

Anthocyanin Content In Various Anthocyanin Rich Fruits And Vegetables

Youngmok Kim, Ph.D. and Daniel J. Wampler

ABSTRACT

Fruits and vegetables which contain high amount of color pigment were purchased from local market and the anthocyanin content was determined. Purple corn (cob), hibiscus, purple cabbage, and purple potato were analyzed for their anthocyanin content. Purple corn (cob) had the highest level of anthocyanin, followed by hibiscus, purple cabbage, and purple potato.

INTRODUCTION

The representative phenolic colorant anthocyanin is a subgroup of flavonoids that contain C₃C₆C₃ carbon skeleton and cover a broad range of colors including blue, purple, violet, magenta, red, and orange. Even though flavonoids release colors as well, anthocyanins are the most broadly distributed pigment in the plant world. Anthocyanins differ in the number of hydroxyl and/or methoxy groups present and sugars such as glucose, galactose, arabinose and xylose are attached to the 3 position in the C ring. When the attached sugars are hydrolyzed into aglycone and sugar, the aglycone is referred to as an anthocyanidin which is another color source along with anthocyanin. The color of anthocyanins and anthocyanidins come from excitation of a molecule by light and the strength of color is determined by the relative electron mobility in the structures. Since the two colorants have many conjugated double bonds which are readily excitable, the compounds can release color readily under the presence of light.

MATERIALS AND METHODS

1. Purple corn (cob only), 2. Hibiscus, 3. Red cabbage, 4. Purple potato were obtained from commercial suppliers (#1 and #2) or the local market (#3 and #4).

3g of each crop powder was brewed at 90°C for 20 min and filtered through cheese cloth and Whatman #4 filter paper to ensure a particle free infusion.

Total anthocyanin content was measured using a spectrometric method. An aliquot of supernatant from each sample was properly diluted into a spectrometric linear range for anthocyanins (Abs 0.8 – 1.2). The proper dilution factor varied depending on the samples and the range was from 4 to 6. Two aliquots of 0.5mL of properly diluted stock solution with pH 3.0 citric acid buffer were added to test tubes containing 4.5mL of pH 1.0 and pH 4.5 buffers and

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they were thoroughly mixed by vortex for 10 sec. After staying at room temperature for 20 min, each solution was measured at 520nm and 700nm against blanks of pH 1.0 and 4.5 buffers. Total anthocyanin calculation was calculated by

$$\text{Total anthocyanin (mg/L)} = (A/a) \times \text{MW} \times 1000 \times \text{DF}$$

Where: A = adjusted absorbance = $(A_{520}-A_{700})_{\text{buffer 1.0}} - (A_{520}-A_{700})_{\text{buffer 4.5}}$, 1000 = molar to ppm, DF = dilution factor

RESULTS AND DISCUSSION

Anthocyanin content and color strength was highest in purple corn cob extract. However, no purple color and anthocyanin was observed in purple potato extract due to quick degradation of anthocyanin (Figure 1). This result suggests that all the processing and handling should be at cold temperature without exposure to light when extracting anthocyanin from purple potato.

The color was lowered by decreasing pH of each extracts (Figure 2). This is a well known affect.

Anthocyanin content in each crop and changes in color value at different pH were illustrated in Table 1.

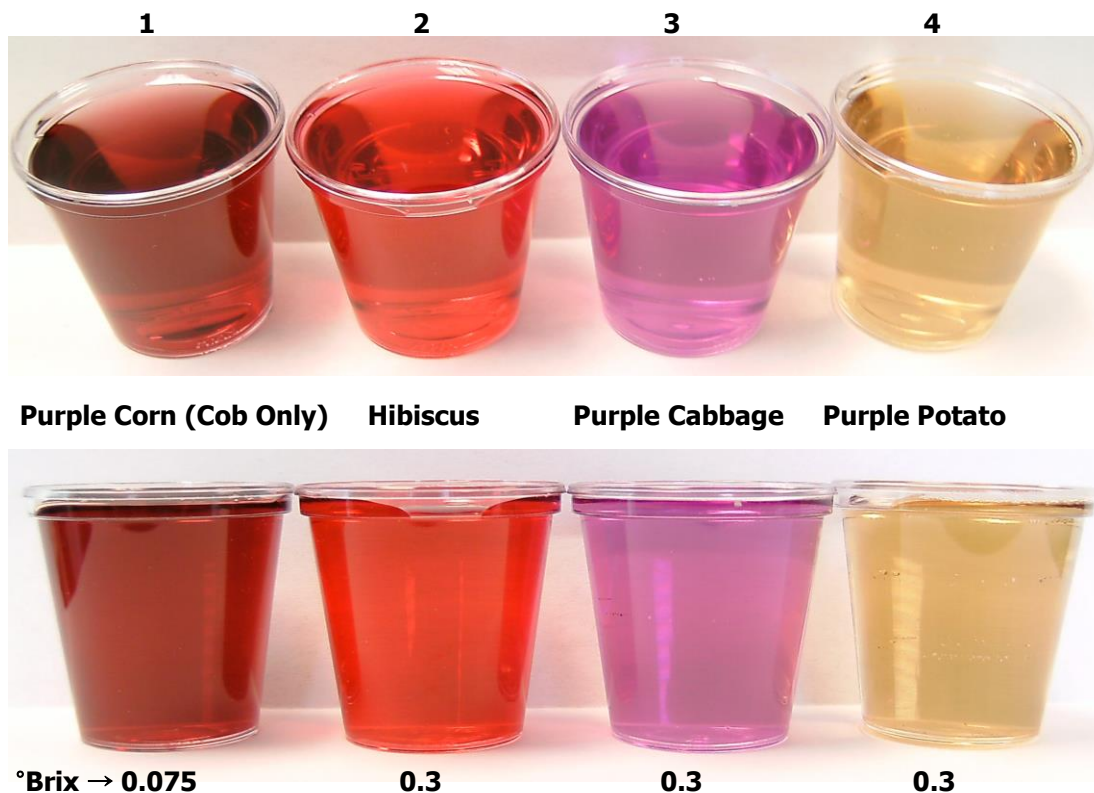


Figure 1. Color comparison of four anthocyanin containing fruits and vegetables. 1. purple corn (cob only), 2. hibiscus, 3. purple cabbage, 4. purple potato.

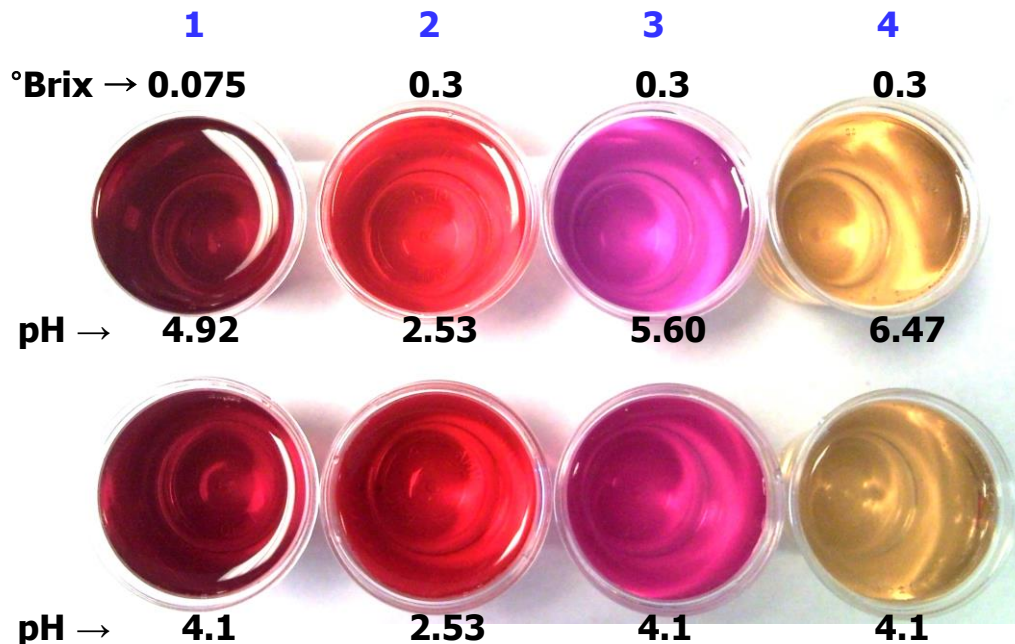


Figure 2. Color comparison of color extracts between original pH and adjusted pH (except no.2 because its pH is already lower than 4.1).

Table 1. Anthocyanin content and changes in color values in purple corn, hibiscus, red cabbage, and purple potatoes at original and modified pHs.

	°Brix	Anthocyanin at original pH (g/Kg)	Color value at original pH	Color value at acidified pH
1. Purple corn	0.075	7.90	295	233
2. Hibiscus	0.3	4.56	139	129
3. Red cabbage	0.3	3.55	150	115
4. Purple potato	0.3	N/D ¹	59	45

1. Not detected