Technical specifications
Sensitivity: 1 ppb
Detection limit
- Chicken, pork, liver, honey, egg: 1 ppb
- Serum, Urine: 4 ppb
- Milk: 20 ppb

Recovery rate
- Chicken, pork, liver: 70 ±10%
- Egg: 65 ±10%
- Milk, honey, serum: 70 ±10%

Cross-reaction rate
No cross reaction with any other substance.

ELISA kits available from ADI:

http://4adi.com/commerce/catalog/spcategory.jsp?category_id=2739

DE-100010 Clenbuterol ELISA kit, 96 tests (For Urine, Serum, Feed, Meat, Liver)
DE-100020 Ractopamine ELISA kit, (For Liver, Urine, Feed), 96 tests
DE-100030 Salbutamal ELISA kit, For Urine, Tissue, Feed, Animal Tissue, Aquatic, Honey, Intestine., 96 tests
DE-100040 Chloramphenicol ELISA kit, 96 tests (For Animal Tissue, Aquatic, Honey, Intestine, Urine, Egg, Milk, Serum)
DE-100050 Florfenicol ELISA kit (For Animal Tissue, Aquatic, Honey), 96 tests
DE-100060 Nitrofurin (AMOZ) ELISA kit (For Fish, Shrimp, Honey, Chicken/Liver), 96 tests
DE-100070 Nitrofurin (AHD) ELISA kit, (For Fish, Shrimp, Honey, Chicken/Liver), 96 tests
DE-100075 Nitrofurin (SEM) ELISA kit (Honey, Fish, Shrimp, Chicken/Liver, Fish/Shrimp), 96 tests
DE-100090 Nitrofurin (AOZ) ELISA kit (For Fish, Shrimp, Honey, Chicken/Liver), 96 tests
DE-100110 Sulfonamides Residues (SAs) ELISA kit, (For Chicken/Liver, Pork/Liver, Honey/Egg, Serum/Urine, Milk), 96 tests
DE-100110 Sulfamethoxydiazine (SMD) ELISA kit, (For Chicken/Liver, Pork/Liver, Honey/Egg, Serum/Urine), 96 tests
DE-100120 Quinolones (QNS) ELISA kit (For Pork/Liver, Chicken/Liver, Shrimp, Fish, Serum, Honey), 96 tests
DE-100130 Enrofloxacin ELISA kit (For Pork/Liver, Chicken/Liver, Shrimp, Fish, Serum, Honey), 96 tests
DE-100140 Ampicillin ELISA kit, (For Pork/Liver, Chicken, Duck, Shrimp, Fish, Honey, Milk), 96 tests
DE-100150 Benzyl Penicillin ELISA kit, (For Pork/Liver, Chicken, Duck, Shrimp, Fish, Honey, Milk), 96 tests
DE-100160 Tylosin ELISA kit (For Meat, Liver, Honey, Egg), 96 tests
DE-100170 Trenbolone ELISA kit (For Animal Tissue, Aquatic, Urine), 96 tests
DE-100180 Diazepam ELISA kit (For Tissue, Urine, Feed), 96 tests
DE-100190 Diethylstilbestrol (DES) ELISA kit (Fish, Shrimp, Liver, Meat, Feed, Urine), 96 tests
DE-100200 Gentamicin ELISA kit (Chicken/Liver), 96 tests
DE-100210 Streptomycin ELISA kit, 96 tests (Chicken/Liver, Honey, Milk)
DE-100230 Olaquindox ELISA kit (Tissue) 96 tests
DE-100240 Sulfoniaq-oxaline ELISA kit, (For Pork/Liver, Honey/Egg, Serum/Urine, Milk), 96 tests

See Details at the web site or Contact ADI
Sulfamethazine (SM2) ELISA KIT Cat. #DE-100100

<table>
<thead>
<tr>
<th>Kit Components, 96 tests</th>
<th>Cat #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro-well coated strip plate</td>
<td>DE-100101</td>
</tr>
<tr>
<td>(12 strips with 8 removable wells each)</td>
<td></td>
</tr>
<tr>
<td>6x standard solution (1 ml each):</td>
<td>DE-100102</td>
</tr>
<tr>
<td>0 ppb, 1 ppb, 3 ppb, 9 ppb, 27 ppb, 81 ppb</td>
<td></td>
</tr>
<tr>
<td>Enzyme conjugate (7 mL)</td>
<td>DE-100103</td>
</tr>
<tr>
<td>Antibody working solution (10 mL)</td>
<td>DE-100104</td>
</tr>
<tr>
<td>Substrate A solution (7 mL)</td>
<td>DE-SSA</td>
</tr>
<tr>
<td>Substrate B solution (7 mL)</td>
<td>DE-SSB</td>
</tr>
<tr>
<td>Stop solution (7 mL)</td>
<td>DE-ST</td>
</tr>
<tr>
<td>20x concentrated washing buffer (40 mL)</td>
<td>DE-WB</td>
</tr>
<tr>
<td>2x concentrated redissolving solution (50 mL)</td>
<td>DE-SS2</td>
</tr>
<tr>
<td>Instruction Manual</td>
<td>M-DE-100100</td>
</tr>
</tbody>
</table>

INTRODUCTION

Sulfamethazine (SM2), sulfamonomethoxine (SMM), Sulfadiazine (SD), Sulfamerazine (SM1), Sulfamethoxazole (SMZ) and Sulfathiazole (ST) are sulfonamide based antibiotic. Sulfonamide is also known as sulfa drugs. It is used as an antimicrobial and plays a role of competitive inhibitor of the enzyme dihydropteroate synthetase. Sulfonamide is also present in some other medications that do not act as an antimicrobial; they include thiazide diuretics, loop diuretics sulfonylureas, some COX-2 inhibitors and acetazolamide. Sulfonamide is an organic sulfur compound containing the amides of sulfonic acids. Its molecular structure is similar to p-Aminobenzoic acid (PABA) which is needed in bacteria organisms as a substrate of the enzyme dihydropteroate synthetase for the synthesis of tetrahydrofolic acid (THF). PABA is not a vitamin but it is essential for the human body. In human body PABA is produce by E. coli in the colon, so human does not have the need to intake from food. Sulfonamide works better in a basic environment, the solubility of the compound is very low and sometimes it can form crystals in the kidneys. The reaction of a sulfonyl chloride with ammonia or an amine will produce sulfonamides.

Sulfonamide drugs were the first antimicrobial drugs which opened the doors for many other antimicrobial drugs. Sulfonamide played a major role during World War II. It saved lives of tens of thousands of patients including the son of the president Franklin Delano Roosevelt, Franklin Delano Roosevelt, Jr. and Winston Churchill. Sulfa drug powder was included in the first aid kit and it was recommended to be sprinkled on any open wound. Sulfonamide works better in a basic environment, the solubility of the compound is very low and sometimes it can form crystals in the kidneys. The reaction of a sulfonyl chloride with ammonia or an amine will produce sulfonamides.

The uses of sulfonamides include urinary tract disorders, haemopoietic disorders, porphyria and hypersensitivity reactions. A strong allergic reaction

CALCULATION OF RESULTS

There are two methods to judge the results: the first one is the rough judgment, while the second is the quantitative determination. Note that the OD value of the sample has a negative correlation with the SM2 concentration.

Qualitative determination

The concentration range (ng/mL) can be obtained from comparing the average OD value of the sample with that of the standard solution. Assuming that the OD value of the sample I is 0.211, and that of the sample II is 0.785, the OD value of standard solutions is: 2.140 for 0 ppb, 1.560 for 1 ppb, 1.124 for 3 ppb, 0.650 for 9 ppb, 0.328 for 27 ppb ,0.125 for 81 ppb, accordingly to the concentration range of the sample I is 27 to 81 ppb, and that of the sample II is 3 to 9 ppb (multiplied by the corresponding dilution fold).

Quantitative determination

The mean values of the absorbance values is obtained for the average OD value (B) of the sample and the standard solution divided by the OD value (B0) of the first standard solution (0 ng/mL standard) and subsequently multiplied by 100%, that is,

\[
\text{Percentage of absorbance value} = \left( \frac{B}{B_0} \right) \times 100\% 
\]

B—the average OD value of the sample or the standard solution
B0—the average OD value of the 0 ng/mL standard solution

Draw the standard curve with the absorption percentages of the standard solution and the semilogarithm values of the SM2 standard solution (ng/mL) as Y- and X-axis, respectively. Read the corresponding concentration of the sample from the standard curve by incorporating its absorption percentage into the standard curve. The resulting value is subsequently multiplied by the corresponding dilution fold, finally obtaining the SM2 concentration in the sample. Using the professional analyzing software of this kit will be more convenient for the accurate and rapid analysis of a large amount of samples. (Please contact us for this software).

A typical assay Standard Curve (do not use this for calculating sample values)
might occur if taken in large amounts; the two most serious are Stevens Johnson syndrome and Lyell syndrome. Adverse reactions when sulfanilamides are taken are very low, only 3% of the population will show symptoms.

Alpha Diagnostic Intl’s Sulfamethazine (SM2) ELISA kit is a highly sensitive competitive type assay for the measurement of SM2 in chicken liver, pork liver, honey, egg, serum, urine and milk.

**PRINCIPLE OF THE TEST**

The test kit is based on the competitive enzyme immunoassay for the detection of Sulfanethazine (SM2) in the chicken, pork, milk, honey and egg. The coupling antigens are precoated on the micro-well stripes. The Sulfanethazine in the sample and the conjugated antigen pre-coated on the micro-well stripes compete for the anti-Sulfanethazine antibodies. After the addition of the enzyme conjugate, the TMB substrate is added for coloration. The optical density (OD) value of the sample has a negative correlation with the Sulfanethazine concentration in the sample. This value is compared to the standard curve and the Sulfanethazine concentration is subsequently obtained.

**MATERIALS AND EQUIPMENT REQUIRED**

**Equipments:** microplate reader, printer, mixer or stomacher, oscillator, centrifuge, nitrogen-drying device, measuring pipettes and balance (a sensitivity reciprocal of 0.01 g)

**Reagents:**
- Acetonitrile (CH3CN), ethyl acetate, N-hexane, Na2HPO4—12H2O, NaH2PO4—2H2O, NaCI.

**PRECAUTIONS AND SAFETY INSTRUCTIONS**

The Sulfamethazine (SM2) Kit contains 1% sulfuric acid. Follow good laboratory practices, and avoid ingestion or contact of any reagent with skin, eyes or mucous membranes. All reagents may be disposed of down a drain with copious amounts of water. MSDS for TMB, sulfuric acid, if not already on file, can be requested or obtained from the ADI website.

**SAMPLE PRE-TREATMENT**

**Instructions**

The following points must be dealt with before the pre-treatment of any kind of sample:
1. Only the disposable tips can be used for the experiments and the tips must be changed when used for absorbing different reagents.
2. Before the experiment, each experimental equipment must be clean and should be re-cleaned if necessary, in order to avoid the contamination that interferes with the experimental results.

**Solution preparation before sample pre-treatment**

1. 2 M NaCl: dissolve 11.69 g NaCl in deionized water to 100 mL
2. 0.02 M PB buffer: weight 2.58 g Na2HPO4—12H2O and 0.44 g NaH2PO4—2H2O, dissolve in the deionized water to 500 mL.
3. Acetonitrile (CH3CN)—water solution: V CH3CN / V H2O =84:16.
4. The 2× concentrated redissolving solution is mixed with deionized water at 1:1 (1 mL 2× concentrated redissolving solution+1 mL deionized water), for the sample redissolving.

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**Work Sheet of Typical Assay-Sulfamethazine (SM2)**

<table>
<thead>
<tr>
<th>Wells</th>
<th>Stds/samples</th>
<th>Mean A450 nm</th>
<th>Absorption Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1, A2</td>
<td>Standard A</td>
<td>0 ppb</td>
<td>2.143</td>
</tr>
<tr>
<td>B1, B2</td>
<td>Standard B</td>
<td>1 ppb</td>
<td>1.560</td>
</tr>
<tr>
<td>C1, C2</td>
<td>Standard C</td>
<td>3 ppb</td>
<td>1.124</td>
</tr>
<tr>
<td>D1, D2</td>
<td>Standard D</td>
<td>9 ppb</td>
<td>0.650</td>
</tr>
<tr>
<td>E1, E2</td>
<td>Standard E</td>
<td>27 ppb</td>
<td>0.328</td>
</tr>
<tr>
<td>F1, F2</td>
<td>Standard F</td>
<td>81 ppb</td>
<td>0.125</td>
</tr>
</tbody>
</table>

**NOTE:** These data are for demonstration purpose only. A complete standard curve must be run in every assay to determine sample values. Each laboratory should determine their own normal reference values.

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Samples preparation

High-detection-limit samples
a) Animal tissue (meat, liver), shrimp, fish, egg.
1. Take the sample, homogenize at 10000 r/min for 1 min.
2. Weigh 3±0.05 g of the homogenized sample, put into centrifugal tube, add 9 mL of the CH3CN-water solution, shake properly for 10 min, centrifuge at above 4000 r/min at 15 °C for 10 min.
3. Transfer 4 mL of the supernatant into a new vessel, add 2 mL 2 M NaCl solution and 7 mL of ethyl acetate, shake for 10 min, and centrifuge at above 4000 r/min at 15 °C for 5 min.
4. Transfer the supernatant into a new vessel, blow to dry with nitrogen completely by rotary evaporator at 50 °C.
5. Add 1 mL of the diluted redissolving solution, shake for 1 min, add 1 mL n-hexane, mix for 2 min and centrifuge at 4000 r/min at 15 °C for 5 min, remove the liquid (upper layer).
6. Take 20 µL of the lower for further analysis.

Fold of dilution of the sample: 1
It needs five fold dilution of the sample (1 mL sample+4 mL of the diluted redissolving solution) if the detection is based on the most residue (100 ppb) of national regulation.

Low-detection-limit samples
b) Animal tissues (meat, liver)
1. Weight 2.0 ± 0.05 g of the sample, add 10 mL 0.02 M PB buffer, shake upside down for 10 min, put into 37 °C constant temperature container for 30 min, centrifuge at above 5000 r/min at 10 °C for 10 min.
2. Take 20 µL of the clear supernatant (upper layer) for further analysis.

Fold of dilution of the sample: 5
Detection limit: 5 ppb
c) Animal tissues (meat or chicken)
1. Take 2.0 ± 0.05 g of the sample, add 10 mL 0.02 M PB buffer and 5 mL n-hexane, shake upside down for 10 min, centrifuge at above 5000 r/min at 10 °C for 10 min.
2. Remove n-hexane phase (upper layer), take 100 µL of the lower, add 100 µL 0.02 M PB buffer, mix vigorously.
3. Take 20 µL for analysis

Fold of dilution of the sample: 10
Detect limit :10 ppb
d) Serum
1. Place sample at room temperature for 30 minutes, centrifuge at above 4000 r/min at 10 °C for 10 min, separate or filter serum.
2. Take 1 mL serum, add 3 mL 0.02M PB buffer, mix properly.
3. Take 20 µL for further analysis.

Fold of dilution of the sample: 4
Detect limit: 4 ppb
e) Honey
1. Put 1.0 ± 0.05 g honey into 50 mL centrifugal tube, add 2 mL 0.02 M PB buffer, shake properly.
2. Add 8 mL ethyl acetate, shake for 10 min, centrifuge at above 4000 r/min at room temperature (20-25 °C) for 10 min.
3. Take the upper layer, blow to dry with nitrogen at 50 °C, add 0.5 mL of the diluted redissolving solution to redissolve.
4. Take 20 µL for further analysis

Fold of dilution of the sample: 1

f) Urine
1. And 3 mL 0.02 M PB buffer and 1 mL of the centrifuged clear sample, mix properly.
2. Take 20 µL for further analysis

Fold of dilution of the sample: 4
Detect limit: 4 ppb
g) Milk
1. Take 1 mL milk, add 0.02 M PB buffer, dilute at 1:20 (V/V) (20 µL milk + 380 µL 0.02 M PB buffer).
2. Take 20 µL for further analysis.

Fold of dilution of the sample: 20
Detect limit: 20 ppb

STORAGE AND STABILITY
Storage: store at 2 to 8 °C, not frozen.
Expiration date: 12 months; date of production is on box.

TEST PROCEDURE
(ALLOW ALL REAGENTS TO REACH ROOM TEMPERATURE BEFORE USE).

Instructions
1. Bring all reagents and micro-well strips to the room temperature (20-25°C);
2. Return all reagents to 2-8°C immediately after use;
3. The reproducibility of the ELISA analysis, to a large degree, depends on the consistency of plate washing. The correct operation of plate washing is the key point in the procedures of ELISA;
4. For the incubation at constant temperatures, all the samples and reagents must avoid light exposure, and each microplate should be sealed by the cover membrane.

Operation Procedure
1. Take out the kit from the refrigerated environment. Take out all the necessary reagents from the kit and place at the room temperature (20-25°C) for at least 30 min. Note that each reagent must be shaken to mix evenly before use.
2. Take the required micro-well strips and plate frames. Re-sealed the unused microplate, stored at 2-8°C, not frozen.
3. Solution preparation: dilute 40 mL of the 20× concentrated washing buffer with the distilled or deionized water to 800 mL (or just to the required volume) for use.
4. Numbering: number the micro-wells according to samples and standard solution; each sample and standard solution should be performed in duplicate; record their positions.