NEMC 2015

Enzymes for Analytical Chemistry

Ellen R. Campbell
Vice President & CEO

NECi Superior Enzymes

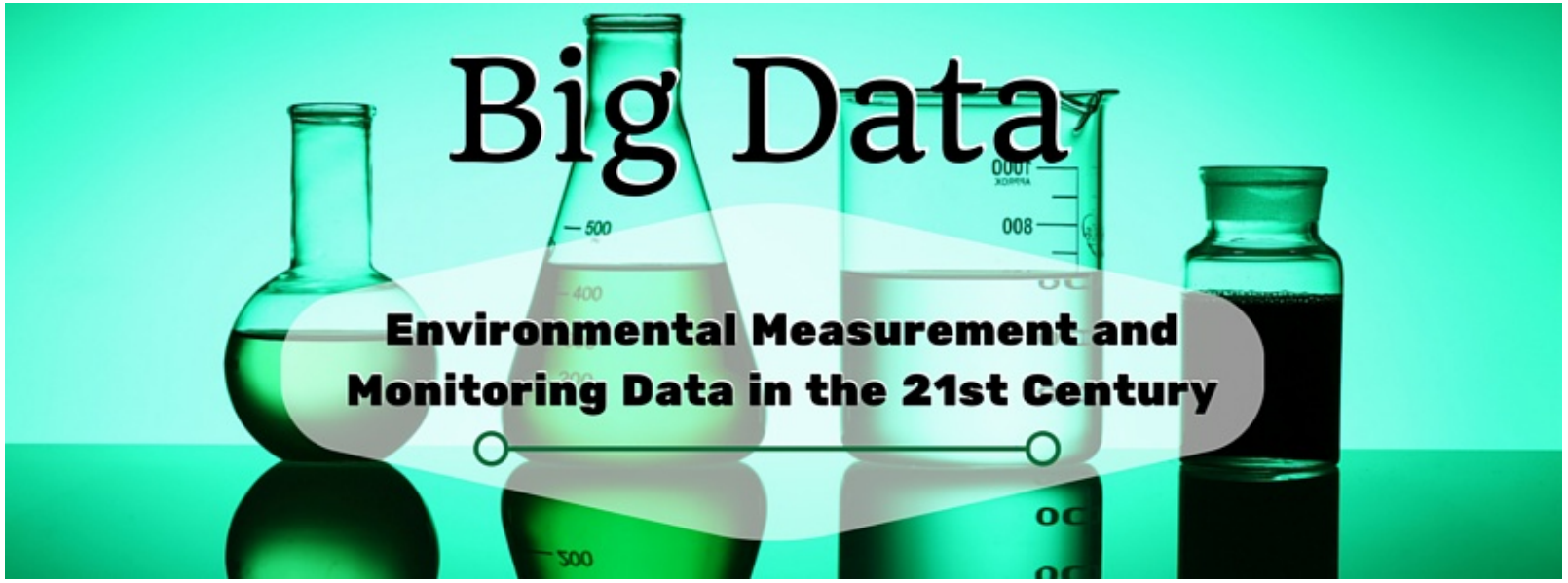
Biotechnology Chemists Can Use

We're Evolving

The Nitrate Elimination Company, Inc

NECi Superior Enzymes

Biotechnology Chemists Can Use



Collaborative Efforts to Improve Environmental Monitoring

Method Validation Across Disciplines:
Biotechnology for Green Analytical Chemistry

Biotechnology Chemists Can Use

NECi Superior Enzymes

- Since 1993, NECi has been pioneering green chemistry by implementing enzymes as "chemical" reagents
- Our claim to fame is Nitrate Reductase
- We're now delving into other enzymes
- Current research is building upon years of recombinant protein expression and stringent quality control

Enzymes

From HE laundry detergent…
to nutraceuticals…
to analytical chemistry reagents?

It's a new generation

Back Then

- Parts per billion was an achievement
- Toxicity was part of the chemistry game
- Enzymes? Those are for animals…

Now

- Single molecule detection limits
- Lab safety is the name of the game
- Enzymes? Those are for analytical chemists!

Enzymes for Analytical Chemistry

Specificity – False negatives and positives are rare

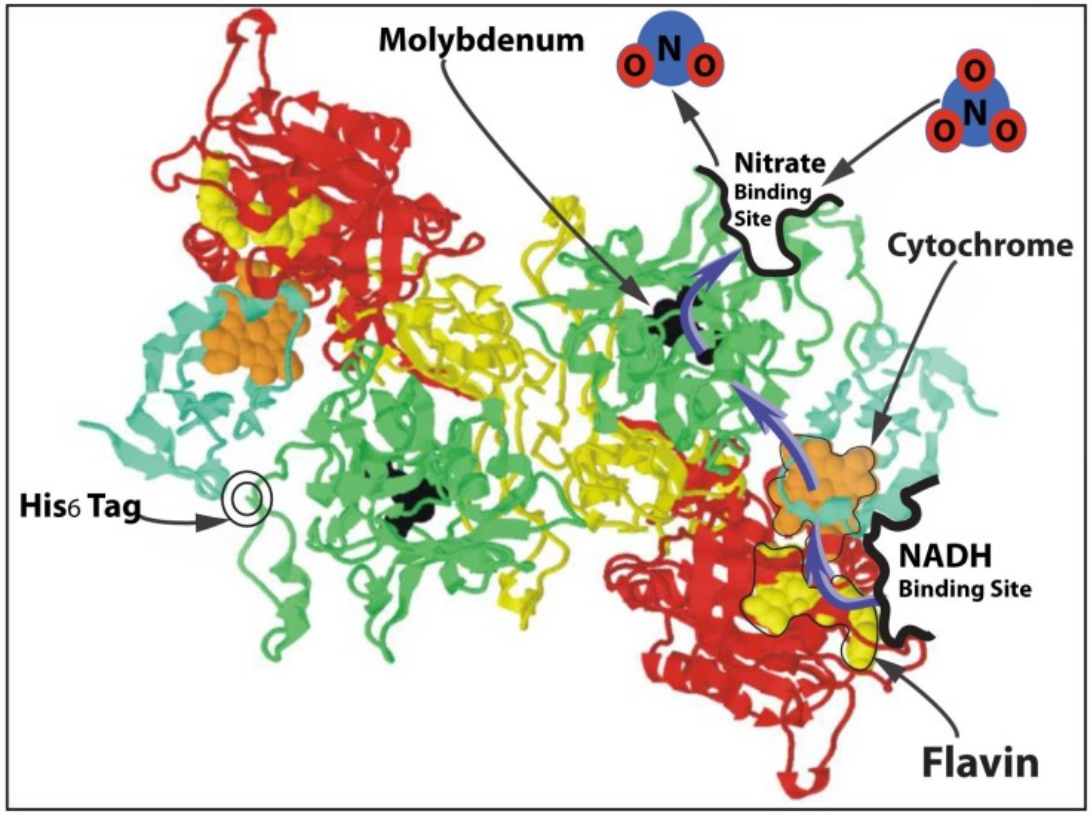
Selectivity – Finds target analyte in complex mixtures

Sensitivity – Low detection limits in a variety of samples

Stability – Ability to ship and store ambient

Safety – Handling and disposal is benign

Nitrate Reductase



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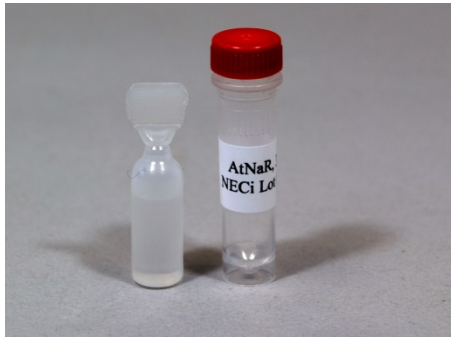
Production

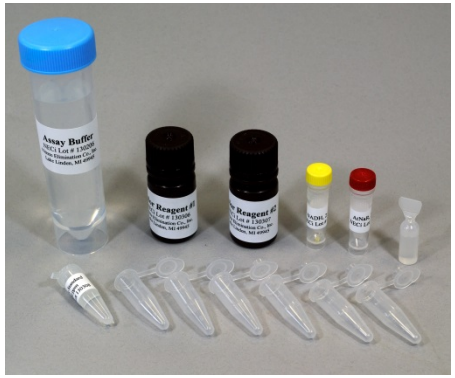
All of NECi's enzymes are manufactured in a yeast called Pichia pastoris.

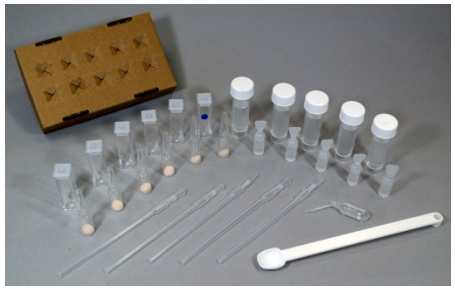
A single 19 liter fermentation can yield anywhere from 1,000 to over 3,000 units of enzyme.

Recombinant Enzymes:

- Increased lot-to-lot reproducibility
- Increased production capacity
- Reasonable production costs
- Improved Stability
- Efficient production
- Tight quality control



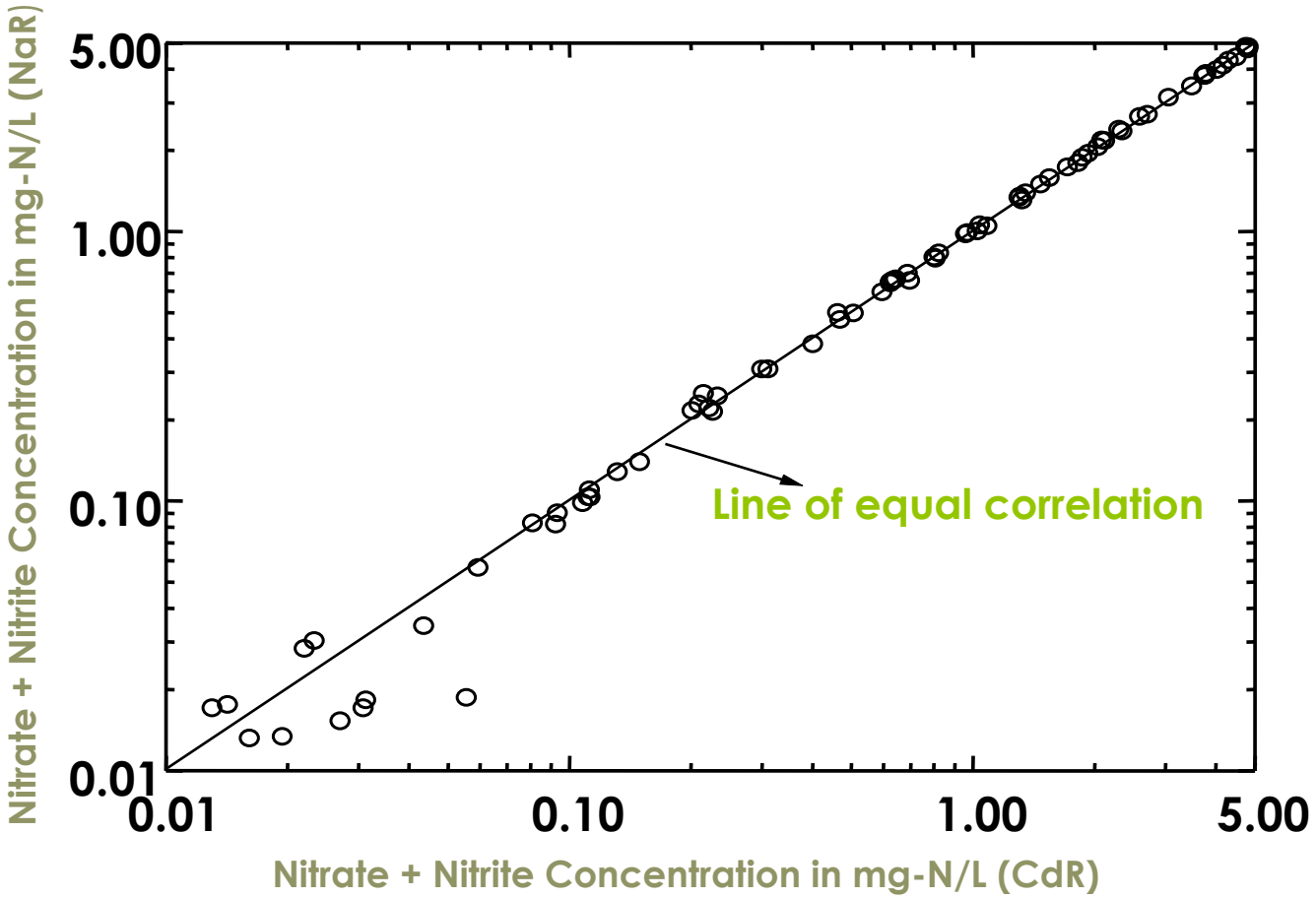




Many Formats Same Results

From the high-throughput laboratory to the field, analytical grade enzymes deliver equivalent results to chemists and novice users.

Cadmium vs. Nitrate Reductase



New Method Validation

- Change is hard, displacing tried-and-true proves more difficult than adopting completely new technologies.
- Enzymes were previously thought of as only being useful in biomedical or clinical laboratories.
- Advantages of enzymes in analytical chemistry applications are finally gaining attention from the laboratory community.

Now What?

Enzymes for quantifying glycerol in biodiesel, galactose in complex mixtures, alcohol for on-site gas and beverage testing, phosphate levels in the fields, and a handheld spectrophotometer to analyze it all.

Thank You