

**14. Department of Science and Technology
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Field of Testing
 Chemical Testing
 Microbiological Testing

Chemical Testing

Product	Specific Test	Method / Reference
I. Foods		
.01 Cereal and Cereal Products	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Vitamin C	High Performance Liquid Chromatography (HPLC) / Titration AOAC Method 967.21 (Modified)

	Beta-carotene	In-house Developed High Performance Liquid Chromatography (HPLC) Method
	Iodine	Inverse Colorimetric (Continuous Flow Auto Analyzer)
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
.02 Nuts and nut products	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
.02 Nuts and nut products	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Vitamin C	High Performance Liquid Chromatography (HPLC) / Titration AOAC Method 967.21 (Modified)
	Beta-carotene	In-house Developed High Performance Liquid Chromatography (HPLC) Method
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)

	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
	Cholesterol	In-house Developed Gas Chromatography (GC) Method
.03 Dairy products	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Vitamin C	High Performance Liquid Chromatography (HPLC) / Titration AOAC Method 967.21 (Modified)
	Beta-carotene	In-house Developed High Performance Liquid Chromatography (HPLC) Method
.03 Dairy products	Iodine	Inverse Colorimetric (Continuous Flow Auto Analyzer)
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
	Cholesterol	In-house Developed Gas Chromatography (GC) Method

.04 Meat, poultry and derived products	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Vitamin C	High Performance Liquid Chromatography (HPLC) / Titration AOAC Method 967.21 (Modified)
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
	Cholesterol	In-house Developed Gas Chromatography (GC) Method
.05 Fish, crustaceans and mollusks and derived products	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
.05 Fish, crustaceans and mollusks and derived products	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)

	Vitamin C	High Performance Liquid Chromatography (HPLC) / Titration AOAC Method 967.21 (Modified)
	Beta-carotene	In-house Developed High Performance Liquid Chromatography (HPLC) Method
	Iodine	Inverse Colorimetric (Continuous Flow Auto Analyzer)
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
	SodiumPotassium	Atomic Absorption Spectrophotometry (AAS)AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
	Cholesterol	In-house Developed Gas Chromatography (GC) Method
.06 Sugar and sugar products	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Total Fat	Acid Hydrolysis (Soxhlet)
.06 Sugar and sugar products	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)

	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
.07 Confectionary	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
	Cholesterol	In-house Developed Gas Chromatography (GC) Method
.08 Fruits, jams and other fruit products	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)

.08 Fruits, jams and other fruit products	Vitamin C	High Performance Liquid Chromatography (HPLC) / Titration AOAC Method 967.21 (Modified)
	Beta-carotene	In-house Developed High Performance Liquid Chromatography (HPLC) Method
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
.09 Vegetables and vegetable products	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Vitamin C	High Performance Liquid Chromatography (HPLC) / Titration AOAC Method 967.21 (Modified)
	Beta-carotene	In-house Developed High Performance Liquid Chromatography (HPLC) Method
	Iodine	Inverse Colorimetric (Continuous Flow Auto Analyzer)
Total Fat	Acid Hydrolysis (Soxhlet)	

	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
.09 Vegetables and vegetable products	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
	Cholesterol	In-house Developed Gas Chromatography (GC) Method
0.11 Soft drinks and cordials	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Vitamin C	High Performance Liquid Chromatography (HPLC) / Titration AOAC Method 967.21 (Modified)
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)	
.12 Fruit juices, drinks and other fruit products	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03

	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
.12 Fruit juices, drinks and other fruit products	Vitamin C	High Performance Liquid Chromatography (HPLC) / Titration AOAC Method 967.21 (Modified)
	Beta-carotene	In-house Developed High Performance Liquid Chromatography (HPLC) Method
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
0.13 Edible fats and oils	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS)

		AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
	Cholesterol	In-house Developed Gas Chromatography (GC) Method
0.14 Margarine	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
0.14 Margarine	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC)AOAC 991.39 (Modified)
	Cholesterol	In-house Developed Gas Chromatography (GC) Method
0.15 Eggs and egg products	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors

	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
	Cholesterol	In-house Developed Gas Chromatography (GC) Method
.20 Other food products	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
.20 Other food product	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Vitamin C	High Performance Liquid Chromatography (HPLC) / Titration AOAC Method 967.21 (Modified)
	Beta-carotene	In-house Developed High Performance Liquid Chromatography (HPLC) Method
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)

	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
	Cholesterol	In-house Developed Gas Chromatography (GC) Method
.21 Vitamins in Foods	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Vitamin C	High Performance Liquid Chromatography (HPLC) / Titration AOAC Method 967.21 (Modified)
	Beta-carotene	In-house Developed High Performance Liquid Chromatography (HPLC) Method
.21 Vitamins in Foods	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
	Cholesterol	In-house Developed Gas Chromatography (GC) Method
.24 Sauce, spices and condiments	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03

	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Beta-carotene	In-house Developed High Performance Liquid Chromatography (HPLC) Method
	Iodine	Inverse Colorimetric (Continuous Flow Auto Analyzer)
	Total Fat	Acid Hydrolysis (Soxhlet)
	CalciumIronZinc	Atomic Absorption Spectrophotometry (AAS)AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
	Cholesterol	In-house Developed Gas Chromatography (GC) Method
.25 Food supplements and / or Dietary supplement	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
.25 Food supplements and / or Dietary supplement	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)

	Vitamin C	High Performance Liquid Chromatography (HPLC) / Titration AOAC Method 967.21 (Modified)
	Beta-carotene	In-house Developed High Performance Liquid Chromatography (HPLC) Method
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
.26 Novel food products	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Vitamin C	High Performance Liquid Chromatography (HPLC) / Titration AOAC Method 967.21 (Modified)
	Beta-carotene	In-house Developed High Performance Liquid Chromatography (HPLC) Method
	Iodine	Inverse Colorimetric (Continuous Flow Auto Analyzer)
	Total Fat	Acid Hydrolysis (Soxhlet)
.26 Novel food products	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS)

		AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
	Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)
	Cholesterol	In-house Developed Gas Chromatography (GC) Method
III. Drugs and Pharmaceuticals		
.02 Herbal products	Moisture	AOAC (Air and Vacuum)
	Ash	Gravimetric Method AOAC Method 923.03
	Crude Protein	Automatic Kjeldahl Method (Buchi)
	Total Carbohydrates	Computed by Difference
	Energy	Computed using Atwater Factors
	Total Dietary Fiber	Enzymatic - Gravimetric AOAC Method 991.43 (Modified)
	Vitamin A	High Performance Liquid Chromatography (HPLC) AOAC Method 974.29 (Modified)
	Vitamin C	High Performance Liquid Chromatography (HPLC) / Titration AOAC Method 967.21 (Modified)
	Beta-carotene	In-house Developed High Performance Liquid Chromatography (HPLC) Method
	Total Fat	Acid Hydrolysis (Soxhlet)
	Calcium Iron Zinc	Atomic Absorption Spectrophotometry (AAS) AOAC Method 985.35 (Modified)
	Sodium Potassium	Atomic Absorption Spectrophotometry (AAS) AOAC Method 999.10 (Modified)
Saturated Fatty Acids	Gas Chromatography (GC) AOAC 991.39 (Modified)	

VI. Water		
.01 Bottled Water	Lead Cadmium	AOAC Method 999.10 (Modified)

Microbiological Testing

Product	Specific Test	Method Reference
I. Foods		
1.0 Milk and Dairy products		
01.1 Milk powder	Aerobic Plate Count	FDA BAM-3 (Pour Plate Method)
01.2 Sweetened condensed milk	Yeast and Mold Count	FDA BAM-18 (Spread Plate Count)
01.3 Liquid milk (evaporated or ready to drink) and cream (UHT/sterilized)	Coliform Count	FDA BAM-4 (MPN and Solid Medium Methods)
01.4 Pasteurized milk	<i>E. coli</i> Count	FDA BAM-4 (MPN Method)
01.5 Pasteurized cream	<i>S. aureus</i> (coagulase positive count)	FDA BAM-12 (Spread Plate Method)
01.6 Yogurt and other fermented milk	<i>Bacillus cereus</i> count	FDA BAM-14 (Spread Plate Method)
01.7 Cheese and cheese products; e.g. Cottage cheese, soft and semi-soft cheese (moisture > 39%, pH > 5)	<i>Salmonella</i> detection	FDA BAM-5 (Conventional Method)
II. Water		
1.0 Bottled water	Heterotrophic Plate Count Total Coliform Count Fecal Coliform Count <i>E.coli</i> Count	SMEWW 22nd ed. (Pour Plate Method) SMEWW 22nd ed. (MPN Method) SMEWW 22nd ed. (MPN Method) SMEWW 22nd ed. (MPN Method)