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HPLC ANALYSIS OF QUERCETIN AND CYANIDIN FROM ONION PEEL (*ALLIUM CEPA* L.,)

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ABSTRACT

The present study investigates the beneficial role of anthocyanin extracted from two varieties of onion peel (*Allium cepa* L.,). And also to find out the quercetin and cyanidin present in the red onion peel and big onion peel by using HPLC.

Key words; *Allium cepa,* red onion peel, big onion peel, anthocyanin, quercetin, cyanidin, HPLC.

INTRODUCTION

Flavonoid is common and widespread secondary plant metabolites, which have a wide range of biological and physiological activities[2] Flavonoids occur in plants as different glycosides, which is also the preferred form for uptake in the human intestine[13] Favonoids are diphenyl-propanes (C_6-C_3-C_6) ubiquitous in plants and are an integral part of human diet[1]. They occur in foods generally as O-glycosides, and are classified as flavonols, flavones, catechins (flavanols), anthocyanidins, isoflavones, dihydroflavonols, and chalcones according to their chemical structure [3, 11].

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Earlier study reported that the color of onion is primarily due to four major anthocyanins of cyaniding like cyanidin-3-glucoside, cyanidin-3-laminaribioside, cyanidin-3-malonylglucoside and cyanidin-3-malonyllaminaribioside[4] and also quercetin and quercitin-4-O-β-glucopyranoside are the major flavonoids in red onion (*Allium cepa* L.,) [5] Quercitin is known to reduce the carcinogenic activity of several cooked food mutagens, inhibits enzymatic activities associated with several types of tumor cells [9] as well as to have anti oxidative properties. Cyanidin belongs to the group of anthocyanin and has the typical C_6-C_3-C_6 structure. It is water soluble pigment. The color of the cyaniding will depends on the pH, where it is red when pH is below 3, blue at pH higher than th11 and violet at neutral pH. In plants the cyanidin is bound to a sugar molecule to form cyanidin-3-O- β- glucoside. Cyanidin and its glycoside are very strong antioxidants and it neutralizes reactive oxygen species [6, 7, 8.]

MATERIALS AND METHODS

Sample collection

The fresh onion were collected from the local market and stored at -20° C.

Extraction of anthocyanin

500mg of onion peel were treated with 10 ml of 1% of acidified methanol, and the mixture was centrifuged at 10,000 rpm for 10 min the supernatant was taken and evaporated. The evaporated sample was taken for the HPLC analysis.

HPLC analysis

The anthocyanin extracts were concentrated in vacuum evaporator. HPLC analysis was carried out with a shimaduzu liquid chromatograph equipped with LC-10 AD pump, SPD-10A UV detector purposes. An aliquot of 20µl were injected. Flavonoids were quantified at 360nm using peak area by comparison to a calibration curve derived from the quercetin. Ambient temperature was used. The flow rate was 1ml/min and mobile phase A (methanol: water) 95:5 and mobile phase B (methanol: water) 5: 95 were used. 100 ppm quercetin standard and 50 ppm cyanidin standard were used.

RESULT AND DISCUSSION

From HPLC analysis, it was determined that quercetin and cyanidin representing the major flavonoid in red and big onion peel. HPLC profile detected at 350 nm comparing the HPLC results with quercetin standard (Figure 1) with red onion (Figure 2) and big onion (Figure 3). The retention time of standard was found to be 7.691 and the retention time of red onion peel was 8 min and for big onion peel was 7.787 and the peak area was also high in the both the samples.

The result of HPLC analysis showed that quercetin was the major compound present in red and big onion peel.

Figure 4 represents the HPLC analysis of the standard cyanidin detected at 535 nm with a retention time of 3.2. The anthocyanin extracted from red onion peel and big onion peels also showed the presence of cyanidin with approximately the same retention time (Figure 5 and 6). Based on the above results, the main anthocyanin in the red onion peel and big onion peel were identified as quercetin and cyanidin. Fossen *et al.*, [5] reported cyanidin-3-glucoside in red onion. Sameh *et al.*, [12] reported the main flavonoid constituent is flavonol aglycons such as quercetin [10.] From the results it was concluded that the quercetin and cyanidin are the major compounds present in the red onion peel and big onion peel. Further analysis has to be done on the glycosides present in cyanidin and quercetin of red and big onion peel.

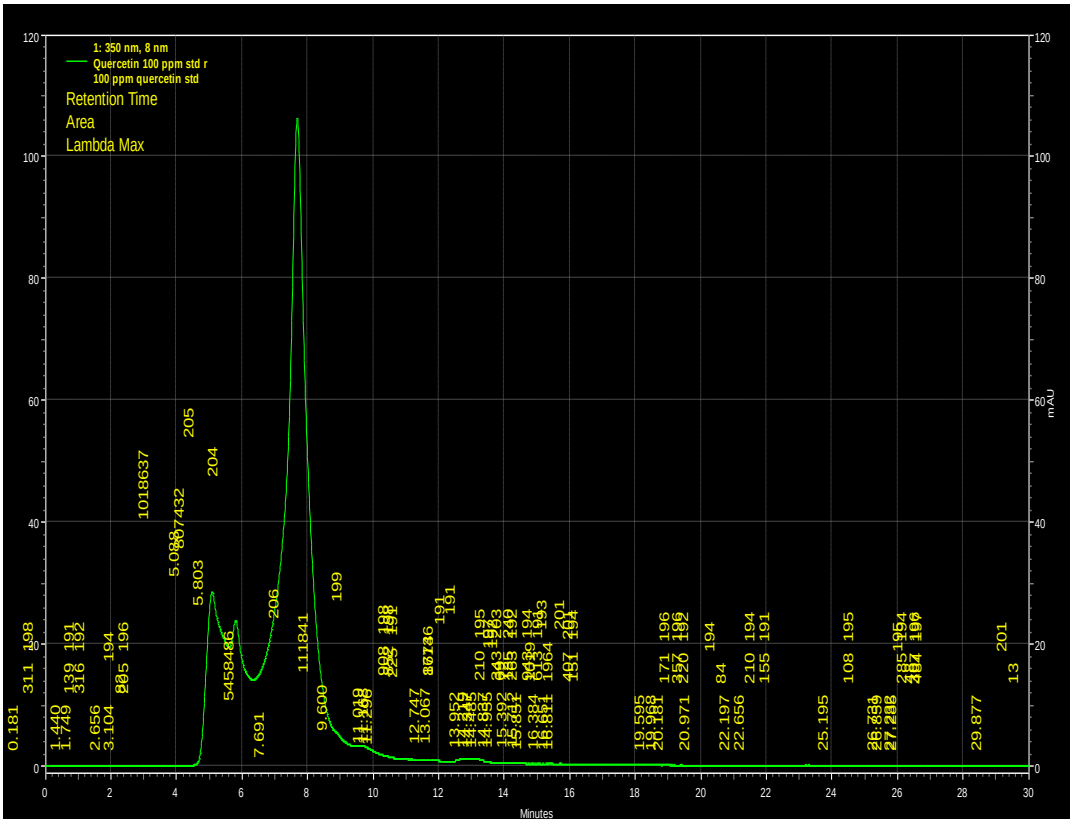

Figure 1 HPLC analysis of standard Quercetin

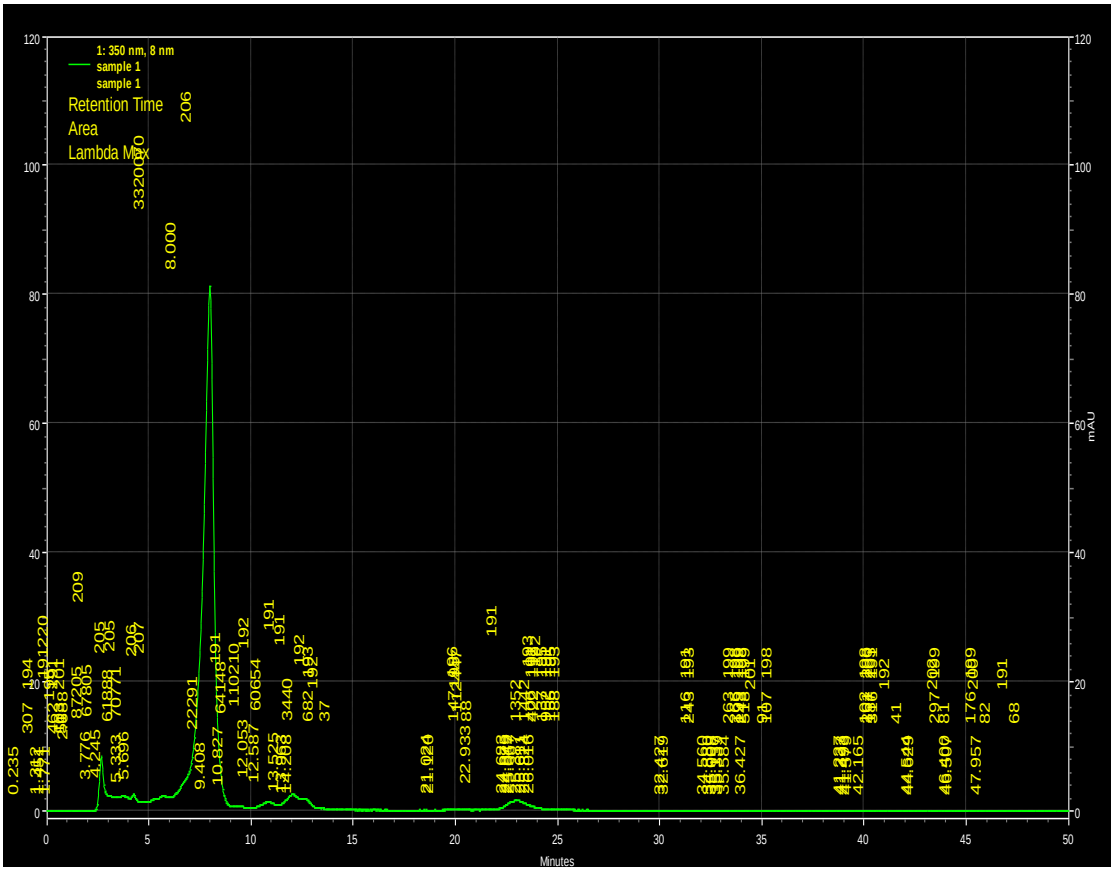

Figure 2 HPLC analysis of Quercetin from red onion peel (Sample 1)

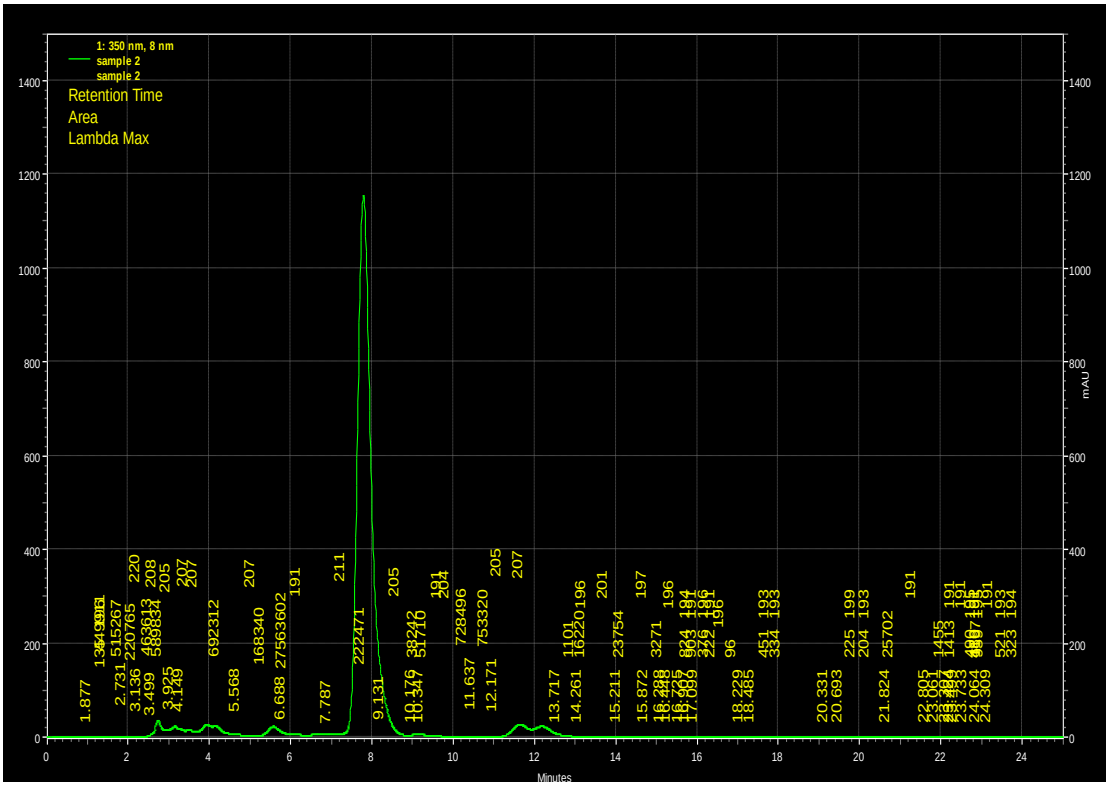

Figure 3 HPLC analysis of Quercetin from big onion peel (Sample 2)

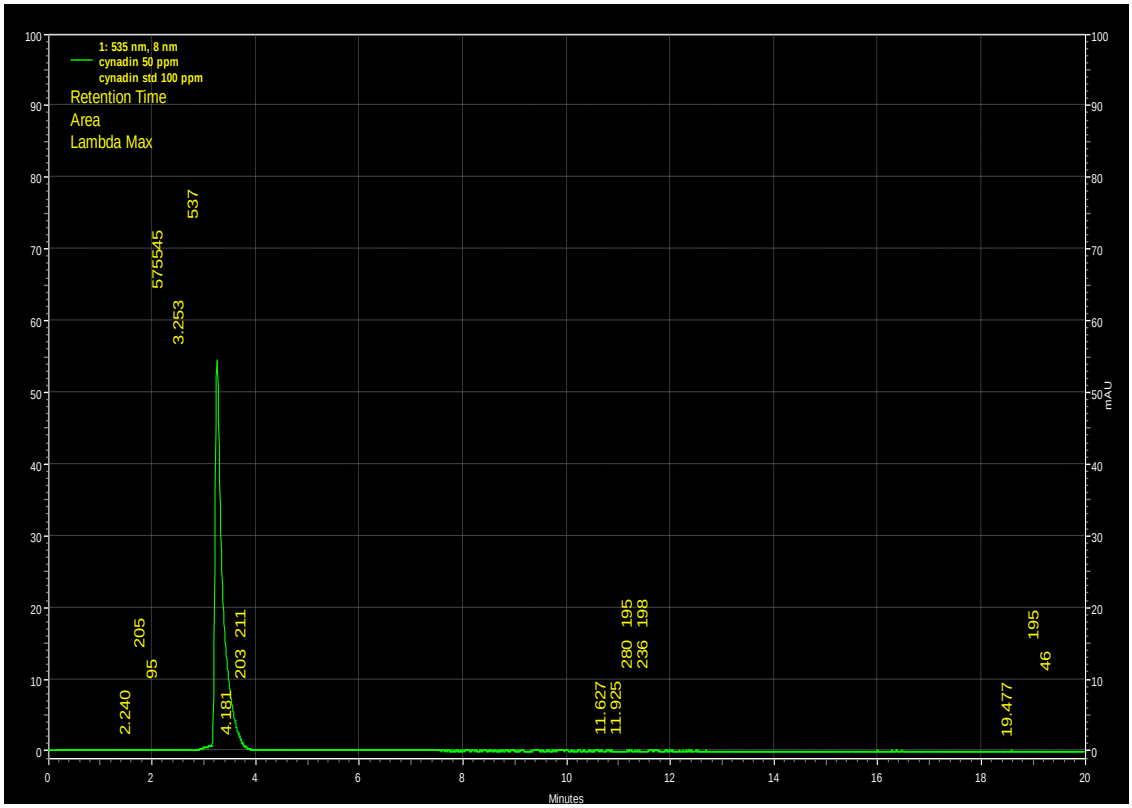

Figure 4 HPLC analysis of standard Cyanidin

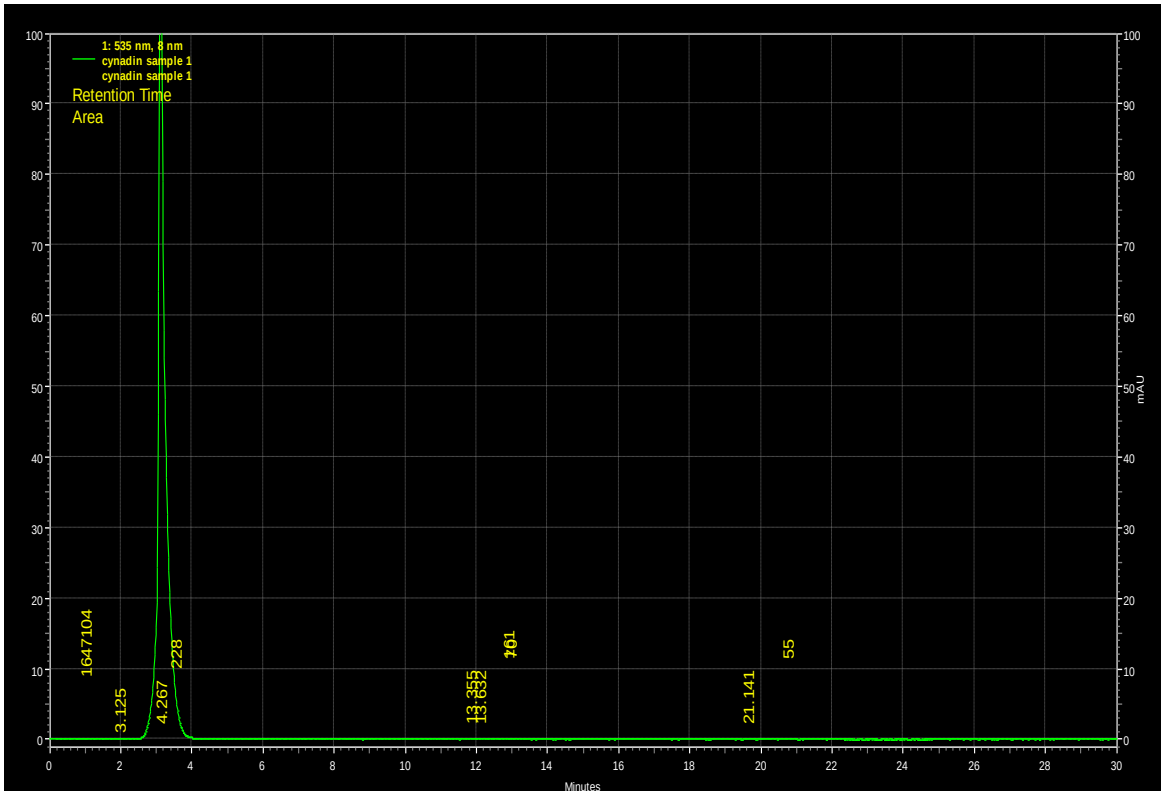

Figure 5 Sample 1 HPLC analysis of Cyanidin from red onion peel

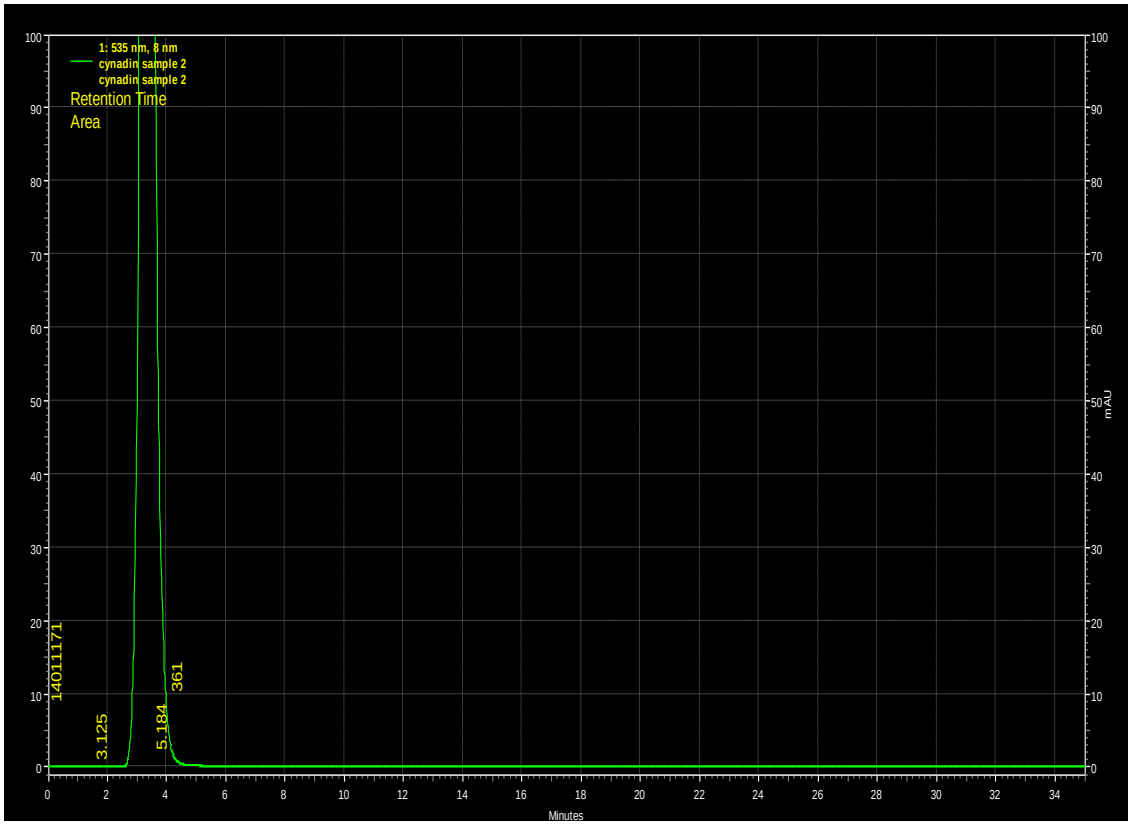

Figure 6 Sample 2 HPLC analysis of Cyanidin from big onion peel

CONCLUSION

The data obtained by HPLC analysis demonstrated the presence of cyanidin and quercetin in red and big onion peel. The extraction solvent has a great impact on the colour from onion peel.

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