INDEX

A	С
AAC. See Antioxidant activity coefficient	Calcium flux mechanisms, 27–28
Acid degree value (ADV) method,	Carbohydrate composition, ragi
178–179	nonstarchy polysaccharide, 233–236
Aeluropodeae, 217	starch, 231–233
Alcoholic fermentation, 49, 54. See also	Cardiovascular diseases (CVDs), 6, 11-13
Fermentation process	Cereals, geographical origin
American trypanosomiasis	discriminant analysis, 118
diagnoses and treatment, 67-68	¹ H NOESY spectrum, 116–117
discovery, 65–66	Chagas disease transmission. See also
with food	American trypanosomiasis
Brazil, 72–77	oral route transmission
Chacao city, 77	animals, 69–70
history, 64–65	humans, 70–71
oral route transmission	T. cruzi strain, 72
animals, 69–70	outbreaks with food, Brazil
humans, 70–71	Barcarena city, 76
T. cruzi strain, 72	Belém city, 74
phases and symptoms, 67	Catolédo Rocha, 74–75
T. cruzi	Chacao city, 77
control (in food), 78–80	Estrela, 73–74
life cycle, 66–67	Macaúbas city, 76–77
transmission routes, 68–69	Pan American Health Organization
Antioxidant activity coefficient	(PAHO), 73
(AAC), 227	routes, 68–69
Aroma extract concentration analysis (AECA), 196	Chamomile flowers (<i>Matricaria recutita</i> L.), 127–128
Aroma extract dilution analysis	CHD. See Coronary heart disease (CHD)
(AEDA), 196	Cheese
Artificial neural networks, 96	compositional analysis
,	acidity and pH, 172–173
В	ash, 172
Balsamic vinegars of Modena (BVM),	calcium and phosphorus, 173
141–144	fat, 171
Beer, 137–138	moisture and total solids, 169, 171
BHA. See Butylated hydroxy anisole	protein, 171–172
Biomarkers. See Milk fat biomarkers	salt and chloride content, 172
Boehringer Mannheim kits, 174, 176	standard methods, 169-170
Botrytis cinerea, 47–48	FTIR spectroscopy
Bureau of Dairy Industry (BDI) method.	NIR and MIR, 197
See Acid degree value method	partial least-squares regression model,
Butylated hydroxy anisole (BHA), 230	199
BVM. See Balsamic vinegars of Modena	principle, 196–197

Cheese (cont.)	D
sampling techniques, 197-198	Daine for decrease time for also Obsailes
spectra of Cheddar cheese,	Dairy food consumption. See also Obesity- related chronic disease
198–199	CLA effects, 18
TruDefender TM FT handheld,	individual dairy foods effects, 21–23
199–200	micronutrients effects, 15–17
geographical origin	milk composition and percent
Emmental, canonical analysis of,	contribution, 13–15
113–114	milk-derived peptides effects, 17
Italian Parmigiano Reggiano vs. east	obesity-related chronic disease
European Grana-type samples,	and cardiovascular diseases, 11–13
114, 116 mozzarella, 113	and dietary fat, 6–7
Parmigiano Reggiano, ¹ H NMR	metabolic syndrome and type
spectrum of, 114–115	2 diabetes, 10–11
quality and authenticity, 151–153	and weight management, 8–10
ripening process	saturated fats, 18–20
citrate metabolism assessment, 176	total dairy fats, 20–21
lactose and lactate	trans-fatty acids effects, 17–18
assessment, 174–178	Dairy products
lipolysis assessment, 178–180	cheese, 151–153
proteolysis assessment, 180–194	milk, 150–151
smaller breakdown products	Discriminant analysis (DA), 94, 96
assessment, 194–196	E
sampling techniques, 168–169	L
Chemometrics. See also Geographical origin	Electrophoresis, cheese ripening
of foods; Quality and authenticity of	capillary, 190
foods	isoelectric focusing (IF), 189
artificial neural networks, 96	sample preparation and staining, 188–189
monovariate statistical analysis, 92–93	types and application, 188
multivariate statistical analysis	Eleusine coracana
applications, 93	composition
compression technique, 93–94 DA and independent component	AAC, 227
analysis (ICA), 94	α-amylase inhibitor, 242–243 benzoic acid, 228
partial least squares	вна, 230
projections, 95–96	caffeic acid, 227
Chromatography, proteolysis assessment	carbohydrate, 231–236
GC-FID chromatogram of cheddar,	coumaric acid, 227
192, 194	ferulic acid, 227
IEC and SEC, 190-191	Folin-Ciocalteau method, 228
RP-HPLC, 191–192	gallic acid, 228–231
water-soluble component extraction,	mineral, 226
192–193	nitrogen and calcium, 225
CLA. See Conjugated linoleic acid	nonstarchy polysaccharide, 233-236
Cocoa, 130–131	phenolic acids, 227
Cod liver oil, 128	polyphenol, 227–228, 230
Conjugated linoleic acid (CLA), 18	protein, 225, 236–243
Copper soaps method, 178	starch, 231–233
Coronary heart disease (CHD), 24–26	tannin, 227–228
CVDs. See Cardiovascular diseases	testa, 228
Cynodonteae, 217	total lipids, 225

trypsin/α-amylase inhibitor, 242–243 zinc, 226 cultivation antiquity, 223 expressed sequence tags, 225 seed development, 223–224	NIR and MIR, 197 partial least-squares regression model, 199 principle, 196–197 sampling techniques, 197–198 spectra of Cheddar cheese, 198–199 TruDefender TM FT handheld, 199–200
glycemic index, 251–252 herbicides and genetic transformation, 253	G
processing and utilization amino acid composition, 247 amylase activity, 247 flour, 243–244 NPU, 246 parboiling and decortication, 251 PER, 246 properties, 244–245 sprouting, 249 taxonomy Chloridoideae, 217–218 chromosome number, 218 distribution, Africa and India, 221 fluorescent in situ hybridization, 219 inflorescence morphology, 217–218 landrace, 221–222 linkage map, 222–223 restriction pattern analysis, 219 sequenced amplicons, 220 tetraploid species, 219 Eleusine indica, 218–220, 235 Eragrostideae, 217	Geographical origin of foods cereals discriminant analysis, 118 ¹ H NOESY spectrum, 116–117 chamomile flowers (<i>Matricaria recutita</i> L.), 127–128 cheese Emmental, canonical analysis of, 113–114 Italian Parmigiano Reggiano vs. east European Grana-type samples, 114, 116 mozzarella, 113 Parmigiano Reggiano, ¹ H NMR spectrum of, 114–115 cocoa, 130–131 cod liver oil, 128 EU regulation, 96–97 fish, 121–122 green tea, 126–127 honey Corsican and non-Corsican, 120–121 hierarchical PLS-DA, polyfloral,
Extra virgin olive oil (EVOO). See Olive oil F	119–120 meat
Fat oxidation mechanisms, 27–29 Fecal fat excretion mechanisms, 27–28 Fermentation process alcoholic fermentation, 49, 54 pesticides residues, 57–58 yeasts, 54–57 Finger millet. See Eleusine coracana Fish geographical origin, 121–122 quality and authenticity, 149–150 Folin–Ciocalteau method, 228 Food characterization. See also Geographical origin of foods; Quality and authenticity of foods analytical online system, 89–90 chromatographic techniques, 89 omics techniques, 90 Fourier-transform infrared (FTIR)	canonical analysis, 123, 125 ¹ H HRMAS and TOCSY spectrum, 123–124 mustard oil, 125 olive oil canonical LDA, 107–108 classification, 106 ¹³ C NMR DEPT, 111–112 ¹ H and ¹³ C NMR spectra, 108–109 ¹ H NMR spectroscopy and PCA, 106–107 LDA, Lazio provinces, 108, 110 PCA, Lombardia and Veneto bank of Garda lake, 111 PDO, PGI, TSG status, 97 product quality level, 97–98 propolis, 128 tomato paste ¹ H NMR spectrum, Chinese and Italian
spectroscopy	triple, 128–129

Geographical origin of foods (cont.) unsupervised PCA protocol, 130	M
traditional food products, 88	Malolactic fermentation (MLF)
wine	lactic bacteria, 59-60
Apulian and Slovenian, 103	pesticide residues, 60
2D ¹ H- ¹³ C GHSQC spectrum, Venosa,	Meat
98, 102	geographical origin
metabolite content, 104	canonical analysis, 123, 125
physicochemical analysis, 103–104	¹ H HRMAS and TOCSY spectrum of
PLS-DA, 104–105	Swiss dried, 123–124
red, 102–103	quality and authenticity, 149–150
trace element analysis and	Metabolic syndrome and type 2 diabetes
chemometrics, 105-106	dairy food intake, 10–11
Grapevine	obesity-related chronic disease, 5
cultivation, 44–45	Micronutrients effects, 15–17
pathogens	Milk-derived peptides effects, 17
citrus mealybugs (P. citri), 48–49	Milk fat biomarkers
downy mildew (P. viticola), 46–47	CHD, 24–26
grape moth (L. botrana), 48	pentadecanoic acid and heptadecanoic acid, 23–24
gray mold (B. cinerea), 47–48	stroke, 26
powdery mildew (U. necator), 47	type 2 diabetes mellitus, 26
vine mealybug (<i>P. ficus</i>), 48–49	MLF. See Malolactic fermentation
Green tea	Monovariate statistical analysis, 92–93
geographical origin, 126–127	Multivariate statistical analysis
quality and authenticity, 141	applications, 93
Н	compression technique, 93–94
11	discriminant analysis (DA) and
Hemicellulose structure, ragi, 234	independent component analysis
Heptadecanoic acid, 3, 23–24	(ICA), 94
High resolution-magic angle spinning (HR-	partial least squares projections,
MAS) spectroscopy, 91	95–96
Honey	Mustard oil, 125
geographical origin	
Corsican and non-Corsican, 120–121	N
hierarchical PLS-DA of polyfloral,	Not and the self-self-self-self-self-self-self-self-
119–120	Net protein utilization (NPU), 246
quality and authenticity	NMR. See Nuclear magnetic
¹³ C NMR study, 153	resonance (NMR) Nonstarter lactic acid bacteria (NSLAB),
¹ H NMR spectrum of polyfloral,	174, 176
154-155 TOCSY NMP experiment 154	NPU. See Net protein utilization
TOCSY NMR experiment, 154	NSLAB. See Nonstarter lactic acid bacteria
L	Nuclear magnetic resonance (NMR). See also
Lactic acid bacteria (LAB), 174	Geographical origin of foods; Quality
Lipolysis, cheese ripening	and authenticity of foods
colorimetric methods, 178–179	energy absorption, 90–91
GC-MS detection, 180	HR-MAS spectroscopy, 91
HPLC, 179	MRI, 91–92
sample preparation and GC analysis,	SNIF, 92
179–180	Nutrigenomic effects mechanism,
Lobesia botrana, 48	27, 29–30

P

Obesity-related chronic disease	Pappophoreae, 217
calcium flux mechanisms, 27-28	Partial least squares discriminant analysis
cardiovascular diseases, 6	(PLS-DA), 95–96, 104–105, 114, 116,
dairy food components	119–120
CLA effects, 18	Pentadecanoic acid, 3, 23–24
micronutrients effects, 15-17	PER. See Protein efficiency ratio
milk composition and percent	Pesticide effect. See also Wine fermentation,
contribution, 13–15	pesticide effect
milk-derived peptides effects, 17	lactic bacteria, MLF, 60
saturated fats, 18-20	maximum residue limits, grape
total dairy fats, 20-21	and wine, 53
trans-fatty acids effects, 17-18	registered pesticides, 49-52
and dietary fat, 6–7	yeasts, fermentation process, 54-57
and dietary foods intake	Planococcus citri, 48–49
and cardiovascular diseases, 11-13	Planococcus ficus, 48–49
metabolic syndrome and type	Plasmopara viticola, 46–47
2 diabetes, 10–11	Propolis, 128
obesity, and weight	Protected designation of origin (PDO), 88, 97
management, 8–10	Protected geographical indication
fat oxidation mechanisms, 27–29	(PGI), 88, 97
fecal fat excretion mechanisms, 27-28	Protein composition, ragi
individual dairy foods effects, 21-23	amino acid, 236–237
and insulin resistance, 4	α-amylases, 241
metabolic syndrome and type 2	carboxyesterase and ferulic acid
diabetes, 5	esterase, 240
milk fat intake, biomarkers of	prolamins, 238–239
CHD, 24–26	protease activity, 239
pentadecanoic acid and heptadecanoic	pyrophosphatase activities and
acid, 23–24	glycerolphosphatase, 240
stroke, 26	Protein efficiency ratio (PER), 246
nutrigenomic effects mechanisms, 27,	Proteolysis, cheese ripening
29–30	analysis scheme for, 181–182
satiation mechanisms, 27, 29	chromatography, 190–194
Olive oil	electrophoresis, 188–190
geographical origin	fluorimetric and colorimetric
canonical LDA, 107-108	methods, 187
classification, 106	nitrogen analysis, extraction and
¹³ C NMR DEPT, 111–112	fractionation methods, 182–184
¹ H and ¹³ C NMR spectra, 108–109	reactive compounds and formol
¹ H NMR spectroscopy and PCA,	titration, 186
106–107	schematic diagram, 181
LDA, Lazio provinces, 108, 110	trichloroacetic acid (TCA), 185
PCA, Lombardia and Veneto bank of	ultrafiltration, 186
Garda lake, 111	water-soluble extracts (WSE), 182, 185
quality and authenticity	0
¹³ C NMR spectroscopy, 147	Q
¹ H and ¹³ C NMR, 148	Quality and authenticity of foods
LDA, Sicilian extra virgin,	beer, 137–138
147–148	BVM and TBVM
³¹ P NMR spectra, 148–149	¹ H NMR spectrum, 143–144

Quality and authenticity of foods (cont.)	Ripening, cheese monitoring
PCA, 142	lactose, lactate, and citrate metabolism
coffee, 154	assessment
dairy products	acetic acid measurement, 176
cheese, 151–153	analysis, 174–175
milk, 150–151	Boehringer Mannheim kits, 174, 176
fish and meat, 149-150	citrate quantification, 176
fruit juice, 143–145	diacetyl and acetoin quantification,
¹ H NMR spectra, 145–146	176–177
PCA, 145	gas chromatographic
SNIF-NMR, 144	methods, 177–178
honey	high-performance liquid
¹³ C NMR study, 153	chromatography (HPLC)
¹ H NMR spectrum, 154–155	method, 177
TOCSY NMR experiment, 154	lipolysis assessment
olive oil	colorimetric methods, 178–179
¹³ C NMR spectroscopy, 147	GC-MS detection, 180
¹ H and ¹³ C NMR, 148	HPLC, 179
LDA, Sicilian extra virgin, 147–148	
³¹ P NMR spectra, 148–149	sample preparation and GC analysis, 179–180
papers dealing NMR and chemometric	proteolysis assessment
characterization, 131–133	analysis scheme for, 181–182
vanilla, 154, 156	chromatography, 190–194
vegetables	electrophoresis, 188-190
green tea, 141	fluorimetric and colorimetric methods
potato, 138–139	187
rice, 141	nitrogen analysis, extraction and
watermelons, 139	fractionation methods, 182-184
wheat, 139-141	reactive compounds and formol
wine	titration, 186
antioxidants, 137	schematic diagram, 181
fermentative performance of yeast	trichloroacetic acid (TCA), 185
strains, 136–137	ultrafiltration, 186
¹ H NMR spectra of red wine, 134, 136	water-soluble extracts (WSE), 182, 185
metabolite content of grape berries, 134	smaller breakdown products assessment
0 1	biogenic amines, 196
R	headspace analysis, 195
K	lactones and methyl ketones, 195
Ragi. See also Eleusine coracana	pathways, 194–195
carbohydrate composition	SPME, 195–196
nonstarchy polysaccharide, 233–236	,
starch, 231–233	S
glycemic index, 251–252	
protein composition	Satiation mechanisms, 27, 29
amino acid, 236–237	Saturated fats, 18–20
α-amylases, 241	Site specific natural isotope fractionating
carboxyesterase and ferulic acid	(SNIF)-NMR technique, 92
esterase, 240	authenticity of fruit juice, 144-145
prolamins, 238–239	authenticity of mustard oil, 125
<u> </u>	geographical characterization of wines,
protease activity, 239	105–106
pyrophosphatase activities and	Sporoboleae, 217

W

TBVM. See Traditional balsamic vinegars of Wine geographical origin Modena Apulian and Slovenian, 103 Tomato paste, concentrated ¹H NMR spectrum, Chinese and Italian 2D ¹H-¹³C GHSQC spectrum, 98, 102 metabolite content, 104 triple, 128-129 unsupervised PCA protocol, 130 physicochemical analysis, 103-104 PLS-DA, 104-105 Total dairy fats, 20-21 red, 102-103 Traditional balsamic vinegars of Modena trace element analysis and (TBVM), 141-144 chemometrics, 105-106 Traditional specialty guaranteed (TSG), quality and authenticity 88,97 antioxidants, 137 Trans-fatty acids effects, 17-18 fermentative performance of yeast Trypanosoma cruzi. See also American strains, 136-137 trypanosomiasis ¹H NMR spectra of red wine, 134, 136 control (in food) metabolite content of grape berries, 134 food contamination, 78 Wine fermentation, pesticide effect freezing and refrigeration, 79 consumption, 45-46 good manufacturing practices fermentation process (GMP), 80 alcoholic fermentation, 49, 54 integrated pest management pesticides residues, 57-58 (IPM), 80 yeasts, 54-57 microwaves and ionizing grapevine cultivation, 44–45 radiation, 79 grapevine pathogens sanitization and pasteurization, 79 citrus mealybugs (P. citri), 48-49 standardized operational procedures downy mildew (P. viticola), 46-47 (SOPs), 80 grape moth (L. botrana), 48 life cycle, 66-67 gray mold (B. cinerea), 47-48 strain influence, 72 powdery mildew (U. necator), 47 Trypsin/α-amylase vine mealybug (P. ficus), 48–49 inhibitor, 240–241 malolactic fermentation Type 2 diabetes, 5, 10-11 lactic bacteria, 59-60 pesticide residues, 60 U maximum residue limits, grape and Uncinula necator, 47 wine, 53 registered pesticides, 49-52 \mathbf{v} Z Vanilla, 154, 156

Zoysieae, 217

T

Vinegar, BVM and TBVM, 141–144