SUPPORTING INFORMATION

INTEGRATED MICROFLUIDIC COLORIMETRIC PATCH WITH AUTO-FRAMING APP FOR MULTIPLEX TEMPORAL DETECTION OF KETONE BODIES IN SWEAT

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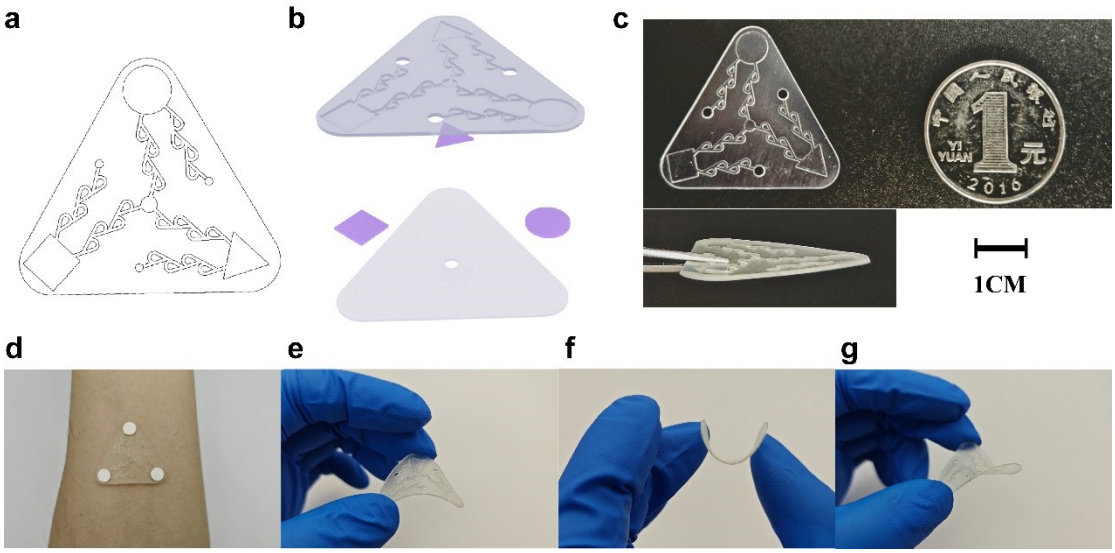

Figure S1 Microfluidic patch with a separate display area for each detection substance. (a) Top view of the patch. (b) 3D model of the microfluidic channels. (c) Schematic diagram showing the microfluidic patch placed next to a one-yuan coin, illustrating its size and thickness. (d) Schematic diagram of the microfluidic patch adhered to the skin. (e)-(f) Demonstration of the flexibility of the microfluidic patch, showing that it can be bent and twisted.

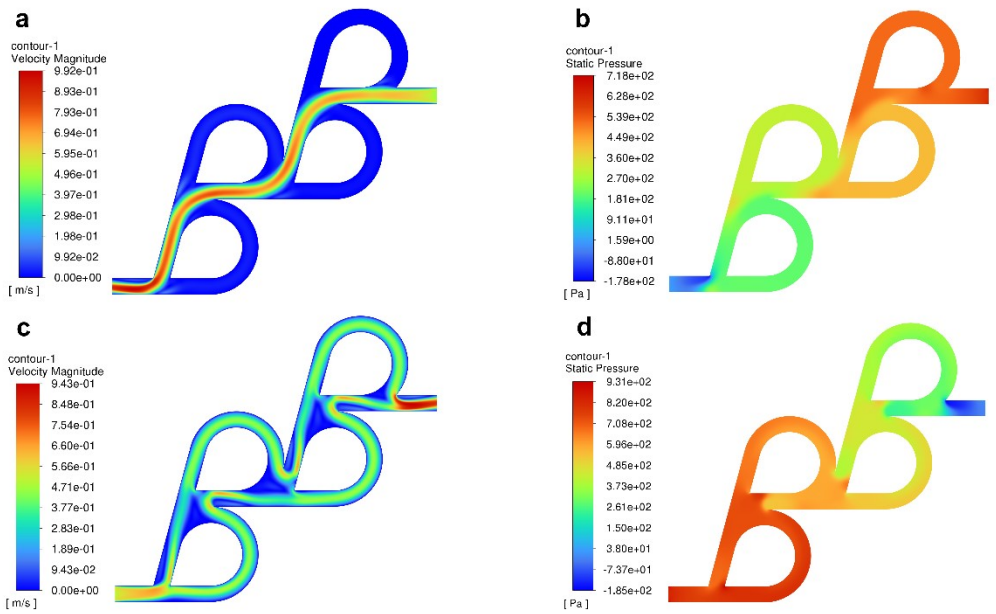

Figure S2 Simulation of forward and reverse flow velocities and pressures for a 75-degree Tesla valve with a channel width of 0.4 mm at a flow rate of 0.5 m/s. (a) Forward flow velocity simulation. (b) Forward flow pressure simulation. (c) Reverse flow velocity simulation. (d) Reverse flow pressure simulation.

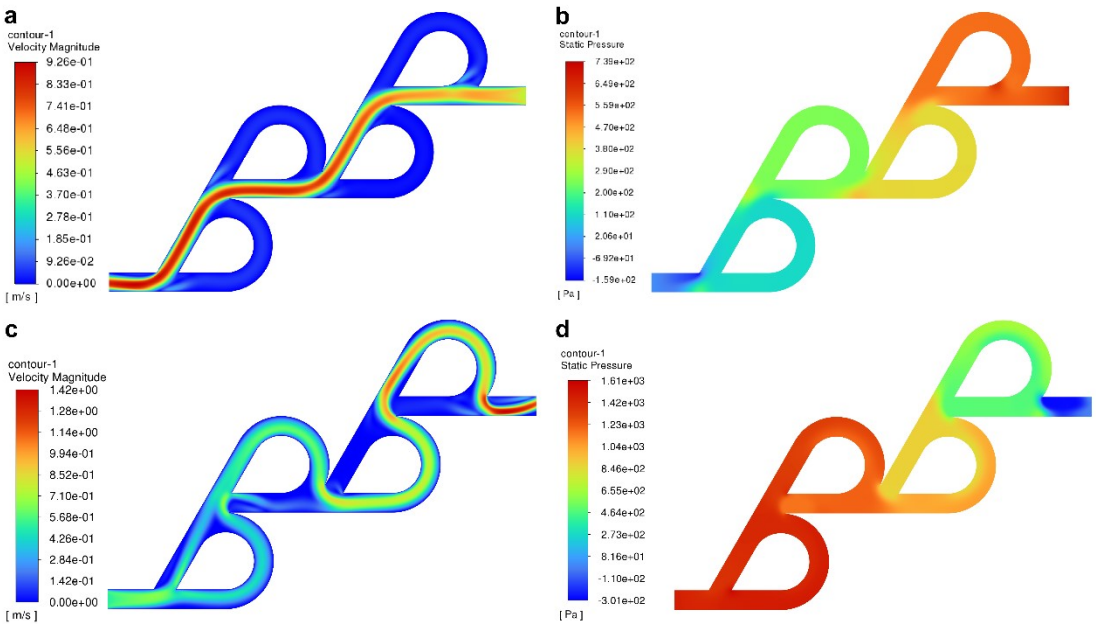

Figure S3 Simulation of forward and reverse flow velocities and pressures for a 60-degree Tesla valve with a channel width of 0.4 mm at a flow rate of 0.5 m/s. (a) Forward flow velocity simulation. (b) Forward flow pressure simulation. (c) Reverse flow velocity simulation. (d) Reverse flow pressure simulation.

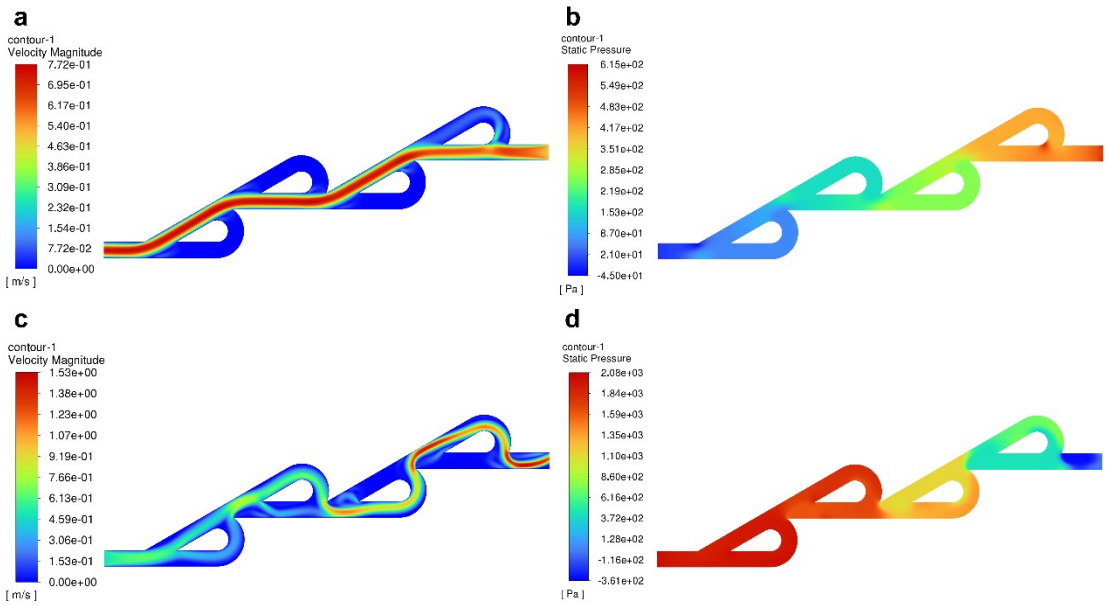

Figure S4 Simulation of forward and reverse flow velocities and pressures for a 30-degree Tesla valve with a channel width of 0.4 mm at a flow rate of 0.5 m/s. (a) Forward flow velocity simulation. (b) Forward flow pressure simulation. (c) Reverse flow velocity simulation. (d) Reverse flow pressure simulation.

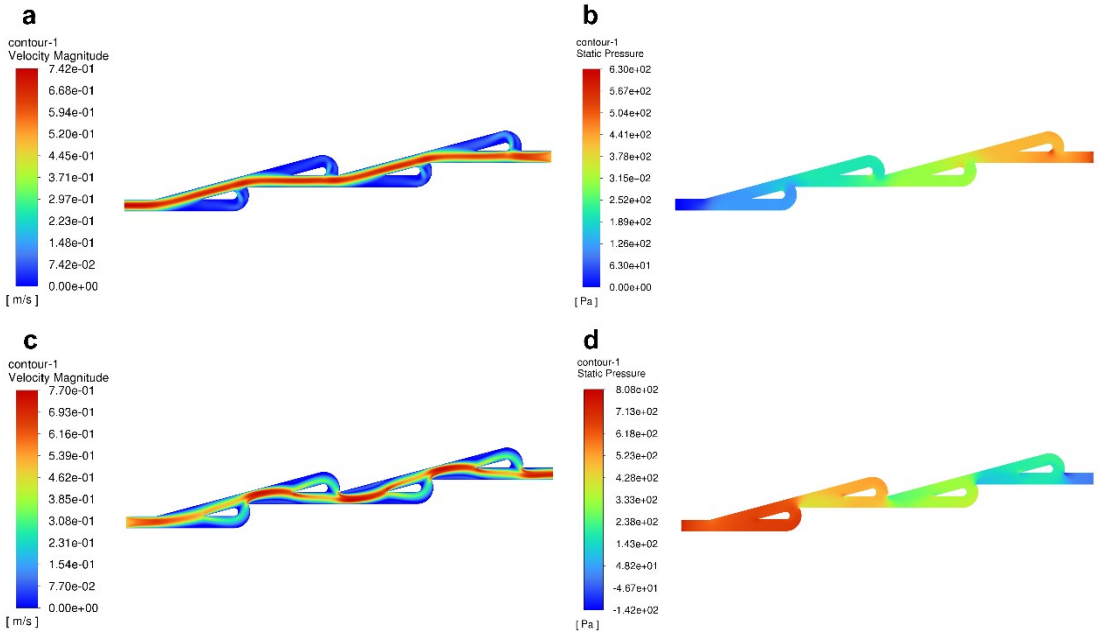

Figure S5 Simulation of forward and reverse flow velocities and pressures for a 15-degree Tesla valve with a channel width of 0.4 mm at a flow rate of 0.5 m/s. (a) Forward flow velocity simulation. (b) Forward flow pressure simulation. (c) Reverse flow velocity simulation. (d) Reverse flow pressure simulation.

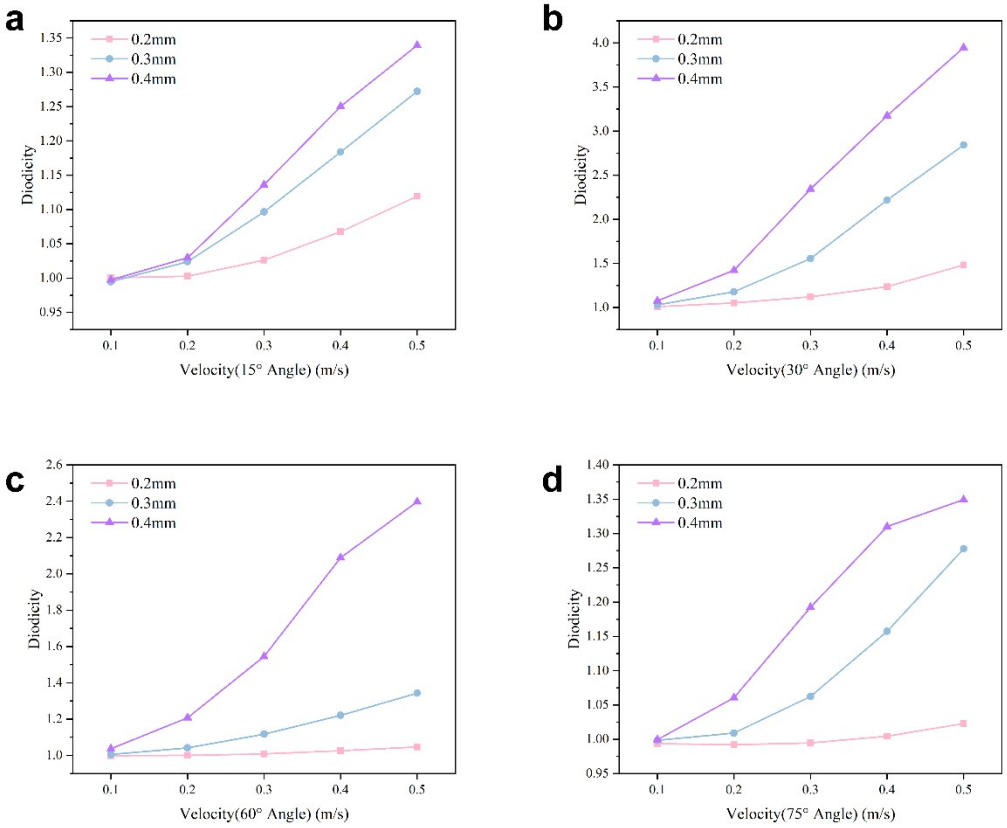

Figure S6 (a)-(d) Under angles of 15 degrees, 30 degrees, 60 degrees, and 75 degrees, fit curves of Di values for Tesla valves of different widths at various flow rates.

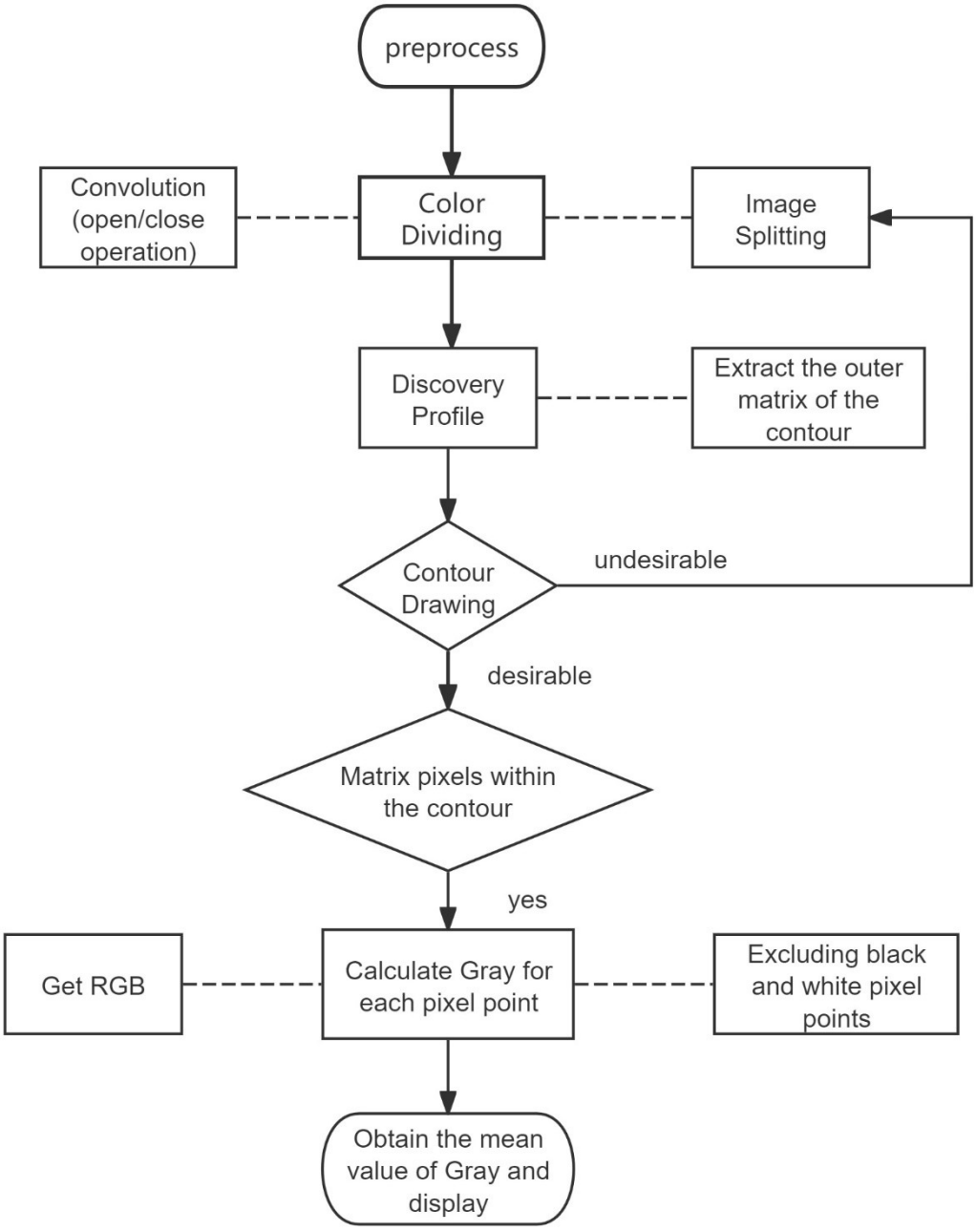

Figure S7 Algorithm logic of the self-developed colorimetric app.

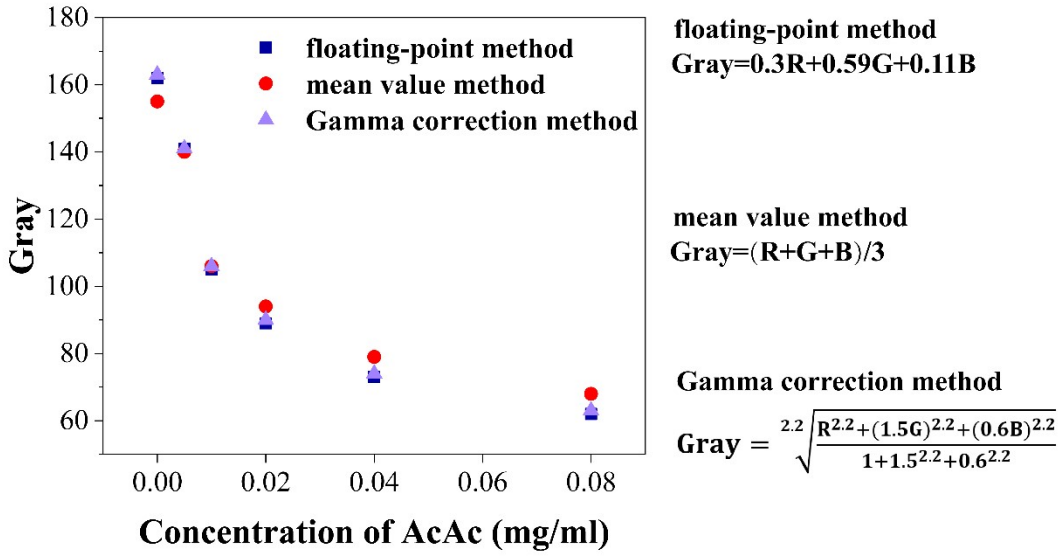

Figure S8 Grayscale comparison of the floating-point method, average value method, and Gamma correction method.

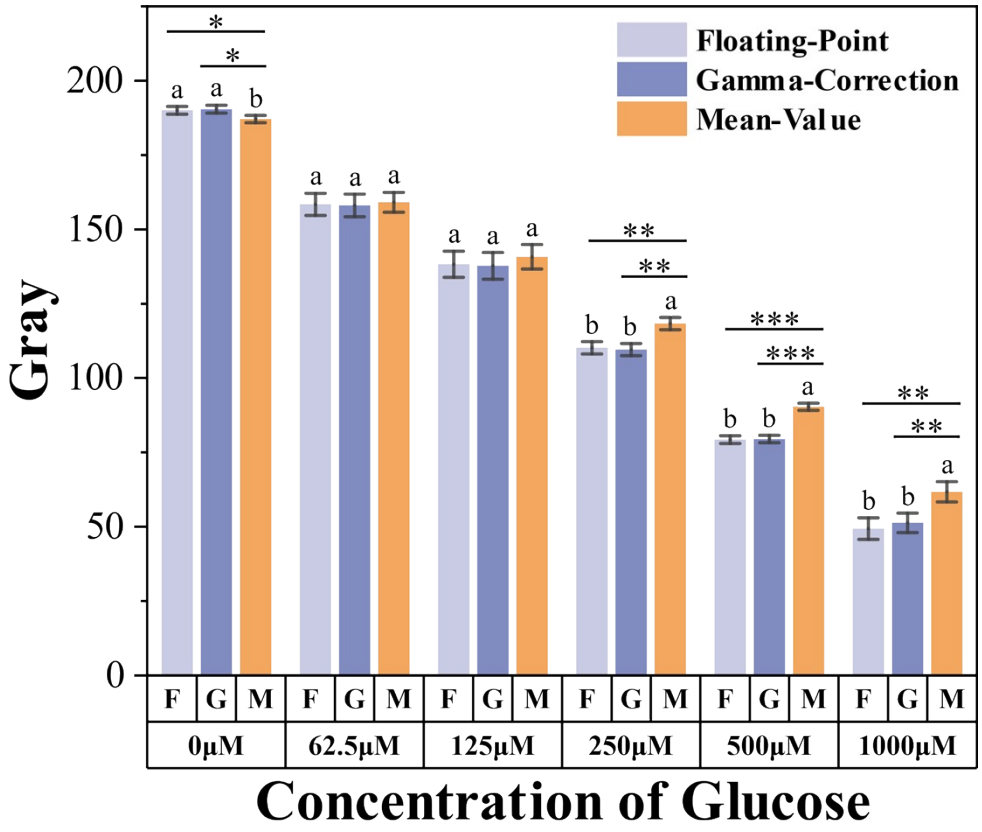

Figure S9 Comparison and correlation analysis of three Grayscale analysis Methods (floating-point method, gamma correction method and mean-value method) when measuring glucose.

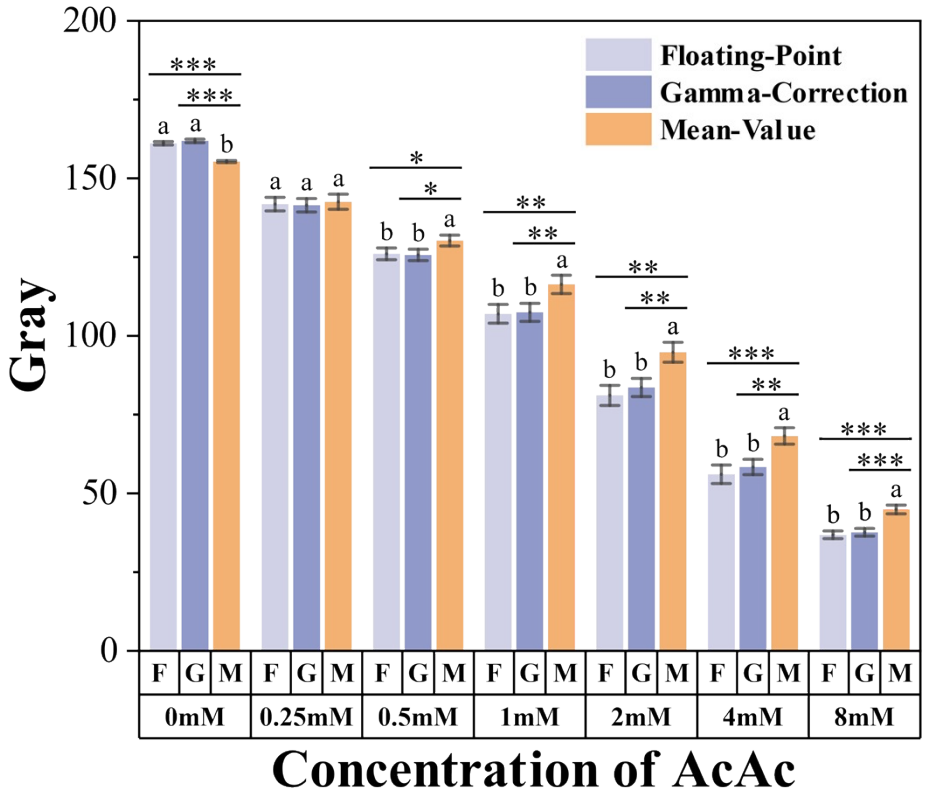

Figure S10 Comparison and correlation analysis of three Grayscale analysis Methods (floating-point method, gamma correction method and mean-value method) when measuring AcAc.

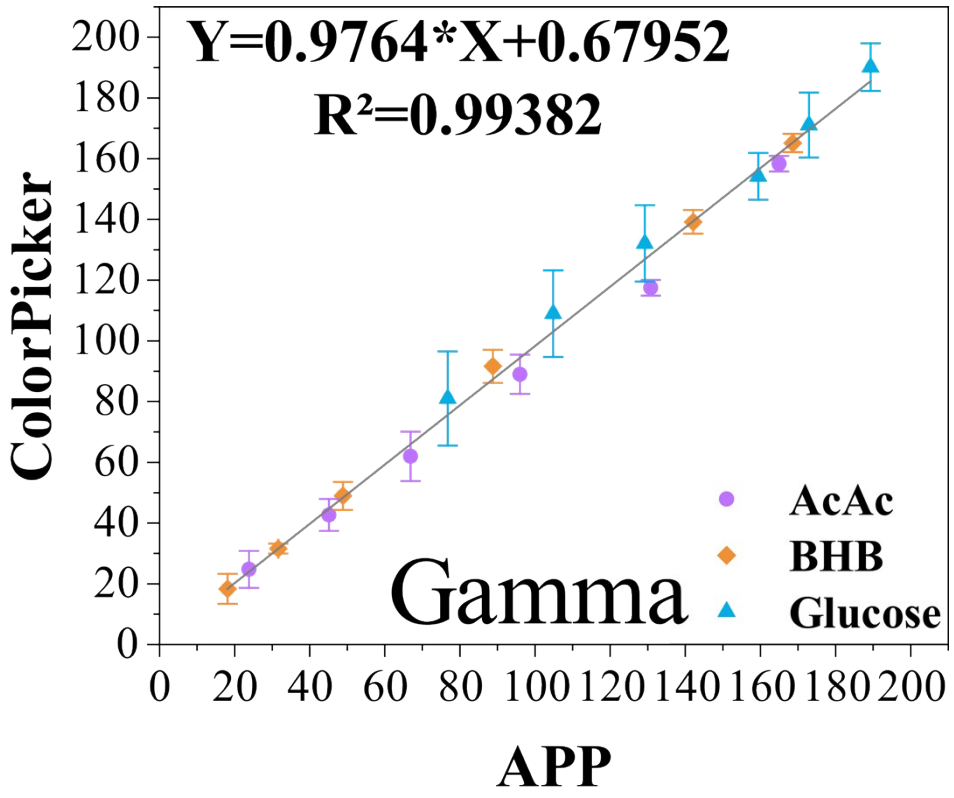

Figure S11 correlation between the self-developed app and color picker when using gamma correction method (R^2=0.99382).

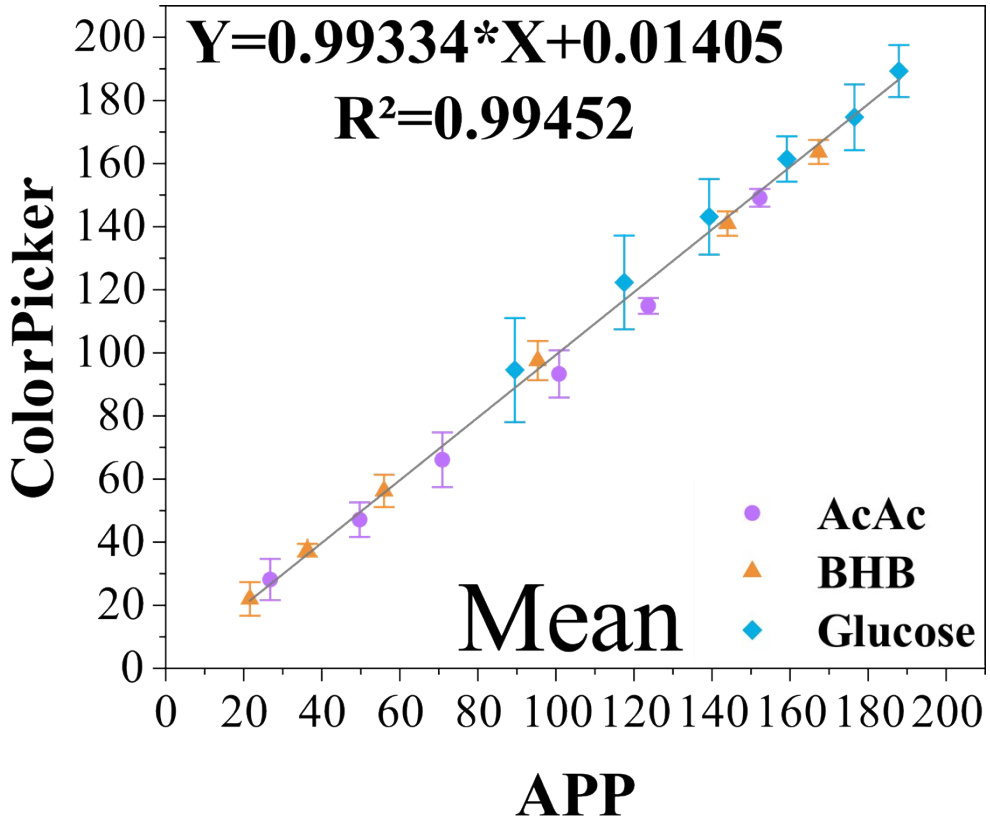

Figure S12 correlation between the self-developed app and color picker when using mean-value method (R^2=0.99452).

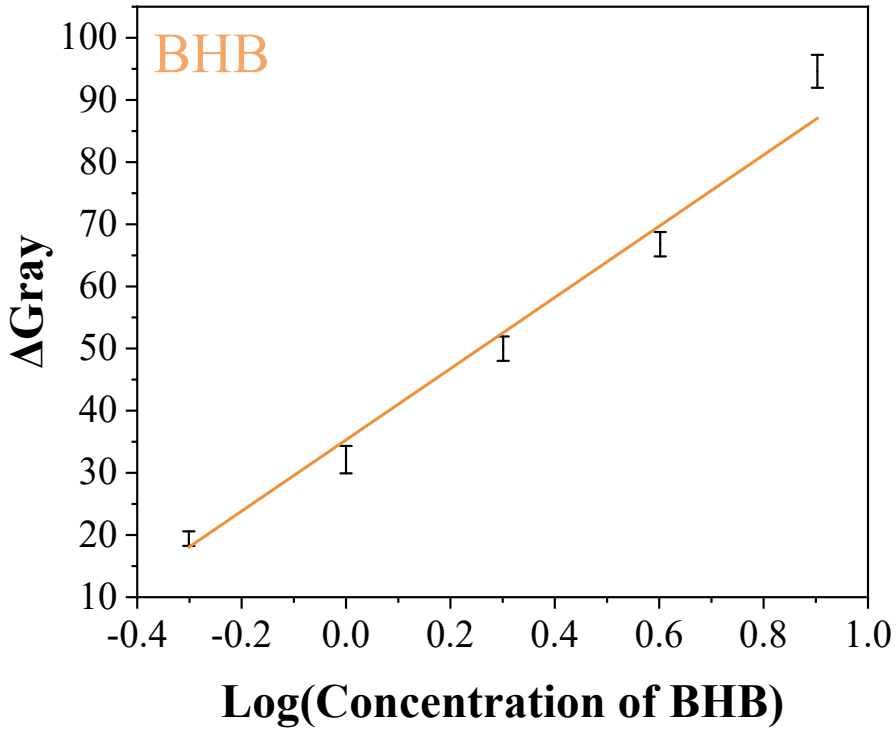

Figure S13 ΔGray fit curve of the self-developed BHB colorimetric test strip.

Supplementary Table 1

Step Count and Calorie Consumption of Subject 4 During the Ketogenic Diet

	Day0	Day1	Day2	Day3	Day4	Day5
Steps	8992	14539	24204	1309	10311	21295
Calorie	342kcal	552kcal	919kcal	506kcal	392kcal	809kcal

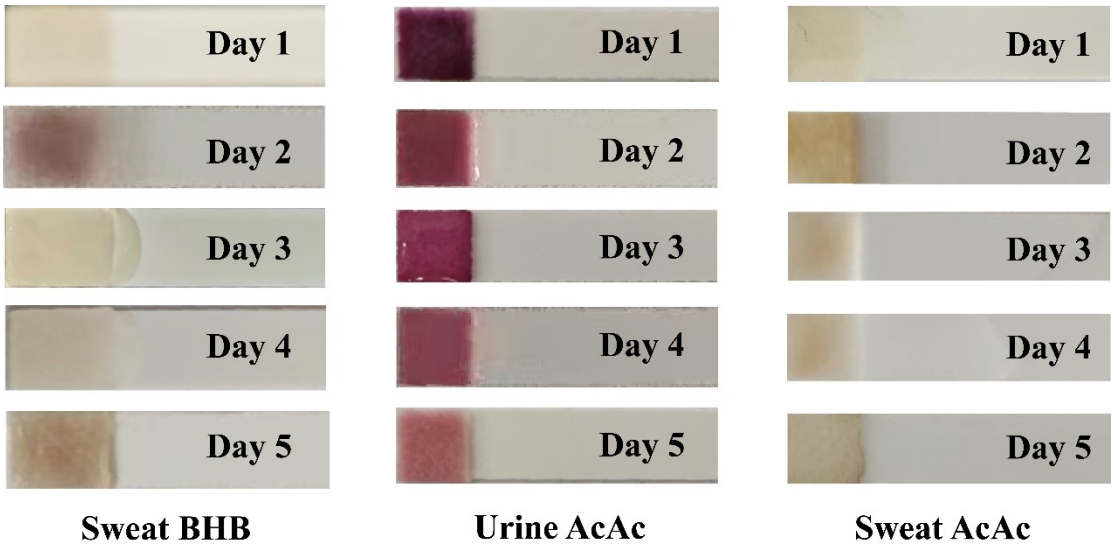

Figure S14 Commercial ketone test strip colorimetric results from Subject 4 during the 5-day ketogenic diet initiation period.