附件四、技術說明表

便攜式多離子感測分析裝置

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簡　歷：

系網教授介紹：https://reurl.cc/aGR319
實驗室網站：https://chenlinchi.wixsite.com/ibslab

市場及需求:
作物生理分析、農業管理、農業水耕養液監測、水產養殖業水質監測、水族業者水質管理、環境水質管理

技術摘要(含成果):
本系統運用固態式離子感測電極陣列為核心技術，結合多通道電位感測模組與微控制器，可立即在現場量測多種離子濃度(可至少 8 種)。應用示範為作物菜汁多離子樣本分析，將植物葉片(或/與莖)打成菜汁後，直接將試片浸入菜汁中即可得知植物體內離子組成與比例。植物體內資訊可協助使用者了解不同栽種條件對植物體內營養素的供給情況與營養障礙，並進一步調整施肥方針。多離子數據可進行不同的數學分析來進行不同應用場域的分析，以作物營養障礙而言可使用雷達圖(網狀圖)。

優勢:
1. 檢測樣本不須另添加試劑或過濾等其他步驟，可直接量測。
2. 可同時得知樣本多種離子離子濃度，並進行不同數學圖譜分析。
3. 所需樣本體積大幅小於市面上其他離子選擇電極。
4. 比起傳統實驗室分析，本系統可達到立即現場量測。
5. 本系統易於結合物聯網技術，利於儲存和建立數據庫。

競爭產品:
1. Horiba LAQUAtwin (單一離子監測、離子選擇電極、水質監控領域、產品為一感測器)
2. Abbott iSTAT (多離子監測、離子選擇電極、醫療照護領域、產品含一感測器與試片)

專利現況:
(1) 本技術之試片部分已有相關專利(中華民國專利申請號: I517989 與 I695166)。
(2) 近年來本團隊專注於固態式離子選擇電極試片之研究與開發，以提升試片的感測能力，並致力將試片與後端模組、使用者介面整合，以打造出完整的離子感測系統平台

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Portable multi-ion sensing analysis device

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Experience:

- https://reurl.cc/aGR319
- https://chenlinchi.wixsite.com/ibslab

Market Needs:

Hydroponics nutrient monitoring, household water quality monitoring, water quality monitoring in aquaculture, fishkeeping, and environmental management

Our Technology:

This system takes a solid-state ion sensing electrode array as its core technology and includes multi-channel potential sensing modules and microcontrollers. The system can measure various ion concentrations of vegetable saps (at least 8 kinds of ions). The practical example is multiple ion analysis of crop vegetables. The users make vegetable saps from the leave and/or stems of plants and put the ion-sensing chips into the saps, which are without filtration. After that, the users can know the proportions of ions in the plant body. As a result, the users can know plants' nutrient supplements and nutritional disorders when using different planting conditions. According to this information on nutrients inside the plant bodies, farmers can adjust their fertilizing strategies. Furthermore, the detection results can be analyzed by different statistical methods which follow the demand of the applications. For example, a radar chart displays the correlation between ion concentrations and plant physiological characteristics.

Strength:

1. No extra reagents or filtration. The device can directly measure samples.
2. The device can measure various kinds of ions and analyze the results by different statistical methods.
3. The volume of samples used for this device is less than that for traditional ion-selective electrodes.
4. Compared with laboratory analysis, the device can achieve on-site measurement.
5. The device can integrate with other IoT sensors and build a database.

Competing Products:

1. Horiba LAQUAtwin (single ion sensing, solid-state ion-selective electrode, water monitoring, product includes one sensor).
2. SAbbott iSTAT (multiple ion sensing, solid-state ion-selective electrode, clinical diagnostics, product includes a sensor and a test chip).

Intellectual Properties:

1. Test chip is already a patent in Taiwan. (ROC Application Number: I517989 and I695166)
2. Our group focus on research and development of solid-state ion-selective electrode in order to improve its sensing performance. Meanwhile, we also dedicate ourselves to integration of test chips, hardware, and user interface to build a complete ion-sensing platform.

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