egg white, 460, 614, 731	expeller cocoa butter see cocoa butter,
elaidic acid, 178, 488	expeller
electrostatic, 79, 371, 401	expert systems, 732
elongational flow, 246	export, 467, 608, 655
elongational mixing, 245	extrusion for manufacture and forming
elongational shearing, 247	chocolate, 405–413
emulsifier, 137, 244, 245, 255, 257, 263, 291,	
292, 294, 295, 321, 331, 479, 485,	Fairtrade International, 33
487, 496, 543-546, 690, 730 see also	family milk chocolate, 670, 678, 684, 685
lecithin; polyglycerol polyricinoleate	fat bloom
(PGPR); YN	anti-bloom fats, 180–181
emulsion, 115, 439, 595	chocolate, 111-113, 552, 727
endothelial function, 525	chocolate flavoured coating, 504
engrossing, 439–441, 447	cocoa butter extender (CBE), 173
enrober, 305, 330, 383–398	cocoa butter substitutes (CBS), 175,
enrober-Savy, 383	178–179, 486, 507
enrobing, 383–398, 386, 388, 393, 501, 502	enrobing and moulding faults, 397–398,
Enterobacteriaceae, 613	424, 581
environment, 13, 19, 36, 489, 605, 652	milk fat as an inhibitor, 105, 113
enzyme interesterification see	rework, 453, 455
interesterification	shelf life determination, 553-554
enzymes, 22–23, 114, 128, 171, 508	sorbitan tristearate, 294, 330
epicatechin (EC), 22, 135, 187, 201, 523	tempering, 317, 348-349, 474
equilibrium relative humidity, 76–77,	fat, bound, 110-111, 136, 140, 289, 486, 587
149, 308	fat fractionation, 117, 164–165, 172–173,
erythritol, 87, 89, 91, 93	175, 177
Escherichia coli, 542, 612	fat globules, 122, 128, 142
esters also sucrose & methyl esters, 108, 188,	fat migration, 112, 397, 461, 635
196, 294	fat reduced cocoa powder, 480, 677
ethanol, 22, 185-186, 191, 550 see also	fatty acids
alcohol	cocoa butter, 153-155, 157-159, 162, 171
ether, 433	lower calorie fats, 181, 729
EU Directive, 64, 681 see also directive	milk fat, 106–109
European Commission, Joint Research	short chain (volatile), 202, 206
Center (JRC), 592	trans, 177–180, 488
European Community (EC), 681, 686, 711	fault finding, 377, 397, 446, 568
see also European Union (EU)	FDA see Food and Drug Administration
European Patent Office, 699, 702	(FDA)
European Union (EU), 592, 614, 670, 680 see	FDA of USA, 36, 69, 85, 162, 533-534, 671
also European Community	Federation of Cocoa Commerce (FCC), 27,
EU Scientific Committee for Foods (SFC), 89	36, 63
eutectic, 110, 112, 178, 480-482, 550	fermentation, 87, 91, 104, 106 see also cocoa
evaporation	bean, fermentation
conching, 202, 204, 243	Fernando Po, 43
milk, 122–123, 128	Ferrero Rocher®, 493, 659, 666
milk crumb, 142–143, 145	ferrous, 51, 52, 225, 312, 382, 583
roasting, 193	fibre, 85, 522, 526
evaporator, falling film, 123, 145	fill level, 562, 570
evaporator, scraped surface, 145, 147–148, 420	film coating (panning), 434
exothermic reaction, 22, 85, 150	filtration, membrane, 117

fine cocoa see cocoa bean, fine/flavour	freeze dried, 421, 463
fineness, 58, 81, 224, 228, 496, 544	French coating, 433
fineness measurement and control of,	frozencone technology, 422, 427
546-547, 574-577, 595	frozen confections, 118
Finland, 162, 665, 680	fructose, 72, 82-83, 85, 93, 94, 192, 232, 507
five-roll refiner, 244–245, 575–576 see also	Fry, 1
mill	fudge, 411, 455, 460, 461, 472
flake, 544, 576, 679-680, 682, 683	fumigation, 32, 535
flavanol, 523-529	functional food, 728
flavour(s) see also cocoa bean, fine/flavour	fungicides, 15
chocolate, 203, 205, 206, 407, 463	furaneol, 137, 138, 198, 203, 207
cocoa, 12, 47, 54, 68, 187	furfural, 137, 138, 201, 206, 207
cocoa butter, 161	futures market in cocoa, 27, 28
milk maillard flavours, 105, 130, 150	
flavour, cooked (or cooked flavour), 2, 105,	galactose, 83, 84, 114
206, 242, 250	Gambia, 166
flavour development, 136-139, 185, 241,	ganache, 365, 458, 465, 468, 485
537–539	gas chromatography, 200, 592
flavour precursors, 22–23, 185–193	gas-liquid chromatography (GLC), 200,
flavour release, 175, 208–209, 500, 547	592, 652
Florin ram extruder, 412–413	gear-type depositor, 361–362
flow (or efflux) viscometry, 285-286	gelatine, 436, 437, 460
flow wrap, 620–622, 631–632, 640, 642, 649	genetically modified crops, 293, 730
fluidised bed, 52, 222, 535, 538	germ, 18, 224, 676, 677
foil, 620, 625, 633, 634, 640	Germany, 657, 660–661, 669, 681
foiling machine, 628	Ghana, 10, 23, 34, 43, 155, 196
fondant, 365, 413, 435, 459, 553	gianduja, 679, 682, 683, 685
Food and Drug Administration (FDA),	glass, 380, 599, 600, 602, 628
36–39, 68, 69, 85, 163, 166,	glassine, 625, 633, 635, 640
533–535, 671	glass jar, 628
Forastero, 10, 12, 43, 186, 205, 494	glass transition temperature, 122, 140, 218,
foreign bodies, 380, 382, 599–600, 604	226, 227, 232, 380, 428
foreign-matter detectors, 562, 582	glaze, 443, 499
form-fill-seal machine, 628, 631	gloss, 111, 314, 315, 360, 372, 442–444, 567
formulated milk powders, 115, 119	glucose, 82, 191, 232, 526
fractionated lecithins, 292, 730	glucose monohydrate, 82
fractionated milk fat, 117	glucose syrup, 82, 140, 142, 300
fractionation of vegetable fats, 164–168,	gluten, 614, 615
172–173, 175, 177–178, 488	glycaemic index, 88–91
France, 76, 431, 493, 655, 657, 660–662,	glycaemic response, 83–92
669, 680, 696	glycerol, 424, 637
Fraunhofer diffraction, 591	good manufacturing practice (GMP), 310,
free and bound fat, 111–112, 120–121, 125,	599, 602–603, 611, 651
127–130, 206, 224, 289–290, 483	grain size distribution, 75
free and bound moisture, 243, 586	grain structure, 75
free-choice profiling, 513	Grand Cru, 493
free fatty acids (FFA) cocoa, 36–38, 42, 64,	gravure, 634
534, 535, 541, 738	Grenada, 46
free fatty acids (FFA) milk fat, 108, 161, 206	grinding, 5, 58, 77, 216–233, 266–272, 289,
free radicals, 401	463, 539