

Chapter 14

Taiwan Fruit Vinegar

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14.1 Introduction

Vinegar has been used as a seasoning in cooking since ancient times. However, recent research has shown that, in addition to its well-known anti-bacterial activity, vinegar (when consumed as a drink) confers considerable health benefits, including lowering blood pressure, acting as an anti-oxidant, alleviating the effects of diabetes, preventing cardiovascular diseases, providing refreshment after exercise, etc. (Nishidai et al., 2000; Ogawa et al., 2000; Fushimi et al., 2001, 2002; Kondo et al., 2001; Shimoji et al., 2002; Sugiyama et al., 2003; Johnston et al., 2004). Consumers are now beginning to appreciate the health benefits of drinking vinegar. Therefore, in addition to the traditional use of vinegar products such as rice vinegar, wine vinegar and cider vinegar as a food flavouring, there is a growing demand for fruit vinegar products that are sold as a health food. The emergence of these new products has resulted in name changes from wine or cider vinegar to grape or apple vinegar, with these being categorized as fruit vinegars. Thus, there are two types of fruit vinegar products on the market: one with a high content of acetic acid which is either used as a seasoning or is diluted with 4-8 times as much water as a health drink, and another that is ready to drink as a beverage.

There are only a few reports in the literature on research into fruit vinegar products made from fruits other than grapes or apples. Most research has studied the acetic acid yield from fermentation using fruit peel and other wastes as the raw materials (Richardson, 1967; Anon., 1973; Adams, 1978; Grewal et al., 1988), and there has been little research work on the quality aspects of fruit vinegars. Koizumi et al. (1987) evaluated the general composition, amino acids and organic acids of some high-priced special vinegars in Japan, and found that they were not of high quality. This tells us that, if fruit vinegar products are good for health and for drinking, much work needs to be done in figuring out the important criteria for manufacturing and marketing healthy and palatable fruit vinegar products. In general, many consumers, especially the younger generation (under 20 years old), do not like fruit vinegar products. This chapter discusses the definition of fruit vinegar and

Table 14.1 The Chinese National Standard (CNS) quality standards for edible vinegar (Chinese National Standard, 2005)

Variety	Composition	Acidity (%, calculated as acetic acid)	Salt-excluded soluble solids (%)	Non-volatile acidity (%, calculated as acetic acid)	Total nitrogen(%)
Brewing vinegar	Grain vinegar	Not less than 4.2	Not less than 1.3	—	—
	Fruit vinegar	Not less than 4.5	Not less than 1.2	—	—
Other brewing vinegar		Not less than 4.0	Not less than 1.2	—	—
High-acidity vinegar		Not less than 9.0	Not less than 1.5	—	—
Condiment vinegar		Not less than 1.0	Not less than 6.0	—	—
Artificial vinegar		Not less than 4.0	Not less than 1.2	Not more than 1.0	Not more than 0.2

Table 14.2 The regulation for composition of vinegar by FAO/WHO (Joint FAO/WHO Food Standards Programme, 2000)

	Wine vinegar	Vinegars other than wine vinegar
Total acid content	Total acid not less than $60 \text{ g} \cdot \text{L}^{-1}$ (calculated as acetic acid) and not more than the amount detainable through the use of biological fermentation	Total acid not less than $50 \text{ g} \cdot \text{L}^{-1}$ (calculated as acetic acid) and not more than the amount detainable through the use of biological fermentation
Residual alcohol content	Residual alcohol (v/v) not more than 0.5%	Residual alcohol (v/v) not more than 1%
Soluble solids (exclusive of added sugars or salt)	Soluble solids not less than $1.3 \text{ g} \cdot \text{L}^{-1}$, 1% acetic acid	Soluble solids not less than $2.0 \text{ g} \cdot \text{L}^{-1}$, 1% acetic acid