An Innovative Method for Determination of Nitrite Content in Salted or Overnight Food by Paper-Based Microfluidic Device

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The microfluidic paper chip method has been an effective method to detect nitrite content in recent years, and the drawing technique is an important method to produce it. This project, aiming to enhance the performance of the chips, contributes to improving the current processing method using better materials. In this experiment, the contact angle of water droplets with the filter paper when they fall on the hydrophobic dam is used as the measurement index. Different materials of filter paper and hydrophobic pens with different chemical compositions are selected, and the performance of microfluidic paper chips is measured in each case. Moreover, this new nitrite measurement method was applied to the actual measurement to determine its efficiency. Throughout the experiment, the experimenter performed sample pretreatment, made microfluidic paper chips in bulk, established a standard curve between nitrite content and the greyscale, and finally performed analysis for the detection of nitrite content in samples. The test results show that one type of filter paper and one type of correction fluid is suitable for chip making. Also, the latter experiment indicates the nitrite content in overnight vegetables, meat, and eggs is extremely low (less than 3mg/kg), and the nitrite content in homemade kimchi is 16.56mg/kg. The collected data has more than 90% agreement with the academically accepted data. This result shows the rapid fabrication method for microfluidic paper devices I invented is in force, and it is worth future research and promotion.

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