



Soy ELISA Kit

REF

**BGT-KET-395
96T**



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Sensitivity (Soy-Trypsin-Inhibitor)	16 ppb
Recovery	77-106%
Incubation Time	60 min

1. GENERAL INFORMATION

Soy (*Glycine max*) belongs to the legumes. With 39% the fraction of proteins in soy beans is very high. Many of these proteins are known for being allergenic, such as Gly m1, Glycinin, Kunitz-Trypsin-Inhibitor and Gly m4 which is known to be cross-reactive to birch pollen allergen Bet v1. For this reason soy represents an important food allergen. For soy allergic persons hidden soy allergens in food are a critical problem. Already very low amounts of soy can cause allergic reactions, which may lead to anaphylactic shock in severe cases. Because of this, soy allergic persons must strictly avoid the consumption of soy or soy containing food. Partly undeclared addition of soy as additive in many foods is of particular importance. Cross-contaminations, mostly in consequence of the production process are representing another problem. The chocolate production process is a representative example. For this reason sensitive detection systems for soy residues in foodstuffs are required. Only a few soy proteins are stable to conventional production processes (for example high temperature). For this reason robust indicator proteins are necessary for detection. Soy trypsin inhibitors (STI) are representing such proteins. The **Soy ELISA** represents a highly sensitive detection system on the base of STI and is particularly capable of the quantification of soy residues in cookies, cereals, ice cream, chocolate, instant soups and sausage.

2. PRINCIPLE OF THE TEST

The **Soy** quantitative test is based on the principle of the enzyme linked immunosorbent assay. An antibody directed against STI is bound on the surface of a microtiter plate. Soy containing samples or standards are given into the wells of the microtiter plate. After 20 minutes incubation at room temperature, the wells are washed with diluted washing solution to remove unbound material. A peroxidase conjugated second antibody directed against STI is given into the wells and after 20 minutes of incubation the plate is washed again. A substrate solution is added and incubated for 20 minutes, resulting in the development of a blue colour. The colour development is inhibited by the addition of a stop solution, and the colour turns yellow. The yellow colour is measured photometrically at 450 nm. The concentration of STI and hence the concentration of soy is directly proportional to the colour intensity of the test sample.

3. PRECAUTIONS

Full compliance of the following good laboratory practices (GLP) will determine the reliability of the results:

1. Prior to beginning the assay procedure, bring all reagents to room temperature (20-25°C).
2. All reagents should be mixed by gentle inversion or swirling prior to use. Do not induce foaming.
3. Once the assay has been started, all subsequent steps should be completed without interruption and within the recommended time limits.
4. Replace caps in all the reagents immediately after use. Do not interchange vial stoppers.
5. Use a separate disposable tip for each specimen to prevent cross-contamination.
6. All specimens and standards should be run at the same time, so that all conditions of testing are the same.
7. Do not mix components from different batches.
8. Do not use reagents after expiration date.
9. Check both precision and accuracy of the laboratory equipment used during the procedure (micro-pipets, ELISA reader etc.).

4. HEALTH AND SAFETY INSTRUCTIONS

1. Do not smoke or eat or drink or pipet by mouth in the laboratory.
2. Wear disposable gloves whenever handling patient specimens.
3. Avoid contact of substrate and stop solution with skin and mucosa (possible irritation, burn or toxicity hazard). In case of contact, rinse the affected zone with plenty of water.
4. Handling and disposal of chemical products must be done according to good laboratory practices (GLP).

5. REAGENTS

The kit contains reagents for 96 determinations. They have to be stored at 2-8°C. Expiry data are found on the labels of the bottles and the outer package.

1. **SORB MT** Microtiter plate consisting of 12 strips with 8 breakable wells each, coated with anti-STI antibodies.
2. **CAL 1 – 5** STI Standards (0; 40; 100; 400; 1000 ppb of STI): 5 vials with 2.0 mL each, dyed red, ready-to-use
3. **ENZ CONJ** Conjugate (anti-STI-peroxidase): 15 mL, dyed red, ready-to-use.
4. **SUB TMB** Substrate Solution (TMB): 15 mL, ready-to-use.
5. **STOP SOLN** Stop Solution (0.5 M H₂SO₄): 15 mL, ready-to-use.
6. **SAM DIL 10x** Extraction and sample dilution buffer (Tris): 2 x 120 mL as 10x concentrate, dyed red. Dilute 1+9 with distilled water. Stored at 4°C the diluted buffer is stable for at least one week. If during the cold storage crystals precipitate, the concentrate should be warmed up to 37°C for 15 minutes.
7. **WASH SOLN 10x** Washing Solution (PBS + Tween 20): 60 mL as 10x concentrate. Dilute 1+9 with distilled water. Stored at 4°C the diluted buffer is stable for at least 4 weeks. If during the cold storage crystals precipitate, the concentrate should be warmed up to 37°C for 15 minutes.
8. Instruction Manual.

6. ADDITIONAL INSTRUMENTATION AND REAGENTS (NOT PROVIDED)

Instrumentation

- 100 - 1000 µL micropipets
- Volumetric flask
- Analytical balance
- Mortar, mixer
- Water bath
- Centrifuge
- ELISA reader (450 nm)
- Plastic bag to store unused microtiter strips.

Reagents

- double distilled water

7. SAMPLE PREPARATION

Due to high risk of cross-contamination all applied instruments like applicator, mortar, glass vials etc. have to be **cleaned thoroughly** before and after each sample. To identify possible cross-contamination caused by previous extractions it is strongly recommended to note the sequence of the extractions.

The following sample preparation should be applied for all kinds of samples:

1. To maximize homogeneity and representativeness of the sample drawing, a minimum of 5 g sample should be pulverized finely in a mortar, impact mill etc.
2. 1 g of the homogenized mixture is suspended in 20 mL of **pre-diluted** extraction buffer. Afterwards the suspension is incubated for 15 min in a preheated water bath at 60°C. To ensure good homogeneity, the samples should be shaken every two minutes.
3. The samples are centrifuged for 10 minutes at 2000 g. If it is not possible to separate the supernatant from the precipitate completely, the suspension should be filtrated if necessary.
4. 100 µL of particle-free solution are applied per well. If the results of a sample are out of the measuring range, further dilution with the **pre-diluted** extraction and sample dilution buffer is necessary. The additional dilution has to be considered when calculating the concentration.

8. PROCEDURE

The washing solution is supplied as 10x concentrate and has to be **diluted** 1+9 with double distilled water before use. In any case the **ready-to-use** standards provided should be determined twofold. When a longer series of samples is determined, the standards should be pipetted once before the samples and a second time after the samples. For final interpretation the arithmetic mean is used for calculation. In consideration of GLP and quality control requirements a duplicate measurement of samples is recommended.

The procedure is according to the following scheme:

1. Prepare samples as described above.
2. Pipet 100 μL **ready-to-use** standards or prepared samples in duplicate into the appropriate wells of the microtiter plate.
3. Incubate for 20 minutes at room temperature.
4. Wash the plate three times as follows: Discard the contents of the wells (dump or aspirate). Pipet 300 μL of diluted washing solution into each well. After the third repetition empty the wells again and remove residual liquid by striking the plate against a paper towel. The wash procedure is critical. Insufficient washing will result in poor precision and falsely elevated absorbencies.
5. Pipet 100 μL of conjugate (anti-STI-peroxidase) into each well.
6. Incubate for 20 minutes at room temperature.
7. Wash the plate as outlined in 4.
8. Pipet 100 μL of substrate solution into each well.
9. Allow the reaction to develop in the dark (e.g. cupboard or drawer; the chromogen is light-sensitive) for 20 minutes at room temperature.
10. Stop enzyme reaction by adding 100 μL of stop solution (0.5 M H_2SO_4) into each well. The blue colour will turn yellow upon addition.
11. After thorough mixing, measure absorbance at 450 nm (reference wavelength 620 nm), using an ELISA reader. The colour is stable for 30 minutes.

9. CALCULATION OF RESULTS

The ready-to-use standards are prepared for a direct determination of sample concentrations. The dilution of samples in the extraction process as described in the above stated sample preparation procedure is already considered. Additional dilution due to high sample concentration has to be accounted for.

1. Calculate the average optical density (OD 450 nm) for each set of reference standards or samples.
2. Construct a standard curve by plotting the mean optical density obtained for each reference standard against its concentration in ppb on semi-log graph paper with the optical density on the vertical (y) axis and the concentration on the horizontal (x) axis. Alternatively the evaluation can be carried out by software. In this case the 4-parameter method should be preferred.
3. Using the mean optical density value for each sample, determine the corresponding concentration of STI in ppb from the standard curve. Depending on experience and/or the availability of computer capability, other methods of data reduction may be employed.

The determined amount of STI [ppb] can be used to calculate the amount of the corresponding soy raw product. Therefore the amount of STI has to be multiplied with a conversion factor (F).

The following conversion factors were determined by validation experiments:

Soy Flour, unroasted	42
Soy Flour, roasted	470
Soy Protein Isolate (90%)	864
Soy Milk	2500
Textured Soy (Granulate)	3080
Tofu	50000

10. TYPICAL STANDARD VALUES

The following table contains an example for a typical standard curve. The binding is calculated as percent of the absorption of the 1000 ppb standard. These values are only an example and should not be used instead of the standard curve which has to be measured in every new test.

STI (ppb)	OD-% of 1000 ppb
1000	100
400	76
100	36
40	19
0	7

11. PERFORMANCE

Sensitivity

The limit of detection (LOD) of the **Soy test** is 16 ppb STI.

The limit of quantification (LOQ) of the **Soy test** is 40 ppb STI.

As matrices can have variable influence on the LOD in specific cases, and the range of matrices that was tested is of course limited, the end user if needed may evaluate its own LOD values depending on the matrices to be analyzed.

Alternatively, any results below LOQ should be just reported quantitatively as "< LOQ".

Cross-reactivity

For the following foods no cross-reactivity could be detected:

Adzuki bean	Cayenne	Crab, cooked	Gliadin	Oats	Pumpkin seed
Almond	Celery	Crab, raw	Goat's milk	Onion	Radish
Apricot	Cherry	Cumin	Guar gum	Paprika	Rice
Barley	Chervil	Dill	Gum arabic	Pea	Rye
Bean, white	Chestnut	Duck	Hazelnut	Peach	Saccharose
Beef	Chia	Egg	Horseradish	Peanut	Sesame
Beef, cooked	Chicken	Ewe's milk	Isinglass	Pecan	Shrimps
Bovine gelatin	Chickpea	Fennel	Kidney bean	Pepper, black	Split pea
Brazil nut	Chili	Fenugreek	Kiwi	Pine seed	Sunflower seed
Buckwheat	Cinnamon	Fish gelatin	Lamb	Pistachio	Thyme
Cabbage, white	Clove	Flaxseed	Leek	Plum	Tomato
Caraway seeds	Cocoa	Garden cress	Lentil	Poppy	Turkey
Cardamom	Coconut	Garlic, fresh	Lupin	Pork	Turmeric
Carob gum	Cod	Garlic, granulated	Macadamia	Potato	Walnut
Carrot	Corn	Ginger, fresh	Mustard	Prawn cooked	Wheat
Cashew	Cow's milk	Ginger, ground	Nutmeg	Prawn, raw	

The following cross reactions were determined:

Rapeseed	0.00001%
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Precision

Intra-Assay Precision	6 - 8%
Inter-Assay Precision	5 - 13%

Linearity














The serial dilution of spiked samples (cookies, cereals, ice cream, chocolate, instant soup and sausage) resulted in a dilution linearity of 81% - 128%.

Recovery

Mean recovery was determined by spiking samples with different amounts of STI:

Cookies	106%
Cereals	100%
Ice cream	77%
Chocolate	77%
Instant soup	90%
Sausage	96%

SYMBOLS USED WITH ASSAYS

Symbol	English	Deutsch	Française	Espanol	Italiano
	European Conformity	CE-Konformitätskennzeichnung	Conforme aux normes européennes	Conformidad europea	Conformità europea
	Consult instructions for use	Gebrauchsanweisung beachten	Consulter les instructions d'utilisation	Consulte las Instrucciones	Consultare le istruzioni per l'uso
	In vitro diagnostic device	In-vitro-Diagnostikum	utilisation Diagnostic in vitro	Diagnóstico in vitro	Per uso Diagnostica in vitro
	For research use only	Nur für Forschungszwecke	Seulement dans le cadre de recherches	Sólo para uso en investigación	Solo a scopo di ricerca
	Catalogue number	Katalog-Nr.	Référence	Número de catálogo	No. di catalogo
	Lot. No. / Batch code	Chargen-Nr.	No. de lot	Número de lote	Lotto no
	Contains sufficient for <n> tests/	Ausreichend für "n" Ansätze	Contenu suffisant pour "n" tests	Contenido suficiente para <n> ensayos	Contenuto sufficiente per "n" saggi
	Note warnings and precautions	Warnhinweise und Vorsichtsmaßnahmen beachten	Avertissements et mesures de précaution font attention	Tiene en cuenta advertencias y precauciones	Annoti avvisi e le precauzioni
	Storage Temperature	Lagerungstemperatur	Température de conservation	Temperatura de conservación	Temperatura di conservazione
	Expiration Date	Mindesthaltbarkeitsdatum	Date limite d'utilisation	Fecha de caducidad	Data di scadenza
	Legal Manufacturer	Hersteller	Fabricant	Fabricante	Fabbricante
<i>Distributed by</i>	Distributed by	Vertrieb durch	Distribution par	Distribución por	Distribuzione da parte di
	Version	Version	Version	Versión	Versione
	Single-use	Einmalverwendung	À usage unique	Uso único	Uso una volta