PORTABLE MICROELECTROCHEMICAL SENSORS FOR RAPID DETERMINATION OF BIOFLAVINOIDS IN CITRUS FRUITS

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Rapid detection of functional ingredients in agricultural products is an important issue in food production and modern precision agriculture. Bioflavonoids, a group of polyphenolic compounds widely distributed in plants, have attracted increasing attention in the past years owing to its health effects not only as a main ingredient in functional foods and nutraceuticals but also in clinical drugs. In this viewpoint, rapid and sensitive detection of bioflavonoids in fruits plays an important role in germplasm resources evaluation, nutrition and health promotion studies. Conventional methods for bioflavonoids detection include liquid chromatography (LC) and LC equipped with other detectors that usually provide high sensitivity and low interference; however, these detection methods are time-consuming and require complex and expensive equipment operated by professional technicians. In this study, after systematic investigation of bioflavonoid electrocatalysis at several carbon nanomaterials modified electrodes, a method for rapid detection of bioflavonoid was developed. Furthermore, two types of novels and highly-integrated microelectrochemical sensors for simultaneous detection of bioflavonoids were developed by in situ formed laser-induced graphene (LIG) and low-cost pencil graphite, respectively. Both microelectrochemical sensors demonstrated low detection limit for common bioflavonoids in citrus fruits. Electrochemical tests on actual solutions sample containing *Citrus grandis* "Tomentosa" (CGT) and *Citrus reticulata* "chachi" (CRC) extract showed that the as-prepared microelectrochemical sensors had high recovery and reliability, and therefore could be used in practical applications.

Keywords: Bioflavonoids, microelectrochemical sensors, citrus fruits