[5]Stanislaus County Food Processing By-product Use Program Sampling and Testing Guidelines

DEPARTMENT OF ENVIRONMENTAL RESOURCES

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FOOD PROCESSING BY-PRODUCT USE PROGRAM
SAMPLING AND TESTING GUIDELINES

LAND APPLICATION SITES

Sample and analyze for the following constituents in:

Soil (units)	By-product (units)	Plant Tissue (units) *
Total nitrogen (%)	Moisture (%)	Moisture (%)
Total organic carbon (%)	Total nitrogen (%)	Total Kjeldahl nitrogen (%)
Sodium[a] (mg/L)	Total organic carbon (%)	Sodium (%)
Chloride[a] (mg/L)	Sodium (mg/kg)	Chloride (%)
Potassium[a] (mg/L)	Chloride (mg/kg)	Potassium (%)
Calcium[a] (mg/L)	Potassium (mg/kg)	Calcium (%)
Magnesium[a] (mg/L)	Calcium (mg/kg)	Magnesium (%)
Available phosphorus – Olsen (mg/kg)	Magnesium (mg/kg)	Phosphorus (%)
Saturation paste extracts shall be analyzed for pH	Phosphorus (mg/kg)	*Further tests for B, Cu and Zn needed when plant toxicity symptoms observed on the site
Saturation paste extracts shall be analyzed for soluble salts - Electrical conductivity @ 25°C (µmhos/cm)	pH	
Nitrate-nitrogen (mg/kg)	Electrical conductivity @ 25°C (µmhos/cm) *EC*	
Ammonium-nitrogen (mg/kg)	Total solids[b] (mg/kg)	
Buffer pH	Fixed solids[b] (mg/kg)	
Exchangeable Sodium Percentage *ESP*	Volatile solids[b] (mg/kg)	
Cation exchange capacity *CEC*		
Sodium Adsorption Ratio *SAR*		

[a]Analysis performed in saturation paste extracts

[b]Total Solids = Fixed Solids + Volatile Solids. Using Standard Methods or EPA procedures for TDS and FDS, a measured amount of the sample is placed on a vacuum filter. Residue upon drying the filtrate is total dissolved solids (TDS). When this residue is ignited the remaining ash is fixed dissolved solids (FDS). Volatile dissolved solids (VDS), an estimate of Dissolved Organic Matter, is the loss on ignition. For total solids, volatile solids and fixed solids, a measured amount of sample would be dried to determine total solids and the dried residue would be ignited to determine volatile and fixed solids. Impact is related to totals, which can become dissolved upon dissolution or decomposition. If TDS were determined for table salt, there would be no filtrate and therefore no TDS. However, there would be 100% total solids.

Submit laboratory results to the Department within 30 days of receipt.

Sampling quantity and frequency is site-specific and determined at the time of permit issuance or re-issuance. If unspecified as a permit condition, initiate the following protocol:

Soil	By-product	Plant Tissue **
Pre-application and post-cropping sampling is required. Sample in late spring or early summer prior to by-product application. Post-cropping sampling for one application period may serve as pre-application sampling for another period, if appropriate. Follow sampling protocol as provided in the *Regulations for the Use of Food Processing By-products in Stanislaus County by Permitted Use Sites*	The site operator shall record the types and sources of food processing by-product from each truckload. Sampling shall occur prior to land spreading. For each load, collect one composite sample from a minimum of four separate, random locations within the load. An analysis of each by-product type is required from each food processor.	Record harvest portion biomass (lbs/acre). At least three composite crop samples shall be collected from each harvest in each field that has received food processing by-products during the preceding twelve months. Collect whole plant tissue samples at 10 to 20 locations per each composite sample. Each composite sample shall have a minimum weight of one pound. Plant tissue samples may be collected from hay bales using a hay sampler. Refer to the sampling protocol as provided in the *Manual of Best Practices for Application of Food Processing By-products on Farmlands*

These guidelines were developed to facilitate understanding of the sampling protocol as described in the current Stanislaus County Code, Title 9 and its adopted documents as referenced. Adherence to the site-specific Plan of Operation, Stanislaus County Code, *Regulations for the Use of Food Processing By-products in Stanislaus County by Permitted Use Sites*, and the *Manual of Best Practices for Application of Food Processing By-products on Farmlands* is required.

**To determine an *annual nutrient budget*, it is essential to obtain the plant tissue samples from all cuttings or harvests that occur during the first 12-month period following food processing by-products applications.

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