

Seed Testing

SERVICE SAMPLE FEE SCHEDULE

Effective November 14, 2016

CDFA Seed Laboratory Mission	<p>Provide accurate, timely, and cost-effective seed testing services.</p> <p>Serve as an independent resource of scientific expertise in seed identification, seed physiology, and seed quality assessment.</p>
Seed Testing Services	<p>Seed samples may be submitted to the California Department of Food and Agriculture (CDFA) Seed Laboratory for testing on a fee for service basis. The attached fee schedule outlines basic services and associated minimum fees. Other customized tests, examinations, or investigations are available at a rate of \$70 per hour.</p> <p>CCR Ch. 7, Section 4600 through 4603</p>
Where to Submit Samples	<p>Seed Laboratory CDFA Plant Pest Diagnostics Center 3294 Meadowview Road Sacramento, CA 95832-1448</p> <p>Telephone: (916) 262-1100 FAX: (916) 262-1190</p>
What Information to Submit with Sample	<p>Sample containers should be clearly marked with the applicant's name (company or individual), mailing address, seed kind, variety, lot number, and lot size.</p> <p><u>A Service Sample Request Form (68-010) should be submitted with each sample.</u></p> <p>Information such as export destination, seed treatment, seed count, seed size, field number, etc. should also be included as part of the sample description. The information provided by the applicant will appear on the Laboratory Report of Analysis.</p> <p>Please also provide the name of a contact person with contact information, such as telephone number, FAX number, and e-mail address.</p> <p>Samples of pesticide treated seed must be sealed in plastic bags before being placed in cloth or paper sample bags and must be clearly marked with the pesticide name(s).</p>
Test Requests	<p>Please indicate what tests are being requested (e.g., seed identification, purity analysis, germination analysis, tetrazolium viability, noxious weed seed examination, all species examination, seed moisture determination, clean-out, etc.)</p> <p>Seed moisture determination samples must be submitted in sealed containers (e.g., sealed plastic bags).</p>
Test Procedures	<p>Please indicate what testing procedures are preferred: Federal Seed Act (FSA) Regulations, Association of Official Seed Analysts (AOSA) Rules for Testing Seeds, International Seed Testing Association (ISTA) Rules for Seed Testing, or Canadian Seed Act & Regulations (CSAR) Methods and Procedures.</p>
Test Results	<p>The laboratory 'Report of Analysis' will be mailed to the applicant's address unless other instructions are provided.</p>
Billing Information	<p>All testing fees will be invoiced to the applicant's address unless other instructions are provided.</p>

Seed Testing Fee Schedule

Fees shown below are based on an hourly rate of \$70 (US) for testing typical samples. Non-typical samples, such as those with excessive amounts of inert matter or other species, may incur additional charges. An additional one-quarter hour (\$17.50) administrative fee will be charged per group of samples (i.e., 1 or more samples) submitted at the same time.

Examples of minimum prices for tests.

Agricultural & Tree Seed, Seed Mixtures, & Native Species * Species not listed will be charged the hourly rate. Fees will be higher if seed lot has excess inert matter or contaminants.	Purity Analysis (AOSA and FSA)	Germination Test (400 seeds)	Tetrazolium Viability (200 embryos)
Alfalfa, Clovers, Trefoils	\$41.00	\$41.00	\$70.00
Barley, Oat, Rye, Triticale, Wheat	\$52.50	\$41.00	\$58.00
Bell Bean, Cowpea, Field Bean, Field Pea, Horsebean, Soybean	\$35.00	\$52.50	\$58.00
Bermudagrass, Bluegrass, Fescue (lawn grass types), Orchardgrass, Ryegrass	\$70.00	\$47.00	\$105.00
Brome, Fescue (non-lawn grass types), Wheatgrass, Wildrye	Hourly	\$47.00	\$105.00
Cotton	\$41.00	\$52.50	\$76.00
Dichondra	\$35.00	\$52.50	\$64.00
Field Corn	\$35.00	\$41.00	\$64.00
Rice	\$52.50	\$41.00	\$76.00
Safflower, Sunflower	\$35.00	\$41.00	\$64.00
Sorghum, Sudangrass	\$70.00	\$41.00	\$82.00
Sugar Beet/Field Beet	\$52.50	\$64.00	\$87.50
Vetches	\$70.00	\$41.00	\$87.50
Grass mixtures (lawn grasses)	Hourly	See footnote 4	Hourly
Pasture mixtures	Hourly	See footnote 4	Hourly
Native species	Hourly	Hourly	Hourly
Tree Seed (e.g., <i>Abies</i> , <i>Juglans</i> , <i>Pinus</i> , <i>Prunus</i> , etc.)	\$35.00	Contact Lab	\$93.00

Vegetable Seed* * Species not listed will be charged the hourly rate. Fees will be higher if seed lot has excess inert matter or contaminants.	Purity Analysis (AOSA and FSA)	Germination Test (400 seeds)	Tetrazolium Viability (200 embryos)
Asparagus	\$41.00	\$47.00	\$105.00
Beet, Swiss Chard	\$52.50	\$64.00	\$87.50
Broadbean, Garden Bean, Garden Pea, Runner Bean	\$35.00	\$52.50	\$64.00
Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Mustard, Radish, Turnip	\$47.00	\$41.00	\$64.00
Bunching Onions, Chives, Onion	\$41.00	\$41.00	\$64.00
Carrot, Celery, Dill, Parsley, Parsnip	\$52.50	\$47.00	\$105.00
Cucumber, Melon, Pumpkin, Squash, Watermelon	\$41.00	\$41.00	\$70.00
Eggplant, Pepper, Tomato	\$41.00	\$41.00	\$82.00
Endive, Lettuce, Spinach	\$41.00	\$41.00	\$87.50
Sweet Corn	\$35.00	\$47.00	\$64.00
Okra	\$41.00	\$41.00	\$76.00

Please contact the Seed Laboratory if you need more information.

Seed Testing Fee Schedule

AOSA Noxious Weed Seed Examinations:

All tests under this category require a minimum working sample size of approximately 25,000 seed units. The weight of the submitted sample will vary depending on the species to be tested. *Please refer to the table on page 6 for the appropriate submitted sample size.* Fees for all these tests are based on the rate of \$70 per hour with a minimum fee of \$35. Tests requiring more than one-half hour to complete will be charged in one-quarter hour increments. Examination for *Orobanche* spp. and *Striga* spp. are charged separately (see AOSA Bulk Examinations below).

California Noxious Weed Seed	California Prohibited and Restricted noxious weed seeds as declared under the California Seed Law, seeds of plants declared as noxious according to the CCR 4500, and seeds of rated plant pests are reported by number found and rate per unit weight. <i>This exam is included at no additional charge when a purity analysis is requested.</i>	\$ 35 minimum
All States & Federal Noxious Weed Seed	Species appearing on the <u>USDA State Noxious-Weed Seed Requirements Recognized in the Administration of the Federal Seed Act</u> are reported by number found and rate per unit weight. <i>The minimum fee for this test is \$25.00 when a purity analysis (AOSA or FSA), or other AOSA Bulk Examination is also requested (for corn and large legume samples, exam fee is included with purity analysis).</i>	\$ 35 minimum
All Federal Noxious Weed Seed	Species appearing on the <u>USDA State Noxious-Weed Seed Requirements Recognized in the Administration of the Federal Seed Act</u> are reported by number found and rate per unit weight. <i>The minimum fee for this test is \$25.00 when a purity analysis (AOSA or FSA), or other AOSA Bulk Examination is also requested (for corn and large legume samples, exam fee is included with purity analysis).</i>	\$ 35 minimum
Foreign Noxious Weed Seed	Objectionable weed seeds listed on USDA APHIS PCIT PEXD database for a particular country are reported by number found and rate per unit weight. The sender is requested to provide the list of species of concern on the import permit if different from the PCIT list. <i>The minimum fee for this test is \$25.00 when a purity analysis (AOSA or FSA), or other AOSA Bulk Examination is also requested (for corn and large legume samples, exam fee is included with purity analysis).</i>	\$ 35 minimum
Undesirable Grass Seed (UGS) Applies only to lawn and turf grass samples	Species appearing on the <u>USDA State Noxious-Weed seed Requirements Recognized in the Administration of the Federal Seed Act</u> and declared by certain states as undesirable when found in lawn and turf seed lots. <i>The minimum fee for this test is \$25.00 when a purity analysis (AOSA or FSA) or other AOSA Bulk Examination is also requested.</i>	\$ 35 minimum
Canadian Noxious Weed Seed	Species declared as noxious weed seeds under the appropriate grade table designation for the kind of seed under consideration as specified under the current edition of the Canada Weed Seeds Order. <i>The minimum fee for this test is \$25.00 when a purity analysis (AOSA or FSA) or other AOSA Bulk Examination is also requested (for corn and large legume samples, exam fee is included with purity analysis).</i>	\$ 35 minimum

Bulk Examinations:

All tests under this category require a minimum working sample size of approximately 25,000 seed units (unless otherwise stated). The weight of the submitted sample will vary depending on the species to be tested. *Please refer to the table on page 6 for the appropriate submitted sample size.* Fees for all these tests are based on the rate of \$70 per hour with a minimum fee of \$35. Tests with a minimum fee of \$35 requiring more than one-half hour to complete will be charged additional fees in one-quarter hour increments.

Seeds of Other Plant Species (AOSA)	AOSA Bulk Exam for seeds of all contaminating plant species are reported by number found and rate per unit weight. <i>The minimum fee for this test is \$25.00 when a purity analysis (AOSA or FSA), or other AOSA Bulk Examination is also requested (for corn and large legume samples, exam fee is included with purity analysis).</i> Examination for <i>Orobanche</i> spp. and <i>Striga</i> spp. charged separately.	\$ 35 minimum
Other Seeds by Number Determination (ISTA)	International Seed Testing Association (ISTA) examination for seeds of all contaminating plant species. Results are reported as number per contaminant found. <i>The minimum fee for this test is \$25.00 when a purity analysis (ISTA) is also requested (for corn and large legume samples, exam fee is included with purity analysis).</i> Examination for <i>Orobanche</i> spp. and <i>Striga</i> spp. charged separately.	\$ 35 minimum
Sclerotia Check	AOSA Bulk Exam for the percentage by weight of sclerotia found is reported. <i>The minimum fee for this test is \$25.00 when a purity analysis (AOSA or FSA), or other AOSA Bulk Examination is also requested (for corn and large legume samples, exam fee is included with purity analysis).</i>	\$ 35 minimum
Soil Check	AOSA Bulk Exam for the percentage by weight of soil found is reported. <i>The minimum fee for this test is \$25.00 when a purity analysis (AOSA or FSA), or other AOSA Bulk Examination is also requested (for corn and large legume samples, exam fee is included with purity analysis).</i>	\$ 35 minimum
500 g Dodder (<i>Cuscuta</i>) Check	Microscopic examination for <i>Cuscuta</i> spp. contaminants in seed lot samples of alfalfa, clovers, trefoils, etc.	\$ 70 per hour
<i>Orobanche</i> and <i>Striga</i> Check	Dry sieve plus microscopic examination (ISTA protocol) for <i>Orobanche</i> and/or <i>Striga</i> species.	\$ 70 per hour

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Additional Tests and Services:

Seed Identification (morphological)	Specimens submitted for identification must be separated into individual seed kinds. For submitted samples in which the types of seeds are not separated, a fee of \$70 per hour may be charged for the separation.	\$17.50 minimum
Seed Identification (molecular)	Optional added test when morphological identification is not possible. This is a destructive test; therefore, the specimen will not be returned to the submitter. Conventional PCR + sequencing (sample processing \$52.50 for 1 to 40 samples per single submission + conventional PCR per each sample \$20 + DNA sequence and analysis per assembled sequence \$43.00). Price per sample is less for 2 to 40 samples submitted at one time.	\$ 115.50
Seed Moisture Determination	Seed moisture content is tested by the air oven methods of the AOSA Rules or the ISTA Rules. Results are reported as the percentage of moisture on fresh weight basis. The sample must be submitted in a sealed plastic bag or other moisture proof container. For size of submitted sample please contact the Seed Laboratory.	\$ 35
Seed Count	AOSA Method for non-mechanical seed count or ISTA 1000 seed weight determination method.	\$ 35
Ryegrass Florescence	The fee for this test is added to the germination test fee.	\$ 20
X-ray Analysis (per 50 seeds analyzed)	This test may be used to determine seed fill, embryo abnormalities, internal seed damage due to insects, mechanical damage, etc.	\$ 35
Digital Image Photomicroscopy	Customer provides specimen to be photographed or requests photograph of specimen in the CDFA Seed Herbarium. Contact Seed Lab for photograph options.	\$35 per image
Livestock Feed Exam	All California noxious weed seed contaminants are identified and tested for viability. Common weed seeds may also be tested at customer request. For size of submitted sample please contact the Seed Laboratory.	\$ 70 per hour
Bird Seed Exam	All California noxious weed seed contaminants are identified and tested for viability. For size of submitted sample please contact the Seed Laboratory.	\$ 70 per hour
Clean-out Test	Custom test. See page 5 for details of the test.	\$ 70 + germ test fee
Seed Vigor Tests	Based on AOSA or ISTA seed vigor testing protocols. See page 5 for details of the tests.	\$ 140
Thermo Gradient Germination	These tests are run using a Bi-Directional Thermo Gradient Germination Table. This technologically advanced equipment is capable of simultaneously testing seeds at up to 196 different and alternating combinations of temperature and light. By simultaneously running hundreds of germination tests, ideal germination parameters, seed quality profiles, and germination recommendations for new species/varieties can be obtained in just a few weeks, a process that can take up to several months when conventional germination testing methods are used. Examples of testing types listed below. For availability of other types of thermo gradient tests please contact the lab.	
	Seed Viability Testing: Determination of germination ability for species not covered by the AOSA or ISTA Rules, native species, weed pests, or new varieties of existing crops.	\$ 105
	Seed Vigor/Tolerance Testing: Customized test that combines the speed of germination test and seedling growth rate test in one evaluation at multiple temperatures using fewer seeds per temperature. See page 5 for details of the tests.	\$ 140
	Determination of Optimum Germination Protocols: Determination of optimum temperature, light condition and test duration for wild and native species, as well as new varieties of existing crop species.	\$ 175
Other Tests Upon Request	Contact the Seed Laboratory	\$70 per hour

Additional Fees:

Testing Pelleted, Coated, or Encrusted Seed	For removal of coating materials from the seed when required by AOSA, FSA, or ISTA protocol.	\$17.50 minimum
Sand or Soil Based Germination Tests	When requested by customer. Fee in addition to the standard germination test fee.	\$17.50
Toxic Waste Disposal Fee (for treated, pelleted, coated, or encrusted seed)	This fee is added to the testing fees for each treated, coated, pelleted or encrusted seed sample for toxic substance disposal.	\$ 8

Seed Testing Fee Schedule

Tetrazolium Viability Testing – prices vary depending on the species, see table on page 2

The tetrazolium viability test (TZ test) is an enzyme staining test using 2,3,5-triphenyl tetrazolium chloride in a buffered aqueous solution. The stain is used to identify actively respiring tissues within the seed. In this test the staining patterns of the embryonic tissues of 200 seed are evaluated. Seed preparation and embryo evaluation is conducted according to the standardized procedures published by the Association of Official Seed Analysts and the International Seed Testing Association. This test may be used to estimate viability of a seed lot or to determine the percentage of dormant seeds when used in conjunction with a standard germination test. Note: viable seeds do not always produce normal seedlings; therefore, TZ test results may be greater than actual germination. Please refer to the table on page 6 for the appropriate submitted sample size.

Clean-out Test – used only on field-run or partially conditioned seed lots

What is the advantage of a clean-out test over a standard purity analysis and germination test? Results obtained from a standard purity analysis on field-run, or partially conditioned seed lots may be misleading. Standard purity testing procedures classify small, light, and immature seed as pure seed; therefore, these seeds are planted along with the fully mature seed in the germination test. As a result, although the percentage of pure seed is high, the germination percentage is usually much lower than desired.

In a clean-out test, the percentage by weight of inert matter, seeds of other species, and small, light, non-viable or weak seed normally removed during conditioning is determined on field run or partially conditioned seed lots. The test procedure will vary depending on the seed kind. Once the light material is removed, a germination test is performed on the remaining heavy seed.

The results of the clean-out test and the germination test can be used to estimate the amount of conditioning necessary to obtain a satisfactory level of germination for marketable seed.

The fee for the clean-out test is \$70.00 plus the cost of a germination test for the kind of seed tested.

Vigor Testing – test fee \$140

All tests include a standard warm germination test done according to the AOSA or ISTA Rules, results of which are included in the final report. Results of the accelerated aging, saturated salt accelerated aging and cool germination tests are compared to the standard germination results done on the same seed lot prior to vigor testing.

Vigor test results can be used to compare seed lots of the same or related genotypes, seed lots of the same origin differing in production or conditioning, or the same seed lot at different points in time. Including a reference sample against which other samples can be compared results in more meaningful comparisons.

Test	Crops Tested
Accelerated aging	Beans, corn, pea, soybeans, watermelon, zucchini
Saturated salt accelerated aging	Broccoli, carrot, cucumber, melon, onion, pepper, pumpkin, tomato, wheat
Cool germination test/Vigor index	Cotton
Speed of germination	Suitable for any species provided that germination can be readily observed as soon as it occurs, but not recommended for species with multiple seed units.
Seedling growth rate - Dry weight	Any species
Seedling growth rate - Linear growth	This test is only suitable for species that produce seedlings with a single straight shoot or plumule and a main root or single root structure.

Customized vigor tests to evaluate specific quality parameters also available. Contact the Seed Laboratory for test types and fees.

Seed Testing Fee Schedule

Minimum Submitted Sample Sizes

Note: Smaller sample sizes will be accepted for testing; however, a statement will be added to the Laboratory Report of Analysis indicating an insufficient amount of seed was received for testing.

Seed Kind	FSA or AOSA Purity Analysis & Noxious or Bulk Exam grams	FSA or AOSA Germ or TZ Viability Only grams	ISTA Purity Analysis & Other Species Determination grams	ISTA Germ or TZ Viability Only grams
Alfalfa	50	2	50	5
Asparagus	500	40	1000	100
Barley	500	35	1000	120
Bean	500	500	1000	1000
Beet	500	20	500	50
Bermudagrass	10	0.5	25	1
Bluegrass	10	0.5	25	1
Broccoli	50	5	100	10
Brussels sprouts	50	5	100	10
Cabbage	50	5	100	10
Carrot	30	1.5	30	3
Cauliflower	50	5	100	10
Celery	12	0.5	25	1
Chard, Swiss	300	20	500	50
Chicory	30	1	50	5
Chives	50	2.5	30	3
Clover, Ladino	20	1	20	2
Corn, field	500	350	1000	900
Corn, sweet	500	350	1000	900
Cotton	500	125	1000	350
Cowpea	500	125	1000	400
Cucumber	500	25	150	70
Dichondra	50	2.5	50	5
Dill	30	1.25	40	4
Eggplant	110	5	150	15
Endive	30	1	40	4
Horsebean	500	1000	1000	1000

Seed Kind	FSA or AOSA Purity Analysis & Noxious or Bulk Exam grams	FSA or AOSA Germ or TZ Viability Only grams	ISTA Purity Analysis & Other Species Determination grams	ISTA Germ or TZ Viability Only grams
Lettuce	30	1	30	3
Melon	500	25	150	70
Oat	500	30	1000	120
Okra	500	55	1000	140
Onion	70	3	80	8
Orchardgrass	30	1.5	30	3
Parsley	50	1.5	40	4
Parsnip	50	2.5	100	10
Pea	500	350	1000	900
Peach	1,500	1500	-	-
Pepper	150	6	150	15
Pumpkin	500	200	1000	700
Radish	300	15	300	30
Rice	500	16	700	70
Ryegrass	50	3	60	6
Safflower	500	35	900	90
Sorghum	500	30	900	90
Spinach	250	10	250	25
Squash	500	200	1000	700
Sudangrass	250	12	250	25
Sunflower	500	50	1000	200
Tomato	50	2.5	15	7
Trefoil	30	1.5	30	3
Turnip	50	3	70	7
Vetch	500	60	1000	150
Watermelon	500	90	1000	250
Wheat	500	40	1000	120

Note: For samples submitted for purity analysis, noxious weed seed examination and germination or viability testing, the seed for the germination or TZ viability testing is taken from the pure seed portion of the purity analysis.