

Hand-Held Automated Instrument For Microchip Electrophoresis With Amperometric Detection

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INTRODUCTION

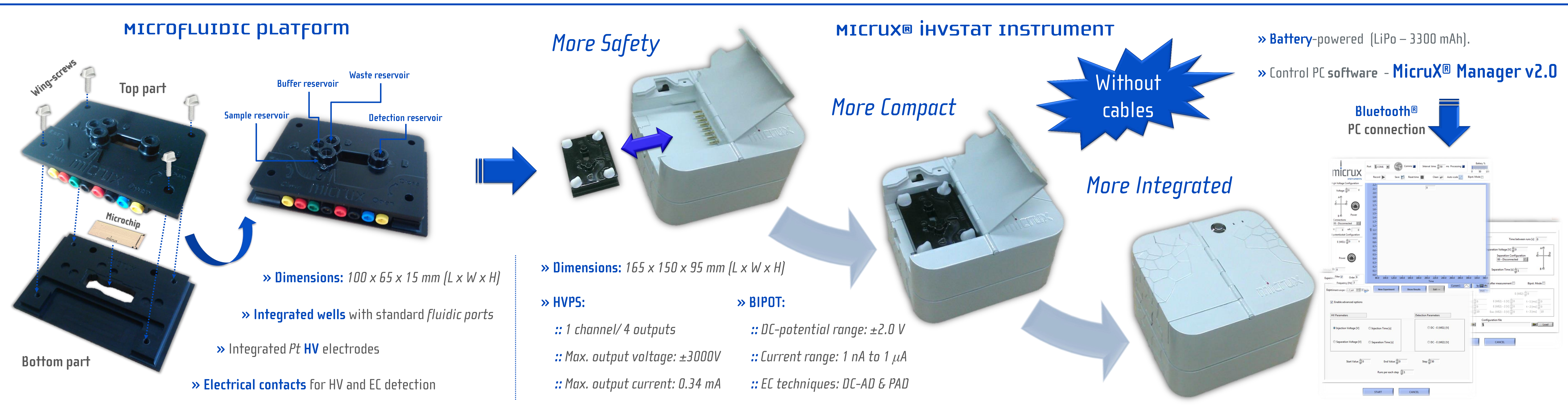
Microchips electrophoresis (ME) in combination with electrochemical detection (ED) can bring a new generation of point-of-care (POC) analysis systems in which would be integrated the main steps of an analytical process. However, the use of these miniaturized devices also requires the development of a new instrumentation in concordance with the features of ME-ED, specially, relative to miniaturization and portability.

Thus, a second-generation of a battery-powered **portable electrophoresis instrument (iHVStat)** for using microchips electrophoresis with electrochemical detection has been developed. The main unit of the instrument (150x165x95mm) consists of four-outputs **high voltage power supply** (HVPS) and a **bipotentiostat** (Bipot) with 2-channels for dual electrochemical detection. The use of an electrochemical transduction system simplifies the instrument developments, since non-optical elements are required.

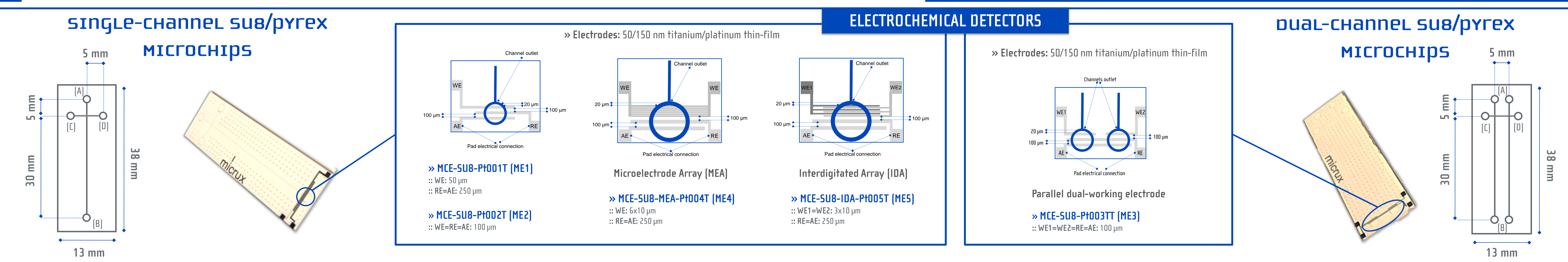
Furthermore, a new [reusable microfluidic platform](#) has been also designed for using the microchips with the portable instrument. The platform with the ME-ED is directly inserted in the main unit of the instrument making easier the use of the complete system. It is controlled with a [user-friendly PC software](#) developed for microchip electrophoresis.

The performance of the electrophoresis platform has been evaluated using [single-](#) and [dual-channel SU-8/Pyrex microchips](#) with different models of integrated electrodes including [microelectrode](#) and [interdigitated arrays](#). The successful performance of the complete system has been demonstrated in different analytical applications such as separation of neurotransmitters, chloro-phenols, purine-derivatives, vitamins, polyphenol acids and flavones.

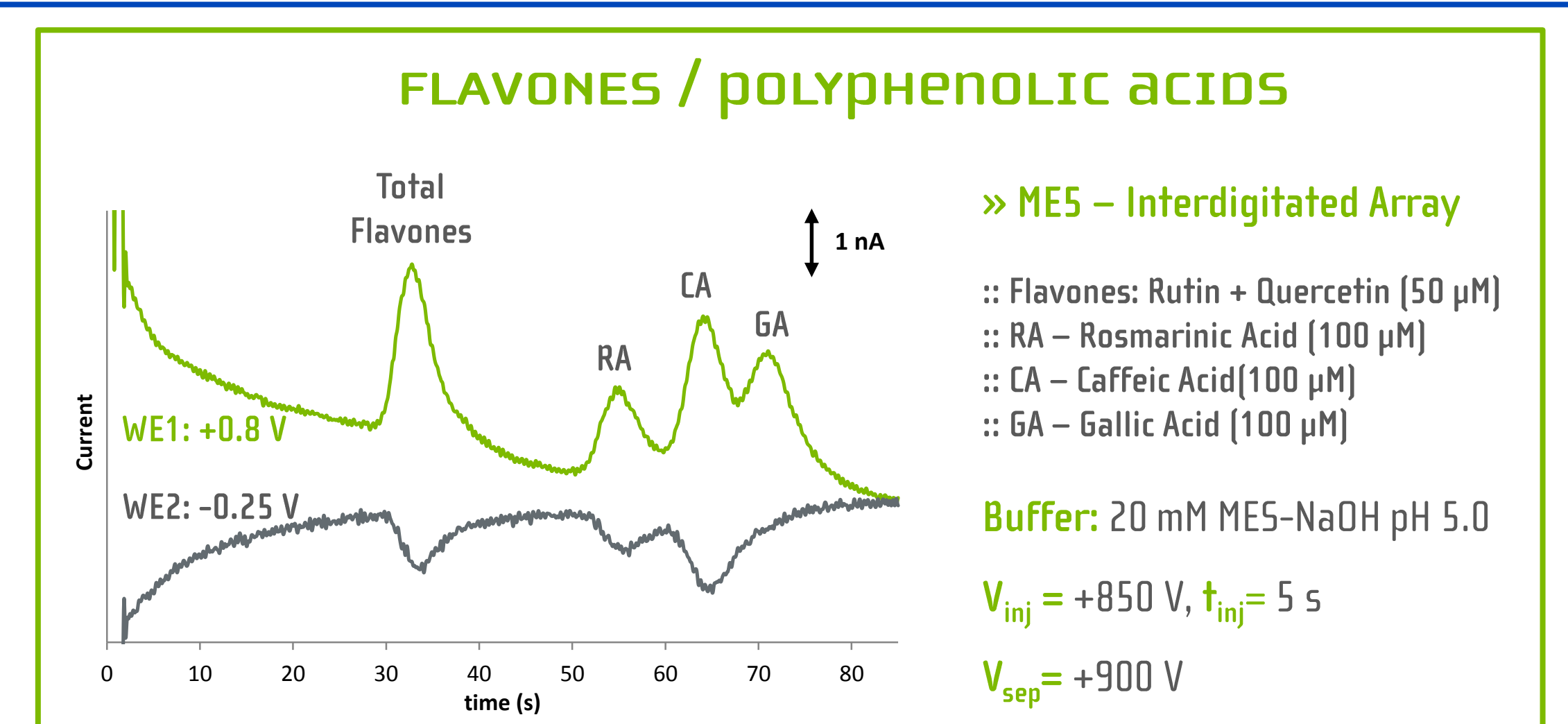
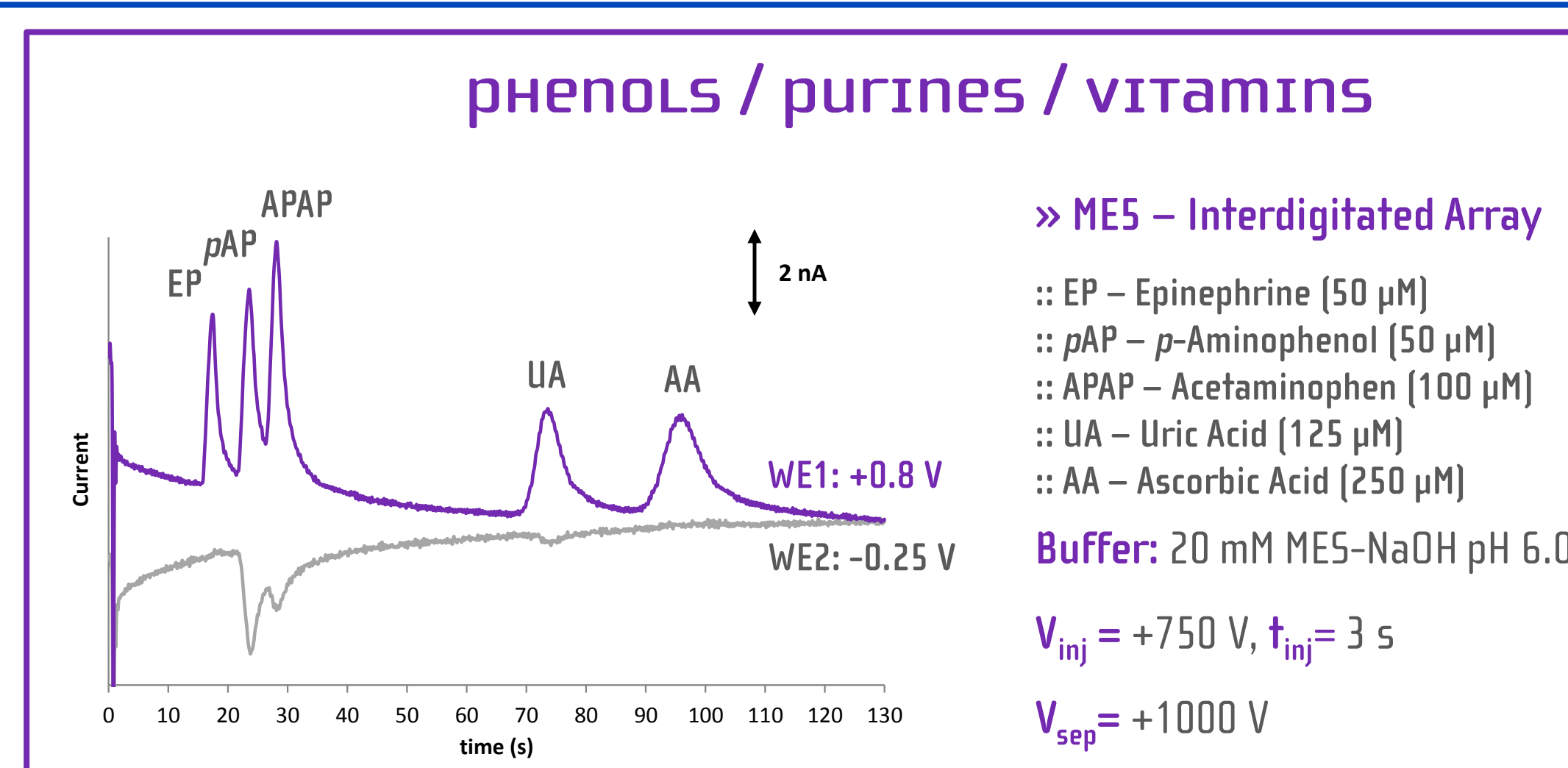
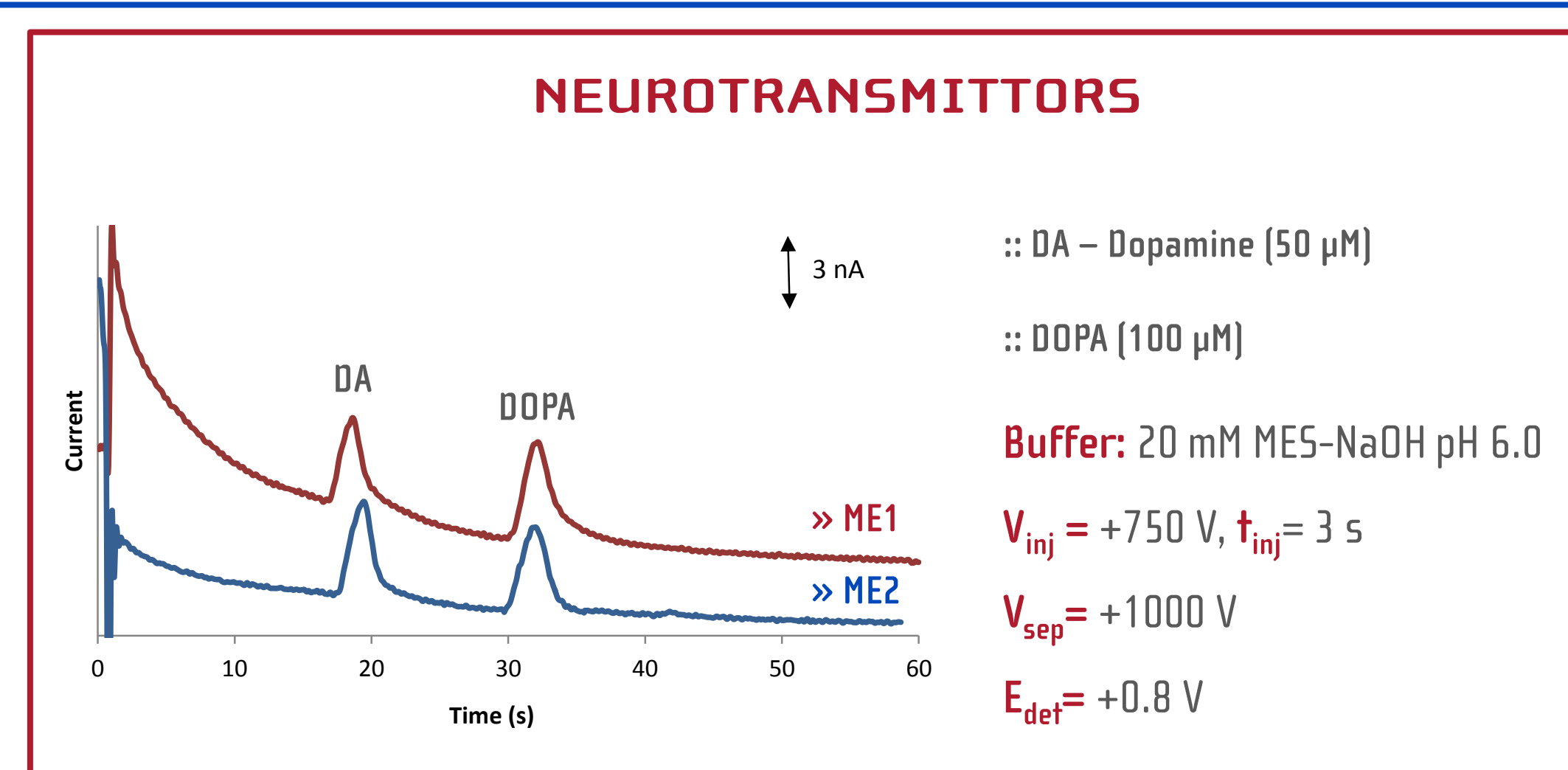
MICROFLUIDIC ELECTROPHORESIS SYSTEM



MICROFLUIDIC CHIPS – ELECTROCHEMICAL DETECTOR



ANALYTICAL APPLICATIONS

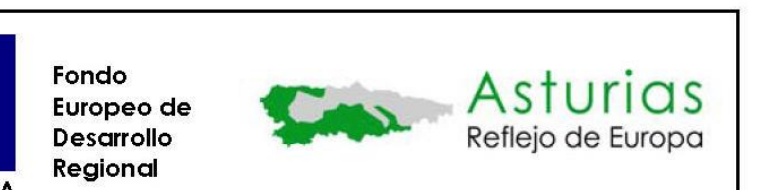


CONCLUSIONS

- » A more **compact, robust** and **easy-to-use** instrument was achieved in the second-generation of *automated microfluidic electrophoresis system*.
- » The new microfluidic system enables the use of a wide variety of **single-** and **dual-channel microchips electrophoresis** with **integrated electrodes**.
- » The **automated analytical system** is going to bring the use of *microfluidic chips* more routinely in research laboratories and industry for “*in-situ*” analysis of diverse matrices, including **clinical**, **environmental** and **food** samples.

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ACKNOWLEDGEMENTS:



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