

Mi-BIOSCANS

Bacterial Identification via Oral Saliva using Combined Analysis through Non-invasive Spectroscopy.

Mi-BIOSCANS offers an in-vitro smart health screening platform that leverages saliva samples with spectroscopy-based photonics technology for bacterial detection. It provides versatile capabilities in identifying microbial-related diseases, with applications in oral health, critical illnesses, food safety, and environmental monitoring.



Technology Overview

Mi-BIOSCANS is an advanced, non-invasive oral health screening platform that integrates ultraviolet (UV) spectroscopy with machine learning to enable early detection and risk assessment of dental caries. The system analyses biochemical markers in saliva, capturing UV light absorption patterns that reflect real-time changes in the oral environment. Through intelligent data interpretation, Mi-BIOSCANS offers rapid caries level assessment and quantitative analysis of bacterial presence, supporting both predictive diagnostics and personalised preventive care.

ICDAS Caries Levels and Risk of Tooth Decay



DNA Sequencing Correlation:

DNA sequencing identifies specific bacterial species in the oral cavity, complementing UV spectroscopy, which detects biochemical changes from bacterial activity. This sensitive method uncovers microbial shifts that signal a higher risk of tooth decay, often before visible symptoms appear, providing a deeper understanding of the oral microbiome's role in caries development.

Machine Learning Integration:

Machine learning allows Mi-BIOSCANS to correlate spectral data signatures with early bacterial activity and caries progression. The integration supports smart screening platform by improving sensitivity and specificity in the diagnostic results.

Non-invasive and Portable Design: Non-invasive detection that utilises painless saliva sampling and adaptable for use in mobile health screening units and community health outreach programmes.

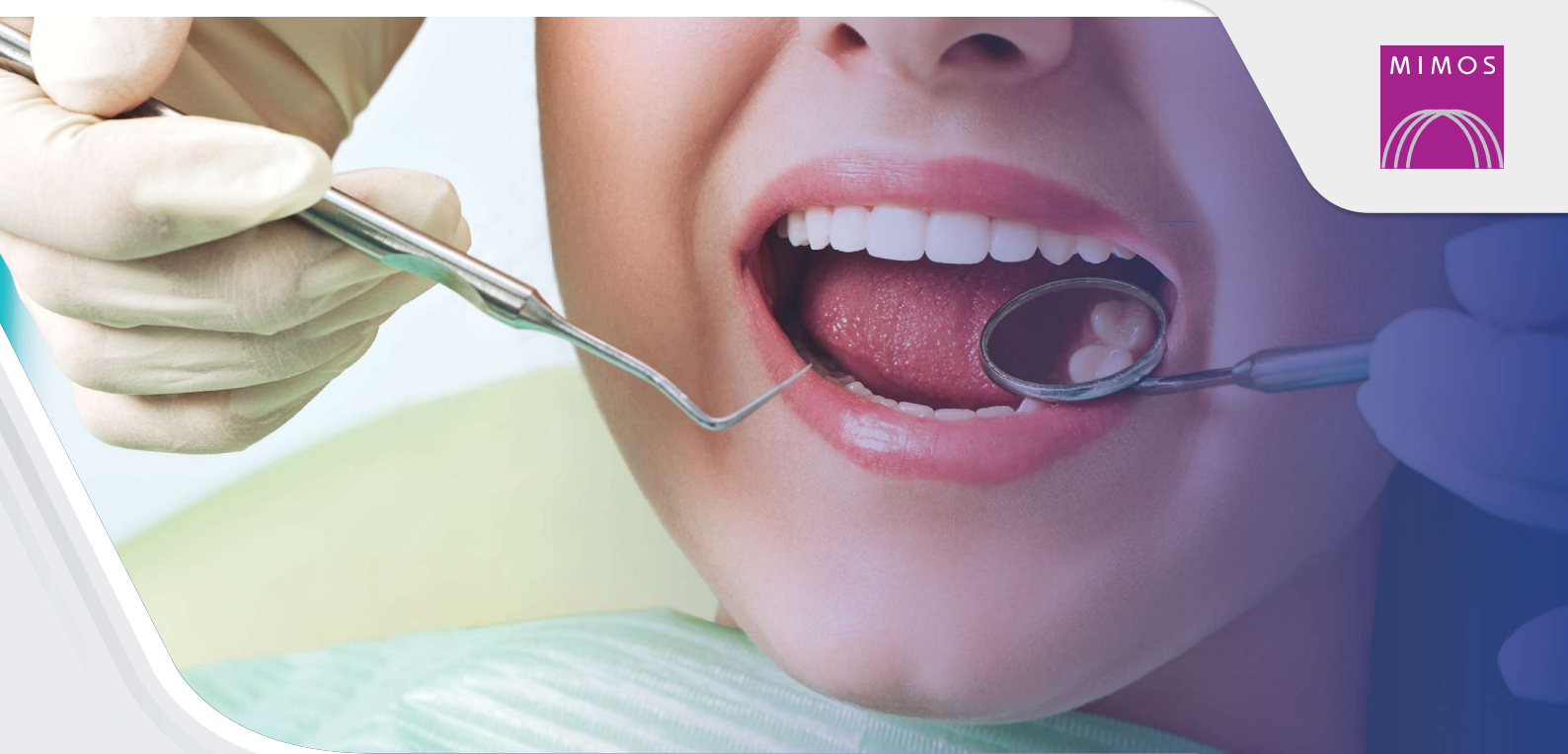
Technology Features

Ultraviolet (UV) Spectroscopy:

UV spectroscopy involves the measurement of light absorption by dental plaque or tooth surfaces at specific UV wavelengths. Bacteria, particularly those involved in caries, produce metabolites that absorb UV light at distinct wavelengths. These spectral patterns provide valuable insight into early indicators of enamel demineralisation and bacterial activity, allowing for detection of tooth decay before physical symptoms become apparent.

Prototype





Early Detection of Caries Risk

UV spectroscopy detects bacteria's organic metabolites to provide early insights into caries risk.



Real-time Monitoring

Machine learning's predictive algorithm provides immediate feedback of caries level and continuous oral health tracking.



Personalised Prevention

Detecting saliva composition allow for tailored oral hygiene or dietary to improve patient prevention strategies.



Smart Oral Health Screening

Solution for modern dental diagnostics and research in microbiome-linked oral diseases.



Accessibility

Suitable for community health, school screening, outreach and preventive dental programme.



Applications

Oral Health Monitoring & Early Caries Detection:

UV spectral biomarker as non-invasive detection of caries risk.

Microbial Surveillance for Public Health:

Detection of salivary bacterial profile linked to oral systemic disease.

Food Safety and Quality Control:

Detection of pathogenic or spoilage related bacteria in food processing industries.

Environmental Pathogen Monitoring:

Screening of water or surface sample in agriculture, aquaculture and environmental inspections.

Diagnostic Technology Development:

Model platform for developing biosensing and machine learning diagnostics.

