METASPEQ

Near-Infrared Spectroscopy

APPLICATION NOTE

Ensuring Honey Authenticity with Handheld NIR Spectroscopy and AI-Based Classification

MetaspeQ near-infrared spectrometers, use proprietary AI/ML technology, **SpectraFind™**, is a game-changing solution for food quality control, particularly for verifying the authenticity of honey. This method provides accurate, efficient, and non-destructive testing for detecting adulteration. It outperforms traditional chemical analysis methods, offering a faster, more cost-effective alternative.



AT A GLANCE

- **Technology**: MetaspeQ™ Near-Infrared Spectroscopy
- **Objective**: Classification and authenticity verification of honey samples using advanced NIR spectroscopy.
- **Industry**: Food and Wellness Industry
- **Solution**: Rapid, non-destructive detection of adulterated honey samples using AI/ML techniques

Challenges

- Honey is the third-most-faked food in the world, behind milk and olive oil. Adulterating honey causes unhealthy impacts on our society
- Expensive,time-consuming testing with no portability

Benefits

- Significant cost savings.
- Drastically reduces analysis time.
- Eliminates need for sample preparation.
- Accurate content quantification achieved.





NEXT-GENERATION QUALITY ANALYSIS

OBJECTIVES

Authenticate honey: Detect adulteration in honey by analyzing its composition using NIR spectroscopy combined with machine learning techniques.
Improve Testing Efficiency: Compare the efficiency, cost, and time saved using NIR technology over conventional methods
SpectraFind™ Classifier: Use advanced data analysis methods such as principal component analysis (PCA) and linear discriminant analysis (LDA) to classify honey samples and differentiate between pure and adulterated products.

SOLUTIONS

Advanced NIR Spectroscopy for Quinine Analysis- Metaspeq™ NIR technology offers a non-invasive and rapid method for detecting adulteration in honey.
AI-Powered Chemometric Analysis: The model showed sclassification accuracy with maximized class separation, improving the detection of adulterated samples.
Improved Cost-Efficiency and Speed-NIR spectroscopy drastically reduces time and complexity associated with traditional chemical testing methods. By eliminating the need for solvents, reagents, and complex procedures, it provides a faster, more efficient solution for routine quality control.

BENEFITS

Faster Analysis Time: Conduct honey authenticity tests up to 90% reduction in analysis time compared to traditional methods, enabling rapid decision-making in quality control processes.
Non-Destructive Testing: Analyze samples without destroying samples and allow for further testing if needed.
Cost-Effective Quality Control: Reduce the operational costs by eliminating the need for expensive reagents and solvents. With no need for sample preparation, the overall complexity and cost of testing are significantly lowered.
Accurate and Reliable Results: The AI-enhanced NIR system offers robust classification capabilities, effectively distinguishing between pure and adulterated honey samples with high confidence.