MICROFLUIDIC PAPER-BASED ANALYTICAL DEVICES FOR HISTIDINE

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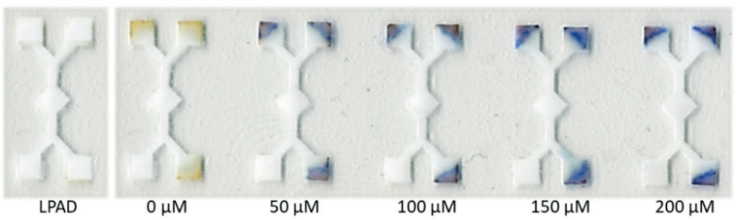
The determination of free amino acids in urine and plasma is useful for estimating disease status in clinical diagnoses.[1] Changes in the concentrations of free amino acids in foods are also useful markers for monitoring the degree of food freshness, nutrition, and taste.

We have reported an enzymatic detection system for 20 amino acids based on aminoacyl-tRNA synthetase (aaRS) as the molecular recognition element; the specific interaction between aaRS and its corresponding amino acid was applied to the measurement of amino acid concentrations. The biosensing system showed selective responses to the corresponding amino acids[2-3].

A laminated paper-based analytical devices (LPAD) for histidine was fabricated with chromatography filtration paper and laminate film. The fabrication is quite simple, only craft-cutting the chromatography filtration paper and laminate film, at a very low cost. For the determination of histidine, histidyl-tRNA synthetase (HisRS) the molybdenum blue reaction was used, and LPAD was also used for the analytical platform. Figure shows the pictures of fabricated LPAD and after assays with each concentrations of histidine. By the molybdenum blue reaction, the color of the detection zones became deep blue in proportion to the concentration of histidine. The linear relationship was obtained from 1 to 100 μM histidine selectively.



References
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2. Kugimiya A., Takamitsu E., Mater. Sci. Eng. C, 33 (2013) 4867-4870.
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