
Ferulic acid 286
FEXPAN, Panel of Expert Scientists 160, 773
FFDCA, Federal Food, Drug and Cosmetic Act 771
FID, flame ionization detector 593f, 666
Filtration 171, 173, 178ff
Fine bakery products 533
Fining aids 173
Fish 263, 288
– aroma 714f
– boiled 715
– fresh 714
Fitness 6, 479
Fixed bed column reactor 271
Fixes 551f
Flame ionization detector, FID 593f, 666
Flash distillation 66
Flavour
– adjunct 756
– analysis 378
– binding and release 437f
– body 557ff
– chemical 140
– definition 138, 576
– dilution factor 705
– enhancer 286
– formulated f.s 5
– fruit f. 410-425
– generation by fermentation 121ff
– industry 1-13, 137f
– intrinsic f. 557
– legislation 763-767
– manufacturing from cell cultures 271f
– manufacturers of f. 3
– migration 9
– modifier 351-372
– potentiator 351
– precursors 282, 285
– preservation by drying 114
– profile 378ff
– pyramid 570
– research 137
– substance 140
Flavour dilution factor, FD factor 705
Flavour & Fragrance Industry 1-13, 138
Flavour & Fragrance Market 2
Flavour extracts 260
– by enzymatic reactions 140
– by microbial processes 140, 145
Flavouring
– agent 140
– definition 138, 755
– permitted f. ingredients 138
– preparations based on biotechnology 260-273
– preparations by enzymatic reactions 261ff
– preparations from microbial fermentation 267f
– preparations 141
– substance 140ff, 158, 755
Flavourings
– alcoholic f. 430
– applification of f. 403f
– artificial f. 158-165
– blended f. 391-435
– commercially available f. 152ff
– dairy f. 430f
– fermented f. 429ff
– for bakery products 531-534
– for beverages 466-514
– for confectioneries 515-530
– for dairy products 542-548
– for ice-cream 535-541
– in fruit preparations 545f
– inventory of f. 160
– natural f. 140ff, 152, 755f
– natural-identical f. 158-165
– of dehydrated convenience food 549-570
– process f. 138ff, 274-297
– smoke f. 138ff, 298-313
– vegetable f. 431f
Flocculation aids 173
Flotation 171, 173
Flow conductance 69
Flow regime 74
Fluid bed dryers 525
Fluorescence detection 591
FMC extractor 166ff
FNU value 467
Fondants 518f
Food additive 757, 772
Food additive legislation 767f
Food and Agriculture Organization of the United Nations, FAO 761f
Food categories 161
Food emulsifier 323f
Food industry 7, 533f
Food proteins 330
Food-Minus 8
Food-Plus 8
Forced circulation evaporator 85
Formic acid 277, 491
Fortification 7
Fourier transform infrared, FT-IR 667
Fragrances 4
Free excess enthalpy 73
Freeze
- concentration 112f, 177
- dried coffee 114
- dried herbs 116
- dried mushrooms 115
- dried products 112-117
- drying 109-119
- shelf life of f. dried products 116
Freezing 110
Freezing point 110
French fries 724ff
- omission test 724
Freshness 7
FreshNote process 180
Fructose syrups 348
Fructose 282, 348, 367
Fruit
- aroma, analysis 720ff
- flavours 270, 410ff
- preparations 545
- purees 174
- teas 469
- wines 505
Fruit juice 166-168, 469, 746
- clarification 173, 179f, 347
- concentrates 166-186, 469, 746
- freshly squeezed 171
- liqueurs 496f
- production 174
FUFOSE, Functional Food Science in Europe 479
Fugacity coefficient 72f
Functional drinks 478-482
- definitions 478ff
Functional food 7, 479f
Fungi 145, 744
Furaneol® 163, 366
Furanones 281, 688
Furfural 279, 454
Furfuryl mercaptan 163
2-Furfurylthiol 280
Gas chromatography-olfactometry (GCO) 704
GC enantiomer separation 665
GC, gas chromatography 589, 593
GCC; Golf Cooperation Council 784
GC-FTIR, GC-Fourier transform infrared spectroscopy 596
GC-IRMS, GC-isotope ratio mass spectrometry 608
GC-MS, GC-mass spectrometry 595
GCO, GC olfactometry 704
- headspace, GCOH 706f
Gelling 334
Genetic engineering 131-133
- genetically engineered products 133
Gentian 230
- spirit 492
Geranial 161, 188
Geraniol 161
Geranium-aroma 387
German purity law 271
Gibbs’ excess enthalpy 25
Ginger 62, 231
Glucose 276ff, 438, 475
- syrup 348, 475
Glutamate 352ff, 578
Glutamic acid 288, 353
Gluten 343f
Gluten free 8
Glycemic 8, 476
Glycemic index 7
Glyceraldehyde 288
Glycerol 287-290
Glycine 276-278, 282, 290
Glycolaldehyde 277
Glycosidically bound flavouring substances 152
GMP, guanosine monophosphate 357
Gooseberry 418
Graesser contactor 44f
Grape 415f
- juice 166f
- extract 473
Grapefruit 192-194, 415
- aqueous essence 193
- aroma 722f
- essence oil 193
- juice 173, 723
- oil 192
GRAS, generally recognized as safe 292, 773
Grating rings 95
Gravies 95

Galanga 229
Garlic 230
Gas chromatography, GC 589, 593
Interactions of volatiles
- and food ingredients 437
- with amino acids 449-450
- with carbohydrates 438-445
- with complex systems and foodstuff 459-462
- with fat-replacers 455-459
- with lipids 450-453
- with proteins 445-449
Interface area 74
Interfacial area per unit volume 26
Interfacial tension 26
Intermediate moisture foods, IMF’s, 381f
Intermolecular forces 25, 71
International isotopic standard, i-IST 691f
International Organization of the Flavour Industry, IOFI 138f, 159, 755
Inventory for flavouring substances 160
IOFI, International Organization of the Flavour Industry 138f, 159, 755
Ionsising radiation 747
IQ mutagens 291
Irregular column packings 93
IRMS, isotope ratio mass spectrometry 609
Isoeugenol 163, 368, 625
Isotonic beverages 746
Isotope
- abundance 608
- analysis 613
- discrimination 606
- effects 603
- ratio mass spectrometry, IRMS 609
Isotopic correlations 637ff
Isotopic pattern 606, 637ff
Isotopomer 602

Jabuticaba 418
Japan, legislation 785f
JECFA, Joint Expert Committee on Food Additives 160, 759, 761
Jellies and gums 520f
JET COOKER 520
Juice
- extraction 167-171
- extractors 166
- oil 176
Juices 9, 171-173
- clarified j. 171ff, 175
- cloudy concentrates 470
- concentrates 173ff, 469
- natural cloudy j. 171
- reconstituted j. 178
Juniper berries 232
Juniper-based spirits 490f
K
Karr column 42
Key lime 197ff
Key odorants 704ff
- screening 705
Kinetic gas theory 68
Kitchen aids 549-572
Kiwi 422
Koch plate casting procedure 750
Koji 124, 337
Kokumi 11
Korea (South), legislation 790f
Kosher 292, 802
Kühni extractor 43

Labelling directive 79/110/EEC 767
Lactic acid starter cultures 744
Lactic acid 162, 287, 804
Lactones 630, 672ff
Lamb 288, 803
Lamellar phase 284
Langmuir-Knudsen equation 87
Laurel 233
Lavandula oils 680ff, 693
Law, Boyle and Mariotte 67
Law, Dalton’s 71
Law, Raoult’s 71
Law, Trouton’s 70
LC Taste™ 160
Leakage rate 83
Lecithine 275
Legislation and Toxicology 753-810
Lemon 194-196, 414
- essence oil 195
- juice 173, 414
- oil 194, 691
- grass oil 635
Lecine 278, 290
Life-style 9
Light taste 545
Likens-Nickerson apparatus 30ff
Lime oil 196, 415
Linalool type 218
Linalool 162
Linoleic acid 284
Linolenic acid 284
Lipid oxidation 276, 282ff
Lipid-based fat-replacers 456
Lipids 450
Index

– interactions of volatiles with l. 450-453
Lipoxygenase 282
Liqueurs 487, 496-504
Liquid-liquid
– continuous countercurrent extraction 32
– extraction 24ff
– extraction tower 38
– multi-stage extraction 30
– single-stage extraction 27
Liquid-solid extraction 17, 589
Liquorice 233f
Litsea cubeba oil 565
Loading diagram 32
Lovage 234
Low caffeine 7
Low nicotine 7
Low-oxygen system 102f
Lulo 417
Lutein 473
LUWA evaporator 88
Lychee 422
m
Macapuno 415
Maceration 18ff, 513
Maillard products 263, 276-282
Maillard reaction 274, 276-282, 287
Malaysia, legislation 791ff
Malt 274, 276, 289
Maltodextrins 101, 319, 443
Maltol 162, 289f, 362ff
Mandarin 199-203, 415
– essence oil 201
– juice 173
– oil 199ff
– oranges, aroma 722
Mango 423
Manufacturers 3
Marjoram 60, 235
Market 8
Market share 2
Marshmallow 521
Masking agents 11
Mass selective detector, MSD 595
Mass spectrometry, MS 595, 667
Mass transfer coefficient 35, 74
Mass transfer rate 26, 74
Massive chocolate products 512
Massoia oil 248
Massoilactone 674
Maximum azeotrope 81f
Mayonnaise 549
McCabe-Thiele diagrams 75, 76
MCP, 3-methyl-2-cyclopentene-2-ol-1-one 366f
MDGC, multidimensional gas chromatography 594, 612
Meat 505
Meat 274f, 427f
– cooked 561
– extract 557
– flavour 263f, 561
– snacks 307
Meat aromas, analysis 711
Meat flavour 274, 288f
Melanoids 278
Melon 423
Membrane contactor 44f
Membrane extraction 271
Membrane processes 178ff
Mentha species 679f
1-Menthen-8-thiol 160
Menthol 60, 162
Methyl lactate 162
3-Mercapto-2-butanone 279
3-Mercapto-2-methylpentan-1-ol 276, 285f
3-Mercato-2-pentanone 279
MERCOSUR 771
Meristema 130
Methional 279
Methionine 288
2-Methylbutanal 279
3-Methylbutanal 279
2-Methyl butyrate 161
Methyl chavicol type 219
4-Methyl-5-ethylthiazol 285
2-Methyl-3-furanthiol 279
Methyl ketones from butterfat 265
2-Methylpropanal 279
Methyl salicylate 158, 625
4-Methylthiazol 285
4-Methyl-5-vinylthiazol 285
Mexico, legislation 778
Microbial growth 744f
Microbial processes 139,260
Microbiological testing 744-751
Microemulsion 289
Microfiltration 179f
Micro-organisms 120, 145ff, 261ff, 744ff
– water activity and growth of m. in food 377ff
Microwave system 289, 547
Microwave heating 291
Microwave 290
Middle notes 429, 559
Milk
- defects 545
- fat 538
- rice 545
- Solids Non Fat, MSNF 538
Minimum azeotrope 73, 81
Minimum reflux ratio 77f
Minimum solvent ratio 32
Mint oils 240f, 679
Miraculin, Mirlin® 369
Miscella 17, 21f
Miscibility 24
- gap 28, 79f
Mixed-blend fat-replacer 456f
Mixer-settler 35, 41
Mixtures, thermodynamic fundamentals 71-83
Modified cyclodextrins 670
Molar evaporation enthalpy 70
Monosodium glutamate, MSG 353ff, 552f, 564
Mould 744
Mouthfeel 351, 455, 475f
MS, mass spectrometry 595, 667
MSD, Mass selective detector 595
MSDI, Maximised Survey-Derived Daily Intake 161
MSG, monosodium glutamate 353ff, 552f
- hypersensitivity 356
MSNF, Milk Solids Non Fat 538
Mugwort 235f
Multifunctionality 10f
Multistage distillation 67
Murcott tangerine oil 200f
Mushroom flavours 270
Mustard 226

n
NAFTA 771
Nanostructure 284, 289
Naranjilla 417
Naringin 163
Nasal-smelling 576f
Nasopharynx 576f
Natural
- abundance 644
- extracts 5
- flavour concentrate 756
- flavouring 775
- flavouring substance 140ff, 152, 756f
- commercially available n. f. s. 152ff
- meat flavours 263f
- origin 619

Nature-identical 1, 158ff
Nature-identical flavouring substance 139, 158, 755
Near water drinks 468
Negative List 757
Neral 161
NMR, nuclear magnetic resonance 614ff
2,6(E,Z)-Nonadienal 284
Non-alcoholic beverages 466
Nonanal 283
2(E)-Nonenal 283
3(Z)-Nonenal 283
Nootkatone 162
Novel food 476
NPD, nitrogen-phosphorus detector 594
Number of a transfer unit, NTU 34
Nut 284
Nutmeg 236
Nutrition 7

O
OAV, odour activity values 160, 673
1,5(Z)-Octadien-3-one 284
Octanal 161, 283
2(E)-Octenal 283
Odorants, identification 707
Odorants, quantification 708
Odorants, stable isotope dilution assay (SIDA) 708
Odour 140f, 380f
- activity values, OAV 673
- threshold 436f
Odor activity value (OAV) 160, 673
- calculation 708
- definition 704
Off-flavours 121, 289
- produced by lipoxygenases 121
- produced by peroxidases 121
- produced by proteases 121
Oldshue-Rushton extractor 43
Oleic acid 283
Olfactometry global analysis 706
Olfactory
- epithelium 437, 576
- organ 437
- perception 576
Oligosaccharides 348
Olive oil 718ff
Omission test 711
Onion 237, 276, 285f
Operating line 76
Oral / pulmonary cavity 437, 576
Orange 203-209, 414
Index 823

- aroma 720ff
- essence oil 203
- juice 173, 414
- oil 203, 414
- wash pulp, OWP 170
- water phase 208
Oregano 237
Organic 7
Organoleptic 575
- quality control, OQC 576
- quality testing, OQT 576
Ornithine 281
Osme method 706
Osmotic drying 382
Ostwald’s triangle diagram 28
OWP, orange wash pulp 170
Oxidation taste 545
2-Oxopropanal 277, 281

P
Packings
- irregular p. 93
- regular p. 93
PAH, polycyclic aromatic hydrocarbons 290f
Paired comparison test 582
Pall rings 93
Panelists 575
Panettone 533
Panned work 525f
Papain 335f
Papaya 424
Papillae 578
Paprika 241
- Oleoresin 375
Parsley 238, 730
Partition coefficient 24
Passiflora edulis 424
Passion fruit 173, 424, 672
Pasteurisation 746
Pastries 531
Pathogens (salmonella, staphylococcus aureus) 744
Paw Paw 424
PCH, polycyclic hydrocarbons 312
Peach 416
Peanuts 306
Pear 416
- juice 171, 173, 179
Pecans 306
Pectin 439, 481
2-Pentylpyridine 286
Pepper 239, 729
Pepper, black 729
Peppermint oil 240f, 679
Peptides 275
Percolation 20f, 514
Perilla aldehyde 162
Permeation 18
Persian lime 197
Pesticide residues 768
Petitgrain oils 188, 209
Phase transfer 74
Phenolic compounds 298f, 374, 454
Phenyl acetaldehyde 158, 279
Phenylalanine 276, 279, 290
Philippines, legislation 794f
Phospholipids 282, 289
Photosynthesis 272
Physical processes 17-119, 141f
Pimento 241
Pineapple 416
- juice 166f, 173
- ketone 688
Plait point 28
Plant
- homogenates 142
- tissue 266f
- tissue cultures 143
Plate efficiency number 33
Plate exchange efficiency 75
Plating procedure 633
Plum 424
Podbielniak extraktor 37
Polarity 18
Polycyclic aromatic hydrocarbons, PAH 290f
Polycyclic hydrocarbons, PCH 312
Polyglycerol polyricineolate 330
Polyhydric alcohols 325, 476
Polymethylsiloxane 275
Polysaccharides 267, 439
Pomegranate 418
Popcorn 732
Pork 263, 288, 711ff
Positive List 757
Potato 432
- starch 440f
Potatoes, boiled 724ff
Precipitates 473
Precolumns 666
Preservation by drying 109
Preservatives 377-387
- Food Additives Directive 382
Presses 168
- belt press 168
Savoury flavour 288ff, 549
– pyramid 557
– taste 552f
SCF, Scientific Committee on Food 760
Screw base 276
SDE, simultaneous distillation-extraction 589
Seafood 263, 304ff
Seasonings 264, 570
Seaweed extracts 331
Selected wavelength chromatograms, SWC 667
Selectivity of extraction solvents 29, 50, 52ff
Senses 576ff
Sensory 575f
– analysis 575-586
– quality control, SQC 576
– quality testing, SQT 576
Sensory expertise 12
Separation factor 664
Sesame seeds 286
Sesame, roasted 732f
SFE, supercritical fluid extraction 50-65
Shiitake 353
Sieve plates 91, 93
Significance level 580
Significance table 582ff
SIM, selected ion monitoring 595, 667
Simultaneous distillation/extraction 589
Singapore, legislation 796ff
Single stage spray drying 99
Sintering 568
SIRA, stable isotope ratio analysis 602-663
Smoke
– components 291, 303
– condensates 310
– generation 309
– solutions 289
Smoke flavourings 298-313, 756
– application on various foods 304ff
– dry s. f. 292
– liquid s. f. 289
– preparations 309f
smoked
– colour 289
– food 289
Snack foods 306
SNIF-NMR®, site-specific natural fragmentation-NMR 617
Sodium chloride 362, 454, 578
Soft drinks 466-486
– based on clear juices 469
– based on emulsiones 470ff
– based on flavour 468
– based on plant extract 469
– circle 466f
– energy drinks 468
– ingredients for s. d. 467ff
– with high juice content 469f
– with low juice content 470
Solid-liquid absolute countercurrent extraction 22
Solid-liquid discontinuous countercurrent extraction 22
Solid-liquid extraction 17f, 589
Solid-liquid relative continuous countercurrent extraction 21
Solvents
– carrier s. 317-321
– dense gases as s. 50-65
– extraction s. 314ff, 768
– evaluation 50f
– miscibility 24, 27
– polarity 18
– properties 18, 50, 52
– selectivity 50
Sorbid acid and sorbates 385
Sorbid acid derived off-notes 387
Soups 563, 566
Sour dough 123
Sour milk products 544ff
Soursop 420
South Africa, legislation 800
Soxhlet-extraction 20, 589
Soy nuts 307
Soy sauce 124, 282, 292, 569
Spearmint oil 241
Spices 214-261, 729ff
Spike oil 694
Spirits 487-496
Spore-forming bacteria 745
Sport drinks 476
Spray chilling 104, 327
Spray drying 97-108, 565
– low oxygen s. d. system 103
– single stage s. d. 99
Spreads 329
Stabilisers 330-335, 538
Stability 330, 408ff, 472, 483
Stable emulsion 322
Stable isotope
– measurements 619
– pattern analysis 614
– ratio analysis, SIRA 602-663
Star anise 217, 624
Starch 439
– complexing 326
– modified starches 471
Starfruit 425
Starter cultures 121
Statistical analysis 583
Steam distillation 81f
Stereodifferentiation 668f
Sterilization 125, 750
Stoke’s law 470
Stollen 533
Strawberry 417, 537, 724
Strecker acid 279
Strecker aldehydes 278ff
Strecker degradation 276, 278
Stripping column 76
Sublimation 110
Succinic acid 162
Sucrose 475
Sugar 475
Sugar apple 424
Sugar confectionery 9
Sugar substitutes 475f
Sulfurol 285
Sulphur containing flavouring substances 289
Sulphur dioxide 336
Supercritical fluid extraction, SFE 50-65
Surface tension 18
Suspension cultures 143
SWC, selected wavelength chromatograms 667
Sweet basil 218
Sweet marjoram 235
Sweet orange oil 205f
Sweetener 466, 475, 536
– production 348
Sweeteners 475f
Sweet sop 420
Synergism 361
Synergistic effects 361f
Syros 475
– activity value (TAV) 160
– compounds 286ff, 735
– dilution analysis (TDA) 558
– enhancement 557ff
– enhancers 263, 558
– on the tongue 578
TAV, taste activity value 160
TBHQ, t-butyl-hydroxy quinone 373
Tea 427
– liqueurs 498
Tea drinks 469
Tea, green 736
α-Terpineol 162
α-Terpynyl acetate 162
Thailand, legislation 799f
Theobromine 287
Theoretical extraction stages 23, 26, 29
Theoretical plate number 74
Thermodynamic equilibrium fundamentals 25
Thermolysis 268
Thiamine degradation 284f
Thiamine 284f, 288
Thiazole 285
Thickening 334
Thin-film evaporator 86
Think-drinks 11
Thyme 245
Thymol 163
TIC, total ion chromatogram 595
Tie line 28
Tissue cultures 261
Tocopherols 374
Toffee 521f
Tomato
– fruit 431f
– puree 175
– paste 727f
– aroma 727f
Tongue 577
Top notes 556f
Top Ten flavour houses 2
Total ion chromatogram, TIC 595
Toxicology and Legislation 753-810
– toxicological considerations 250, 758-761
– toxicological tests 291
Tray column 93
Trehalose 476
Triangular diagram 28
Triangle test 582
Trickle flow 57
2,4,7(E,Z,Z)-Tridecatrienal 284
Trigeminal stimuli 578f
Triglycerides 329
TRIO test 582
Trouton’s law 70
Truffle 272
Turbidity 468
Turkish delight 521
Turmeric 246
Tutti frutti 433

Ultrafiltration 173, 179
Ultrasound 18
– treatment 18
Umami 287f, 292, 353, 358f, 552ff
2-Undecanone 161
2(E)-Undecenal 283
UNIFAC method 25
USA, legislation 771ff
UV/VIS detection 591
UV/VIS spectroscopy 587

Vacuum generation 68f
Valencene 164
Valine 290
Values of natural products 605ff, 619ff
Vanilla 247, 432, 533
Vanilla flavour from cell cultures 272
Vanillin 1, 158, 163, 286, 368f, 528
– synthesis 164
Vapour-liquid loading 74
Vapour pressure curves 67, 80
Vapour pressure, partial 71
Veal 288
Vegetable 288
Vegetarian 7
Vermouth 505

Vinylguaiacol 286
Virial coefficient 73
Viruses, bacteriophages 744
Vitamins 7, 468
Vodka 493

Walnuts 306
Warmed over flavour, WOF 283
Washing 190
Water activity $a_w$ 377, 744
Water extracted solids, WESO 170
Water extraction 170
Weighting agents 470
Wellness 7
WESO, water extracted solids 170
Wheat gluten 287, 516
Wheat gluten hydrolysate 287
White mustard 236
WHO, World Health Organization 761
Wine 503f, 735f
Wine-like beverages 505f
Wintergreen oil 625
WOF, warmed over flavour 283
WONF, with other natural flavours 775
Wood pyrolysis 309
World Health Organization, WHO 761
Wormwood 247

Xylose 279, 284, 287-289

Yeast 123, 145
– autolysates 268f
– extracts 268, 557, 559, 568f
Yellow 472f
Yoghurt cultures 123