ANP Technologies, Inc. - NIDS ACE Test System

GENERAL DESCRIPTION:

The NIDS® ACE Test is an in vitro analytical test for the rapid qualitative detection of acetylcholinesterase-inhibiting pesticides, nerve agents, and heavy metals in water and food. Acetylcholine is a neurotransmitter that stimulates muscle contraction. In humans and other vertebrates, Acetylcholinesterase (AChE) is the enzyme that hydrolyzes acetylcholine, thereby regulating its levels. When AChE is inhibited, the excess acetylcholine causes the nervous system to lose control over the muscular system, resulting in convulsions, asphyxia, heart arrest, and death. Many pesticides, such as organophosphates, carbamates, and chemical warfare nerve agents, are AChE inhibitors. These classes of contaminants may be present in drinking water as the result of farm irrigation run-off where pesticides have been used or possibly by the intentional contamination of water by terrorist groups. The ACE Test is a quick method for the determination of possible water contamination by these classes of contaminants.

TECHNICAL DESCRIPTION:

The NIDS® ACE Test is based on the inhibition of acetylcholinesterase and other enzymes by pesticides and neurotoxins. Two different enzymes are used, Reagent A and Reagent B. Reagents A and B contain enzymes which have different reactivities with different acetylcholinesterase-inhibiting compounds. The reagents are lyophilized to ensure long term stability. A sample of water is introduced into a vial of Reagent A and Reagent B. A negative control composed of purified water is introduced into similar vials of Reagent A and Reagent B. The vials are mixed and allowed to react with any compounds present in the water. Acetylcholinesterase-inhibiting compounds in the water will deactivate one or both of the lyophilized enzymes. The negative control, which does not contain acetylcholinesterase inhibiting compounds, will not be deactivated. Samples from the test and control vials are introduced into designated wells on test tickets which contain filter pads that have been treated with a fluorescent substrate. The sample and control are allowed to react with the fluorescent substrate and then the level of fluorescent product in each well is measured by a reader. If the test sample contains acetylcholinesterase-inhibiting compounds, then the level of fluorescence in the test well will be significantly lower than in the control well in one or both of the tests.

CONTACT INFORMATION

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COST

• $10,000/system
• $20/analysis

Tier Selection

Final tier assignment is based on overall product score.

- 🟢 Top Tier
- 🟢 Second Tier
- ⚪ Third Tier
- 🔴 Fourth Tier
- 🔴 Bottom Tier

RANKINGS

|	Biological	Chemical	Radiological
FIELD USE System	N/A	⚪ (Third Tier)	N/A
MOBILE Laboratory	N/A	⚪ (Third Tier)	N/A
DIAGNOSTIC Laboratory	N/A	⚪ (Third Tier)	N/A
ANALYTICAL Laboratory	N/A	🔴 (Fourth Tier)	N/A

Notes

This system is the core technology in the DoD's Water Monitoring System.

## Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.
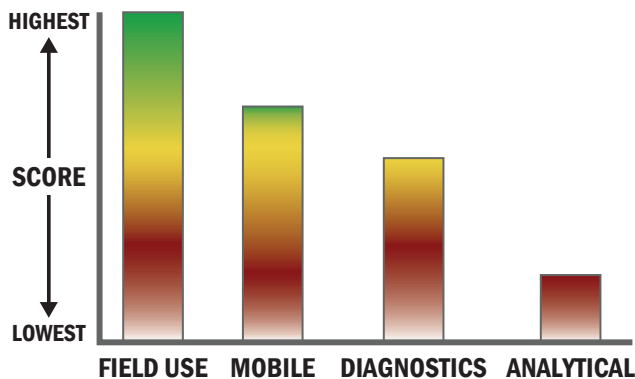
Impact Chart

The Impact Chart is a spider graph representing specific categories and designed to give the reader a visual depiction of how a particular system is expected to operate across the four different scenarios. The score for each of the seven categories is presented as the percentage of the total possible score. Higher category scores extend the spokes of a graphic toward the outer edge of the chart. The area graphed for each of the four scenarios relates to how well the system performed in that scenario. Graphics for each of the four scenarios are super-imposed for ease of comparison.
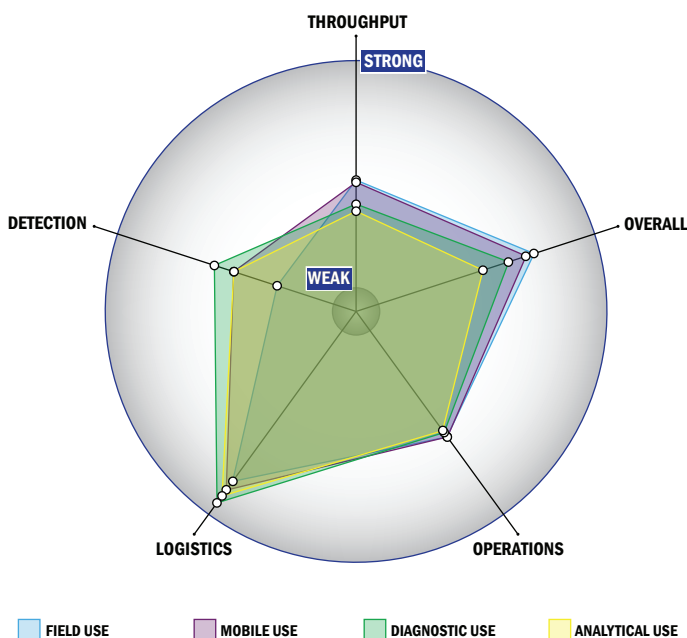

Evaluation Criteria

Throughput:
- Between 15 and 30 minutes for detection
- Multiple samples, single tests/sample per run
- Less than 32 samples every 2 hours
- The system could be adapted to a semi-automated system with some effort
- Device or system is intended for multiple detection assays
- 2 solutions, buffer, eluents, and/or reagents
- 3 components
- Less than 5 minutes is required
- 6-8 steps are required for detection

Logistics:
- An afternoon of training and some technical skills required
- Approximately the size of a toaster
- Between 1 and 5 kg
- Wired connections are available
- System or device uses batteries
- 4-8 hours battery life

MOST MATURE ← LEAST MATURE
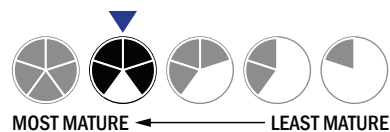
Operations:
- Can be used from 4°C to 37°C
- Components must be stored at room temperature (27°C)
- Performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- 5-10 years expected life
- The system could be adapted to a fully autonomous system with significant effort
- The system software is closed and not available for modification
- The system hardware is closed and not available for modification

Detection:
- Possible the system could receive 510K clearance, no current efforts at this time
- Possible the system could receive FDA approval, no current efforts at this time
- Greater than 250 μL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1 ppb-1 ppm
- Possible system could identify aerosolized chemical agent
- System currently can identify liquid chemical agent