Colorimetric Detection of Oxalate and Calcium for the Early Screening of Urolithiasis

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Screening and early diagnosis is necessary to prevent the recurrence of urinary stones and reduce treatment costs. This study aimed to propose a simple and rapid colorimetric method for detecting oxalate and calcium, which mainly compose urinary stones. RGB and light absorbance were measured to determine whether the color change in impregnated papers occurred in a certain concentration of oxalate or calcium. The color change of paper impregnated with Patton and Reeder's indicator was observed after the reaction with various concentrations of calcium in both clean water and artificial urine. The color change of paper impregnated with Fe(?)Cl2 was indirectly observed as the color change of another pH indicator paper solution after the reaction with various concentrations of oxalate in both clean water and artificial urine. The result of current study implies that Patton and Reeder's indicator and Fe(?)Cl2 may be able to be applied in a urinary strip as an effective marker of hypercalciuria and hyperoxaluria, respectively, and therefore may be able to screen and early diagnose urolithiasis with calcium oxalate. I believe that this result would lay the foundation for the future work on effective colorimetric detection of urolithiasis.

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