

## SpectraStar XT-R Calibration Library V1.1

April 2021

| Chocolate             |                                                                                  |                                            |
|-----------------------|----------------------------------------------------------------------------------|--------------------------------------------|
| Substance             | Constituents                                                                     | Sampling Accessories                       |
| Chocolate             | Fat, Moisture, Sugar, Lactose                                                    | US-ISIH-0307 Ring cup                      |
| Cocoa Beans           | Moisture                                                                         | US-LGOP-0001 Large Open Cup with plunger   |
| Cocoa Butter          | Iodine Value (IV), FFA                                                           | US-LIQK-0003 Liquid Sampling Kit (.5 mm)   |
| Cocoa Liquor          | Fat, Moisture                                                                    | US-ISIH-0307 Ring cup                      |
| Cocoa Nibs            | Moisture                                                                         | US-LGOP-0001 Large Open Cup with plunger   |
| Cocoa Powder          | Fat, Moisture                                                                    | US-LGOP-0001 Large Open Cup with plunger   |
| Dairy                 |                                                                                  |                                            |
| Substance             | Constituents                                                                     | Sampling Accessories                       |
| Butter - Salted       | Solids, Fat, Salt                                                                | US-ISIH-0307 Ring cup                      |
| Butter - Unsalted     | Solids, Fat                                                                      | US-ISIH-0307 Ring cup                      |
| Cheese - Cheddar      | Solids, Fat, Salt, pH                                                            | US-LGOP-0001 Large Open Cup with plunger   |
| Ice Cream Mix         | Solids, Fat                                                                      | US-SRPC-0025 Small Round Cup, 25 MM Height |
| Infant Formula Powder | Moisture, Protein, Fat                                                           | US-LGOP-0001 Large Open Cup with plunger   |
| Liquid Whey           | Protein, Solids, Fat                                                             | US-LIQK-0003 Liquid Sampling Kit           |
| Liquid WPC            | Protein, Solids                                                                  | US-LIQK-0003 Liquid Sampling Kit           |
| MPC 56                | Moisture, Fat, Protein                                                           | US-LGOP-0001 Large Open Cup with plunger   |
| MPC 70                | Moisture, Fat, Protein                                                           | US-LGOP-0001 Large Open Cup with plunger   |
| Processed Cheese      | Moisture, Fat, Salt, pH                                                          | US-ISIH-0307 Ring cup                      |
| Skim Milk Powder      | Moisture, Protein, Fat, Lactose                                                  | US-LGOP-0001 Large Open Cup with plunger   |
| Cheese - Various      | Moisture, Fat, Salt, pH                                                          | US-LGOP-0001 Large Open Cup with plunger   |
| Whole Milk Powder     | Moisture, Protein, Fat, Lactose                                                  | US-LGOP-0001 Large Open Cup with plunger   |
| WPC Powder            | Moisture, Fat, Protein                                                           | US-LGOP-0001 Large Open Cup with plunger   |
| Feed                  |                                                                                  |                                            |
| Substance             | Constituents                                                                     | Sampling Accessories                       |
| Feed - General        | Moisture, Protein, Fat, Fiber, Ash, Ca, P, NaCl                                  | US-LGOP-0001 Large Open Cup with plunger   |
| Feed - Poultry        | Moisture ,Protein, Fat, Fiber, Ash, Ca, P, Cl, Met, Cys, Met+Cys                 | US-LGOP-0001 Large Open Cup with plunger   |
| Feed - Swine          | Moisture, Protein, Fat, Fiber, Ash, Ca, P, Lysine, NaCl                          | US-LGOP-0001 Large Open Cup with plunger   |
| Flour and Milling     |                                                                                  |                                            |
| Substance             | Constituents                                                                     | Sampling Accessories                       |
| Flour - Clear         | Moisture, Protein, Ash, Alveo P, Alveo W, Color B, Water ABS, Dev Time           | US-LGOP-0001 Large Open Cup with plunger   |
| Wheat - Ground        | Moisture, Protein                                                                | US-LGOP-0001 Large Open Cup with plunger   |
| Flour - Hard Wheat    | Moisture, Protein, Ash, Alveo P, Alveo W, Color B, Water ABS, Dev Time           | US-LGOP-0001 Large Open Cup with plunger   |
| Flour - Soft Wheat    | Moisture, Protein, Ash, Alveo P, Alveo W, Color B, Water ABS, Dev Time           | US-LGOP-0001 Large Open Cup with plunger   |
| Wheat Midds           | Moisture, Protein, Fat, Fiber, Ash                                               | US-LGOP-0001 Large Open Cup with plunger   |
| Wheat Seeds           | Moisture, Protein                                                                | US-LGOP-0001 Large Open Cup with plunger   |
| Forage                |                                                                                  |                                            |
| Substance             | Constituents                                                                     | Sampling Accessories                       |
| Hay - Alfalfa         | Moisture, DM, Protein, ADF, NDF, Fat, P, Ca, K, Mg, dNDF48, Ash, Lignin, DP, ADP | US-ISIH-0307 Ring cup                      |
| Corn Silage           | Moisture, DM, Protein, ADF, NDF, Fat, Ash, Starch, Ca, P, K, Mg                  | US-ISIH-0307 Ring cup                      |
| Hay - Grass           | Moisture, DM, Protein, ADF, NDF, Fat, P, Ca, K, Mg, dNDF8, Ash, Lignin, DP, ADP  | US-ISIH-0307 Ring cup                      |
| Hay - Mixed           | Moisture, DM, Protein, ADF, NDF, Fat, P, Ca, K, Mg, dNDF48, Ash, Lignin, DP, ADP | US-ISIH-0307 Ring cup                      |
| Olives                |                                                                                  |                                            |
| Substance             | Constituents                                                                     | Sampling Accessories                       |
| Olives - Crushed      | Moisture, Oil                                                                    | US-LGOP-0001 Large Open Cup with plunger   |
| Olive Oil             | Acidity, PV, K270, K232, DK, ST, PA, HE, HA, OL, PA, LN, LI, AR, TS              | US-LIQK-0003 Liquid Sampling Kit           |
| Olive Pommace         | Moisture, Oil                                                                    | US-LGOP-0001 Large Open Cup with plunger   |
| Others                |                                                                                  |                                            |
| Substance             | Constituents                                                                     | Sampling Accessories                       |
| Neonatal Milk         | Protein, Fat, Carbohydrate, Calculated Calories                                  | US-LIQK-0003 Liquid Sampling Kit           |
| Petfood Dry Kibbles   | Moisture, Protein, Fat, Fiber, Ash                                               | US-LGOP-0001 Large Open Cup with plunger   |
| Raw meat blend        | Moisture, Protein, Fat, Ash                                                      | US-LGOP-0001 Large Open Cup with plunger   |
| Sausage               | Moisture, Fat, Protein, Fat, Salt                                                | US-LGOP-0001 Large Open Cup with plunger   |

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| Raw material                   |                                                                                     |                                          |
|--------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|
| Substance                      | Constituents                                                                        | Sampling Accessories                     |
| Bakery by-Product              | Moisture, Protein, Fat, Fiber, Ash                                                  | US-LGOP-0001 Large Open Cup with plunger |
| Barley                         | Moisture, Protein, Fat, Fiber, Starch, Ins Fiber                                    | US-LGOP-0001 Large Open Cup with plunger |
| Canola Flakes                  | Oil                                                                                 | US-LGOP-0001 Large Open Cup with plunger |
| Canola Meal                    | Moisture, Protein, Oil, Fiber                                                       | US-LGOP-0001 Large Open Cup with plunger |
| Corn                           | Moisture, Protein, Fat, Fiber, Ash, NDF, ADF, Starch                                | US-LGOP-0001 Large Open Cup with plunger |
| Corn Flour                     | Moisture, Protein, Oil, Ash, Fiber                                                  | US-LGOP-0001 Large Open Cup with plunger |
| Corn Germ                      | Moisture, Protein, Oil, Ash, Fiber                                                  | US-LGOP-0001 Large Open Cup with plunger |
| Corn Gluten Feed               | Moisture, Protein, Oil, Starch                                                      | US-LGOP-0001 Large Open Cup with plunger |
| Corn Gluten Meal               | Moisture, Protein, Oil, Fiber, Ash, Starch                                          | US-LGOP-0001 Large Open Cup with plunger |
| Corn Meal                      | Moisture, Protein, Oil, Fiber, Ash                                                  | US-LGOP-0001 Large Open Cup with plunger |
| Corn Starch - dry              | Moisture, Protein, Ash                                                              | US-LGOP-0001 Large Open Cup with plunger |
| Dried Distillers Grains (DDGS) | Moisture, Protein, Oil, Ash, ADF, NDF, Ca, P, DM                                    | US-LGOP-0001 Large Open Cup with plunger |
| Egg Powder                     | Moisture, Protein, Fat                                                              | US-LGOP-0001 Large Open Cup with plunger |
| Malted Barley                  | Moisture, Protein, Alpha Amylase, Beta Glucan, Diastatic Power, FAN, Sol Protein    | US-LGOP-0001 Large Open Cup with plunger |
| Mustard Flour                  | Moisture, Protein, Oil, Volatile Oil                                                | US-LGOP-0001 Large Open Cup with plunger |
| Mustard Seeds                  | Moisture, Protein, Oil, Palmitic, Stearic, Oleic, Linoleic, Linolenic, Erucic, SATS | US-LGOP-0001 Large Open Cup with plunger |
| Rape Seed (Canola)             | Moisture, Protein, Oil, Chlorophyll, Gluco, Oleic, Lenoleic, Erucic, SATS, IV, FFA  | US-LGOP-0001 Large Open Cup with plunger |
| Rice (Brown)                   | Moisture, Protein                                                                   | US-LGOP-0001 Large Open Cup with plunger |
| Rice (White)                   | Moisture, Protein                                                                   | US-LGOP-0001 Large Open Cup with plunger |
| Soybean Meal                   | Moisture, Protein, Fat, Fiber, Ash                                                  | US-LGOP-0001 Large Open Cup with plunger |
| Soybean Seeds                  | Moisture, Protein, Oil                                                              | US-LGOP-0001 Large Open Cup with plunger |
| Soybeans                       | Glucose, Fructose, Sucrose, Raffinose, Stachyose                                    | US-LGOP-0001 Large Open Cup with plunger |
| Soybeans (amino acids)         | ASP,THR,SER,GLU,PRO,LAN,GLY,ALA,CYS,VAL,MET,ILE,LEU,TYR,PHE,LYS,HIS,ARG,TRY         | US-LGOP-0001 Large Open Cup with plunger |
| Soybeans (fatty acids)         | Palmeic, Stearic,Oleic,Linoeic,Linolenic                                            | US-LGOP-0001 Large Open Cup with plunger |
| Whole Oats                     | Moisture, Protein, Oil, Beta Glucan                                                 | US-LGOP-0001 Large Open Cup with plunger |
| Whole Peas                     | Moisture, Protein                                                                   | US-LGOP-0001 Large Open Cup with plunger |
| Rendering                      |                                                                                     |                                          |
| Substance                      | Constituents                                                                        | Sampling Accessories                     |
| Blood Meal                     | Moisture, Protein, Fat, Ash, Ca                                                     | US-LGOP-0001 Large Open Cup with plunger |
| Feather Meal                   | Moisture, Protein, Fat, Ash, Ca, P                                                  | US-LGOP-0001 Large Open Cup with plunger |
| Fish Meal                      | Moisture, Protein, Fat, Ash                                                         | US-LGOP-0001 Large Open Cup with plunger |
| Meat & Bone Meal               | Moisture, Protein, Fat, Ash, Ca, P, Digestibility                                   | US-LGOP-0001 Large Open Cup with plunger |
| Pork Meal                      | Moisture, Protein, Fat, Ash, Fiber                                                  | US-LGOP-0001 Large Open Cup with plunger |
| Poultry Meal                   | Moisture, Protein, Fat, Ash, Ca, P                                                  | US-LGOP-0001 Large Open Cup with plunger |
| Snack Food                     |                                                                                     |                                          |
| Substance                      | Constituents                                                                        | Sampling Accessories                     |
| Cookies                        | Moisture, Fat, Sugar                                                                | US-LGOP-0001 Large Open Cup with plunger |
| Frozen finished French Fries   | Moisture, Solids, Oil                                                               | US-LGOP-0001 Large Open Cup with plunger |
| Pita Chips                     | Moisture, Oil                                                                       | US-LGOP-0001 Large Open Cup with plunger |
| Potato Chips                   | Moisture, Oil                                                                       | US-LGOP-0001 Large Open Cup with plunger |
| Potatoes - Raw/Dried           | Moisture, Solids                                                                    | US-LGOP-0001 Large Open Cup with plunger |
| Tortilla Chips                 | Moisture, Oil                                                                       | US-LGOP-0001 Large Open Cup with plunger |

## Glossary

| Constituent                  | Definition                                                                                                         |
|------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Acid Detergent Fiber (ADF)   | The fibrous component represents the least digestible fiber portion of forage or other roughage                    |
| Acid Detergent Protein (ADP) | The insoluble protein fraction                                                                                     |
| Acidity                      | The level of acid in substances such as water, soil, or wine                                                       |
| Alanine (ALA)                | Amino Acid                                                                                                         |
| Alpha Amylase                | Enzyme that catalyze the hydrolysis of the internal $\alpha$ -1,4-glycosidic linkages in starch                    |
| Alveo P                      | Maximum pressure required for the deformation of the sample or overpressure                                        |
| Alveo W                      | Indicates dough baking strength                                                                                    |
| Arachidic                    | Fatty Acid                                                                                                         |
| Arginine (ARG)               | Amino Acid                                                                                                         |
| Ash                          | The residue containing inorganic mineral elements of a feed sample                                                 |
| Aspartic                     | Amino Acid                                                                                                         |
| Beta Glucan                  | One form of soluble dietary fiber that's strongly linked to improving cholesterol levels and boosting heart health |
| Calcium (Ca)                 | Essential mineral                                                                                                  |
| Calories                     | Calorie is a unit of measurement for energy                                                                        |

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|                                                   |                                                                                                                                                                     |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Carbohydrates                                     | Biochemical compounds composed only of the elements carbon, hydrogen and oxygen, and are the main source of energy for animals                                      |
| Color B                                           | Yellow to Blue color axis                                                                                                                                           |
| Cysteine (CYS)                                    | Amino Acid                                                                                                                                                          |
| Dev Time                                          | Classification for water absorption in flour                                                                                                                        |
| Diastatic Power                                   | A measurement of a malted grain's enzymatic content                                                                                                                 |
| Digestability                                     | Measure of nutrition a food provides in a given volume. It indicates how much of the food is absorbed by the gut into the bloodstream                               |
| Digestable Protein (DP)                           | Measure of how well the proteins are digested                                                                                                                       |
| DK                                                | Index DK is a criterion of discrimination between a bad quality virgin olive oil and a virgin olive oil adulterated with refined olive oil                          |
| Dry Matter (DM)                                   | A measurement of a sample with all volatiles removed                                                                                                                |
| Erucic                                            | Fatty Acid                                                                                                                                                          |
| Fat/Oil                                           | The term often refers specifically to triglycerides, that are the main components of vegetable oils and of fatty tissue in animals                                  |
| Fiber                                             | The insoluble residue of an acid hydrolysis followed by an alkaline one                                                                                             |
| Free Fatty Acids (FFA)                            | Are produced by the hydrolysis of oils and fats                                                                                                                     |
| Fructose                                          | A common sugar                                                                                                                                                      |
| Glucose                                           | A common sugar                                                                                                                                                      |
| Glutamic (GLU)                                    | Amino Acid                                                                                                                                                          |
| Glycine (GLY)                                     | Amino Acid                                                                                                                                                          |
| Heptadecanoic                                     | Fatty Acid                                                                                                                                                          |
| Histidine (HIS)                                   | Amino Acid                                                                                                                                                          |
| Insoluble Fiber                                   | Refers to all the parts of plant-based foods that cannot be digested or absorbed by the body                                                                        |
| Insoluble Fiber                                   | All the parts of plant-based foods that cannot be digested or absorbed by the body                                                                                  |
| Iodine Value (IV)                                 | Mass of iodine in grams consumed per 100 grams of a chemical substance, often used to determine the amount of unsaturation in fats, oils and waxes                  |
| Isoleucine (ILE)                                  | Amino Acid                                                                                                                                                          |
| K232                                              | A delicate indicator of oxidation in oils                                                                                                                           |
| K270                                              | Detects the level of adulteration, blends with refined olive oil                                                                                                    |
| Lactose                                           | A large sugar molecule that is made up of two smaller sugar molecules, glucose and galactose                                                                        |
| Linoleic                                          | Fatty Acid                                                                                                                                                          |
| Linolenic                                         | Fatty Acid                                                                                                                                                          |
| Lignin                                            | A complex organic polymer deposited in the cell walls of many plants, making them rigid and woody                                                                   |
| Lysine (LYS)                                      | Amino Acid                                                                                                                                                          |
| Magnesium (Mg)                                    | Essential mineral                                                                                                                                                   |
| Methionine (MET)                                  | Amino Acid                                                                                                                                                          |
| Moisture                                          | Total amount of bound and unbound water contained in a sample                                                                                                       |
| Neutral Detergent Fiber (NDF)                     | Measures most of the structural components in plant cells (i.e. lignin, hemicellulose and cellulose), but not pectin                                                |
| Neutral Detergent Fiber Digestibility 48 (dNDF48) | This method mimics rumen digestion. The forage sample is dried, ground and incubated in rumen fluid for 48 hours                                                    |
| Oleic                                             | Fatty Acid                                                                                                                                                          |
| Palmitic                                          | Fatty Acid                                                                                                                                                          |
| Peroxide Value (PV)                               | Gives the initial evidence of rancidity in unsaturated fats and oils                                                                                                |
| Phenylalanine (PHE)                               | Amino Acid                                                                                                                                                          |
| Phosphorus (P)                                    | Essential mineral                                                                                                                                                   |
| Polarity (POL)                                    | An approximate measure of the sucrose content of the sugar                                                                                                          |
| Potassium (K)                                     | Essential mineral                                                                                                                                                   |
| Proline (PRO)                                     | Amino Acid                                                                                                                                                          |
| Protein                                           | Organic compounds composed of building blocks called amino acids                                                                                                    |
| pH                                                | Quantitative measure of the acidity or basicity of aqueous or other liquid solutions                                                                                |
| Purity                                            | Purity=(pol/rds)*100 Used to determine value of sugar beets to pay farmers                                                                                          |
| Raffinose                                         | A trisaccharide composed of galactose, glucose, and fructose                                                                                                        |
| RDS                                               | Measurement of total dissolved solids in a sugar liquor                                                                                                             |
| RWST                                              | Recoverable white sucrose per ton                                                                                                                                   |
| Salt (NaCl)                                       | Mineral Sodium Chloride                                                                                                                                             |
| Saturated Fat                                     | A saturated fat is a fat or fatty acid in which there are no double bonds between the carbon atoms of the fatty acid chain                                          |
| Serine (SER)                                      | Amino Acid                                                                                                                                                          |
| Solids                                            | A measurement of the amount of solid substance contained in a liquid sample                                                                                         |
| Stachyose                                         | A tetrasaccharide consisting of two $\alpha$ -D-galactose units, one $\alpha$ -D-glucose unit, and one $\beta$ -D-fructose unit sequentially linked as galgalglcfru |
| Starch                                            | A white, granular, organic chemical that is produced by all green plants                                                                                            |
| Stearic                                           | Fatty Acid                                                                                                                                                          |
| Sucrose                                           | A common sugar                                                                                                                                                      |
| Sugar                                             | Also called monosaccharides, include glucose, fructose, and galactose                                                                                               |
| Threonine (THR)                                   | Amino Acid                                                                                                                                                          |
| Tryptophan (TRP)                                  | Amino Acid                                                                                                                                                          |
| Tyrosine (TYR)                                    | Amino Acid                                                                                                                                                          |
| Valine (VAL)                                      | Amino Acid                                                                                                                                                          |
| Water ABS                                         | The amount of water taken up by flour to achieve the desired consistency and create a quality end-product                                                           |

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