

MX3 Technology Brief

MX3 Diagnostics, Inc. is a new health technology company with a revolutionary approach to portable, point-of-care analytics. MX3's innovative system uses saliva to perform lab-quality tests in real-time by sampling directly from a subject's mouth. Our first product measures hydration status in seconds and is more accurate and far more convenient than any other hydration measurement approach available today.

The MX3 Hydration Testing System includes hardware, software on the device and in the app, biosensors, machine learning, and physiology data analytics. Significant new technology and IP have been developed in each of these areas, and MX3 has filed for multiple patents.

Hardware



Powerful Portable Analysis

The MX3 Meter is a handheld electrochemical workstation capable of laboratory-grade impedimetric, potentiometric, and amperometric analysis. This wide range of analytical techniques can be applied to detect a comprehensive set of biomarkers including osmolarity, ions, metabolites and hormones. The MX3 Meter is compatible with a range of biological (saliva, blood, urine, sweat) and non-biological (chemical analysis, environmental monitoring) samples.

Designed for Ease-of-Use

MX3 is designed for all users – athletes or trainers, nurses or patients, professionals or home users. With automatic sensor calibration, analyte detection and temperature compensation, the MX3 Meter removes the need for coding strips or manual user selection of sensor type before taking a measurement. All that is required is to simply insert a sensor, take a saliva sample and read the results.

The low power usage of the MX3 system allows for thousands of measurements on a single charge. Additionally, the MX3 Meter charges through a standard USB connection, compatible with all USB-C phone and laptop chargers.

Future Compatible

The MX3 Meter is designed for future compatibility and can be updated to the latest functionality in minutes through a firmware update delivered by the MX3 mobile application.

Biosensors



Microfluidics Optimised for Saliva

Saliva is a rich source of biomarkers that can be used to monitor health and wellness, including hormones, metabolites, nucleic acids and drugs. Collection and analysis of saliva for electrochemical analysis can be complicated due to mouth dryness or sample inconsistencies. MX3 has developed a sensor platform designed to optimise direct-from-mouth saliva sampling and allow for rapid collection and analysis of raw, unprocessed saliva with only microlitre volume samples.

The World's First Saliva Hydration Biosensor

The MX3 biosensor architecture has enabled MX3 to produce the first commercially available saliva electrochemical biosensor. The MX3 Hydration Sensor measures salivary osmolarity (SOSM), a sensitive marker of hydration. Until now, application of SOSM measurement in real-world applications has been restricted by the cost, lack of portability and technical expertise needed to use laboratory-based osmometers. Using the MX3 Hydration Sensor and MX3 Meter, SOSM can be measured directly from the tongue in only a few seconds, putting laboratory-grade, actionable information in the palm of your hand.

Future Development

MX3 is currently developing sensors for detection of a wide range of biomarkers relevant to health to fitness, including key electrolytes, lactate levels, and more. The goal is to put laboratory-quality biometric testers in the hands of any at-home user or professional. The future applications of this technology in a market showing strong interest in personal health are exciting.

Software



Overcoming the Complexity of Saliva with Advanced Algorithms

Electrochemical saliva analysis is challenging due to the extensive variability in volume, viscosity and consistency among samples. MX3 has developed advanced algorithms that integrate multiple parameters from the MX3 biosensor to ensure enough sample has been applied to the sensor, saliva is consistent throughout the sensor, and sampling has been performed with the appropriate technique. When anomalies are detected, these algorithms can accommodate sample inconsistency to derive an accurate result, reducing measurement error rate and variability. In short, users can follow simple prompts to take measurements that remain accurate, even among wide variations.

Automated Tracking and Analysis using the MX3 Portal and Mobile App

Measurements made while paired with the MX3 mobile application (app) are automatically recorded, categorised and analysed on the individual, team and organisational level. Detailed reports can be generated and accessed through both the MX3 app and MX3 web portal, ensuring important results are highlighted to key individuals by highly customisable notifications and easily accessible wherever and whenever needed. A dynamic dashboard and easy-to-follow prompts make the information simple to navigate, interpret and use.

Personalisation of Measurements through Machine Learning

Salivary analytes can differ among individuals due to age, sex, ethnicity, diet and lifestyle. Rather than performing analysis in a one-size-fits all approach, the MX3 app accommodates these inherent differences in salivary analytes. The more measurements are taken, the more results are personalised to better reflect an individual user's health status.

Future Features

The MX3 app will integrate detailed meteorological (temperature, humidity) and physiological (heart rate, activity, diet) information to prompt users to take measurements during at-risk periods.

Physiology

The MX3 Biomarker Database

MX3 is leveraging the high throughput capacity and portability of the MX3 Meter and MX3 Hydration Biosensor to construct an extensive database of salivary hydration biomarkers and their relationship to physical performance. Our team members have used the MX3 Meter to measure thousands of athletes, generating the largest ever database of SOSM values. As the MX3 ecosystem continues to evolve, MX3 will integrate additional biomarkers and health and wellness metrics into this database. MX3 will utilise this unique database to perform world-leading research investigating the relationship between saliva biomarkers, health and performance.

Clinical Trials in Low and Middle Income Countries

The MX3 Hydration Testing System is being applied for world-first clinical trials investigating the relationship between SOSM and the hydration status of children with severe diarrhoeal dehydration. Due to the low cost, portability and ease-of-use of the MX3 system, SOSM monitoring may assist first-line medical professionals in the assessment and treatment of children like these around the world, improving disease outcome. Biosensors