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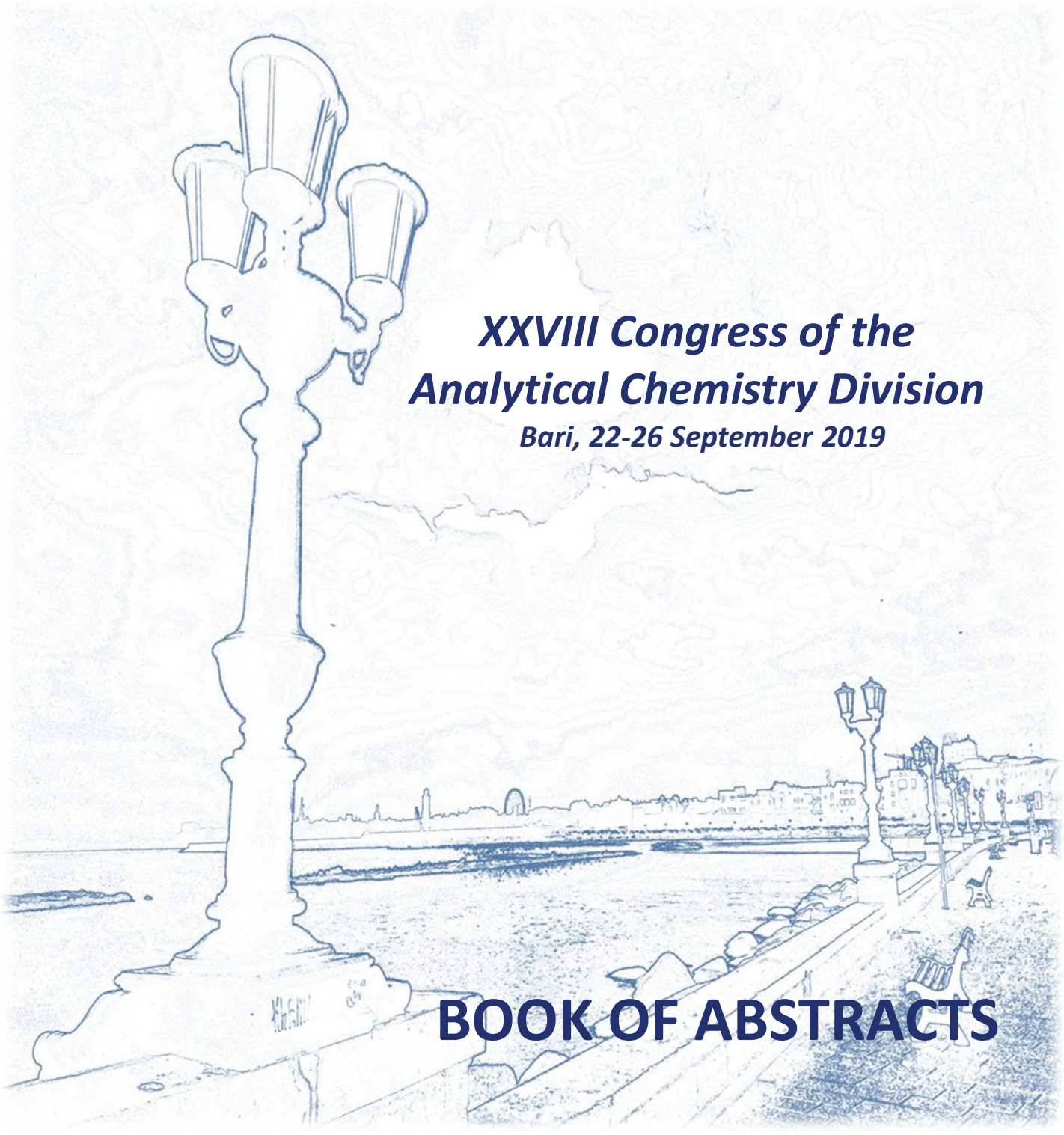

XXVIII Congress of the Analytical Chemistry Division

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BOOK OF ABSTRACTS

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EVALUATION OF BIOMARKER STABILITY WITHIN A PROJECT FOR THE DEVELOPMENT OF AN INTEGRATED LAB-ON-CHIP AND POINT-OF-CARE DEVICE FOR NON-INVASIVE DIAGNOSIS AND THERAPY MONITORING OF HEART FAILURE PATIENTS (KARDIATOOL PROJECT-H2020)

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Heart failure (HF) is a rapidly diffusing chronic cardiovascular disease and one of the main causes of mortality and poor quality of life in western societies, for which early detection and continuous monitoring play a crucial role for tits prognosis and therapeutic treatment. The H2020 KardiaTool Project is aimed to develop Lab-on-a-Chip (LoC) and Point-of-care (PoC) devices as an innovative approach for the non-invasive, rapid and accurate determination of HF biomarkers in saliva samples. Saliva is a promising biological fluid alternative to blood, urine or tissues that are conventional specimen to assess patients' health status. Saliva can be easily and unobtrusively collected, even from critical subjects (e.g. children, elder and disabled people [1,2]. The KardiaTool LoC-PoC devise will allow to monitor four different HF biomarkers, namely N-terminal pro-brain natriuretic peptide (NT–proBNP), tumor necrosis factor-α (TNF-α), interleukin-10 (IL-10), and cortisol in saliva samples [3-4]. Currently, the determination of cortisol in saliva is performed by analytical methods such as chromatography, mass spectrometry and iphenated techniques, but NT-proBNP, TNF-α and IL-10 are usually determined only in blood, plasma or serum by immunochemical methods (e.g. enzyme-linked immunosorbent assay, ELISA). Several commercial ELISA kits are available for plasma, serum or urine analysis, but their usability has not reported for saliva analysis. At the same time, the concentration of analytes in saliva can be affected by sample storage, which thus have to be investigated in order to translate a saliva biosensor from a laboratory-proven concept to a reliable LoC-PoC device.
In this study we investigated both ELISA kit practicability to saliva analysis and the effect of storage conditions to define the best approach in the development of the KardiaTool LoC-PoC. Commercially available ELISA kit intended for cell culture supernates, serum, EDTA plasma, heparin plasma, and citrate plasma have been validated for the quantification of NT-proBNP, TNF-α and IL-10 in saliva. Matrix effect, reproducibility, repeatability, and sample recovery were evaluated. In addition to ELISA kit validation for salivary NT-proBNP, TNF-α and IL-10 quantification, an ultra-high performance liquid chromatography coupled to electrospray ionization-tandem mass spectrometry (UHPLC-ESI-QQQ) method was

developed for salivary cortisol determination. Finally, both short-term and long-term stability studies were carried out.

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