TABLE II Connection between Grape and Wine Physicochemical Index

Grape wine physicochemical index	**Major related factors in grape**
Anthocyanin	Anthocyanin, DPPH radical, Soluble solid, Total phenols(-)
Tannin	DPPH radical, soluble solid
Total phenols	Anthocyanin, DPPH radical, Soluble solid
Total flavone of wine	Anthocyanin, DPPH radical, Soluble solid, Total phenols(-)
Resveratrol	Anthocyanin, DPPH radical(-), Total flavones of grape(-)
DPPH half inhibitory volume	Anthocyanin, DPPH radical, Soluble solid, Total phenols(-)
Color and lustre（L*）	Color of fruit peel a*(++), Anthocyanin(-)
Color and lustre（a*）	Color of fruit peel a*(--)
Color and lustre（b*）	Total phenols(++), Color of fruit peel b*(++), Malic acid(--), Color of fruit peel a*(-)

The table above roughly describes that the anthocyanin, DPPH radical and soluble solid in grape promotes generating anthocyanin in wine in the process of brewing, while total phenols in grape has a role in decomposition or destruction of generating conditions to anthocyanin in wine. Resveratrol has serious positive correlation with anthocyanin in grape, while it has serious negative correlation with protein and malic acid in grape.

Looking at the main related factors in other indicators, we can get further conclusions:

1) The anthocyanin, DPPH radical and soluble solid has close correlation with the quality of grape wine [6].

2) The indicator of color and luster of red wine primarily has correlation with the content of anthocyanin in grape and the color of grape peel.

V. Conclusion

This paper first analyses the rough relation between the grape and grape wine physicochemical index through multiple linear regression model, based on which physicochemical index whose correlation is relatively low are eliminated. Then through the single-layer forward neural network a mathematical model is established about the relation between the physicochemical index of grape and grape wine. Combining multiple linear regression model with single-layer forward neural network helps not only to reduce the impact of too many physical and chemical indicators on the accuracy of neural network's training, but also to simplify the structure of neural network and greatly improve the speed of network training. Finally we get the physicochemical index of grape whose correlation is relatively high, which may provide some guidance and reference for wine industry on how to select grape according to the physicochemical index of grape.

References

[1] Wang Jinjia, Yin Tao, Li Jing, Hong Wenxue, Ma Chongxiao, Visual evaluation of wine quality from physicochemical properties, Journal of Yanshan University, 2010, 133-137.

[2] Wang Wenjing. Development of Study on Sensory Evaluation in Wine . Liquor Making, 2007, 57-59.

[3] Gary J. Pickeringetal Journal wine Research,2000,129-144.

[4] Cortez P, Cerdeira A, Almeida F, et al. Modeling wine preferences by data mining from physicochemical properties. Decision Support Systems, 2009, 547-553.

[5] Jang Q X, Xing W X, Xie J X, Yang D H, College Mathematics Experiment , Tsinghua University Press, 2005-2.

[6] Boulton R. The copigmentation of anthocyanins and its role in the color of red wine: A critical review. American Journal of Enology and Viticulture, 2001, 67-84.