

Correlations between antioxidant activity and the contents of total anthocyanins (TA), total polyphenols (TP), total flavonoids (TF) and total sugars (TS)

Correlations between the antioxidant activities and the contents of TA, TP, TF, and TS were shown in Table 5. There was a good linear correlation between the antioxidant activity and TP in the extracts of mulberry determined by DPPH and OH radical scavenging assays. Previous literatures had shown that anthocyanins (especially monoglucosides of cyanidin and delphinidin) as well as non-anthocyanin phenolic (chlorogenic acid, kaempferol, quercetin, etc.) possess high antioxidant activity which could compare well with the activity of the well-known antioxidants α -tocopherol and

trolox.^[35] The antioxidant activity values were slightly better correlated to total polyphenols (TP vs. DPPH, $R^2=0.8735$; TP vs. OH, $R^2=0.9249$) rather than to total anthocyanins (TP vs. DPPH, $R^2=0.8463$; TP vs. OH, $R^2=0.7228$). This conclusion was in agreement with previous findings obtained on blueberries and on red wines.^[33,34] The correlations between the antioxidant activity and total flavonoids were TF vs. DPPH, $R^2=0.6432$ and TF vs. OH, $R^2=0.5886$, respectively. There was a negative linear correlation coefficient between the antioxidant activity and total sugars (TS vs. DPPH, $R^2=0.6373$; TS vs. OH, $R^2=0.5318$). There was a slightly better correlation between antioxidant activity and TP/TA as compared to that of TF/TS, which meant that polyphenols and anthocyanins significantly contributed to the antioxidant activities of mulberry fruits.

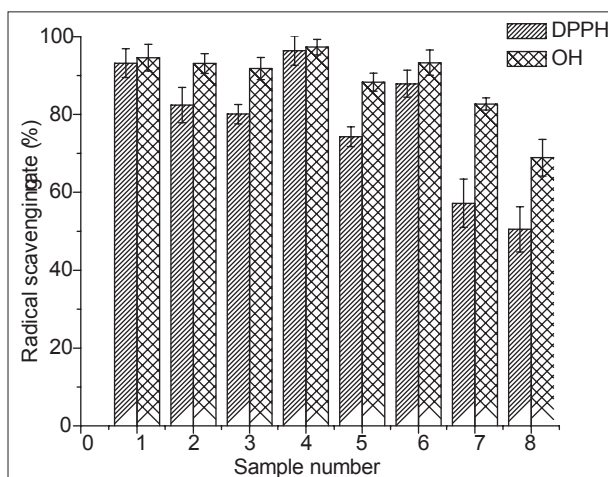


Figure 1: The scavenging radical ability of different mulberry cultivars on DPPH and OH. 1-Zhongsang 5801, 2-Dashi, 3-Guang 7200, 4-Jushensang, 5- Damo_{4x}xguiV-4, 6- Hongyayizhilaishisheng₉₉₋₆₇, 7-Yaan 3, 8-Lvshenzi

CONCLUSION

Significant differences of the chemical composition, nutritional value, and antioxidant activities among the mulberry cultivars were observed. The different cultivars could be exploited and made the best value according to their own nutritive value for different processes purpose. The mulberry fruits can be considered as a good dietary source of some nutrients and antioxidant compounds, especially some anthocyanins and polyphenols, which could provide nutritionally useful amounts of most of minerals as well. The total polyphenols content was observed in the mulberry cultivars between 56.32 mg/100g DW (Lvshenzi) and 246.00 mg/100g DW (Guang 7200), and the total anthocyanins content ranged from 19.00 mg/100g DW (Yaan 3) to 193.00 mg/100g DW (Jushensang), whereas not

Table 4: Contents of total anthocyanins, polyphenols, flavonoids and sugars of mulberry cultivars*

No.	Total anthocyanins (mg/100g)	Total polyphenols (mg/100g)	Total flavonoids (mg/100g)	Total sugars (mg/100g)
1	116.67±9.61 ^c	189.67±5.69 ^b	90.00±5.57 ^c	2310.75±13.50 ^e
2	155.00±7.55 ^b	233.33±7.77 ^a	59.67±7.09 ^d	2667.38±32.01 ^c
3	114.67±6.5 ^c	246.00±4.58 ^a	50.67±4.04 ^e	1281.72±17.01 ^f
4	193.00±10.54 ^a	244.33±11.93 ^a	100.09±3.51 ^b	2417.00±17.69 ^d
5	66.0±5.57 ^d	174.00±9.54 ^c	60.00±2.52 ^d	2665.24±12.77 ^c
6	76.67±8.02 ^d	191.65±5.69 ^b	150.32±3.05 ^a	2670.35±11.24 ^c
7	19.00±4.58 ^e	159.72±6.56 ^d	40.94±5.57 ^f	5755.60±40.11 ^a
8	nd	56.32±3.69 ^e	nd	4671.00±30.45 ^b

Mean±standard, n=3; nd: not detected; are in the same column with different superscript lower-case letters are significantly different at $P < 0.05$ *1-Zhongsang 5801, 2-Dashi, 3-Guang 7200, 4-Jushensang, 5- Damo_{4x}xguiV-4, 6- Hongyayizhilaishisheng₉₉₋₆₇, 7-Yaan 3, 8-Lvshenzi

Table 5: Correlations between antioxidant activity and the total anthocyanins, polyphenols, flavonoids and sugars

	DPPH	OH
Total anthocyanins (TA)	$Y=0.2289X+56.42, R^2=0.8463, P<0.01$	$Y=0.1173X+77.761, R^2=0.7228, P<0.01$
Total polyphenols (TP)	$Y=0.2393X+32.614, R^2=0.8735, P<0.01$	$Y=0.1365X+62.946, R^2=0.9249, P<0.01$
Total flavonoids (TF)	$Y=0.29913X+57.534, R^2=0.6432, P<0.05$	$Y=0.1545X+77.969, R^2=0.5886, P<0.05$
Total sugars (TS)	$Y=-0.009X+105.26, R^2=0.6373, P<0.05$	$Y=-0.0046X+102.62, R^2=0.5318, P<0.05$

detected in Lvshenzi. The correlation analysis indicated that total polyphenols contribute significantly to the antioxidant activity. The results indicated that mulberry has the potential to be further developed into a nutritionally interesting raw material for food and beverage applications. Additionally, the *Morus atropurpurea* Roxb. showed considerable high nutritive value and antioxidant activity which could be chosen for functional food development that benefits human health.

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