

# COMPARISON OF SOUR CHERRY WINE MAKING METHODS IN THE ASPECT OF VARIETY CHOICE

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## Abstract

*In this experiment, I tried several of the winemaking methods already used in practice and examined which of the best ones could be used in large-scale technology. The aim of this paper is to describe the methods of making sour wine and the composition of the residual sugars in each recipe and the dangers of their presence.*

## 1. Introduction

The consumption of fruit wines is increasing all over the world. Many fruit species and the different varieties represent diverse flavors. Sour cherry wine is one of the most popular fruit wines in Hungary. Sour cherry has proper sugar content and acidity for winemaking. This fruit is not so juicy, therefore water is needed for winemaking and sugar is also required due to the dilution. In the case of home-made sour cherry wine, the amount and the proportion of water and sugar are various, so home-made wines also have distinct tastes.

## 2. Making fruit wine

According to most authors, almost all fruit wines can be produced by the same methods, but Szabó [10] distinguishes several methods, so I basically relied on his works. The methods described are mostly about homemade processing or using traditional recipes. Industrial production is not typical in Hungary. Only a few pioneer wineries produce fruit wines.

Fruit wine is made of fruit juice through alcoholic fermentation. Alcoholic fermentation is carried out by yeasts via various enzymes. The fermentation process is actually a chemical decomposition in which compounds with higher energy content, (e.g. sugar) produce compounds with lower energy content, (e.g. alcohol and carbon dioxide).

General formula of this process:  $C_6H_{12}O_6 \rightarrow 2 C_2H_6O + 2 CO_2 + \text{heat}$

The acidity of must is important in winemaking, as it must be balanced with the sugar content to ensure that the wine is harmonious and free from wild, unpleasant acids. Fruits contain mainly malic and citric acids [11]. The ideal acidity for consumption is 6-8 gram/liter, but most fruits exceed this, thus dilution with water is required.

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### 3. Material and method

#### 3.1. Choosing the proper recipe

Methods and recipes that I used, had collected from friends and acquaintances. Making small amounts of sour cherry wine for own consumption is becoming more common among young people in the countryside. I chose and used in the experiment six recipes from a wide range of sour cherry wines with different flavors. In the experiment I used 'gipsy' sour cherry (or black cherry). My goal was to select the wine that the judges liked the most from the wines made from different recipes. The experimental batches of wine were fermented in 15-liter glass containers in a poorly lit room with near-constant temperature (Figure 1).

Vinasse preparing happened in the same way in every method:

The first process was cleaning and removing stalk, leaves and other contaminants that came in during picking. Prepared fruits were pitted by a juicer and grinded. The resulting pulp was mixed with water in a 1: 1 ratio and allowed to mature for 4 days in a covered stainless steel pan. First I removed the floating peel and pulp from the top of the fermenting vinasse, then filtered through a small hole filter and poured it into a glass container. The mouth of the container was so closed that excess carbon dioxide could escape, but air could not infiltrate to the wine, because various wine defects would appear. When the wine was ready I covered it with a well-ventilated fabric to prevent the vinegar flies from accessing it, but the carbon dioxide that was produced could escape.



Figure 1. Fermenting vinasse

#### 3.2. Methods of cherry wine making

##### Method 1.:

I take this method as a point of reference, as I only raised the sugar level of the must so that safe, even fermentation would take place, so I expected to get a very dry wine. The must weight of the vinasse was 9.8 brix% that I raised it to 18 brix%. For that reason, I added 10 decagrams of granulated sugar to 10 liters of vinasse. The Hungarian wine law does not set a maximum value for fruit wines as it does for grapes. Here I expected the least residual sugar.

##### Method 2-3.:

These two methods are actually the same. I just adjusted the proportions. I added as much sugar to the basic vinasse as in the first method, and added 20 and 30 decagrams of dried cherry

seeds to 10 liters of vinasse to help dissolve the bitterness of the seeds in the wine. Many people say that these seeds should be shattered, but I do not share this opinion, because sour cherry seeds contain cyanide. Here I expected two very acidic, bitter tasting wines with slightly more residual sugar than in the first method.

#### Method 4-6.:

In these methods I adjusted the amount of added sugar to 10 liters of vinasse. I mixed the vinasse with water and added 3-4-5 grams of sugar to it. I got vinasses with 23.2 Brix %, 27.6 Brix % and 32.6 brix%. Here I expected a cherry wine with high sugar content.

## **4. Results**

Cherry wines were judged by a tasting committee which consists of 10 young people in their 20s (5 men and 5 women). There are five aspects in the tasting (taste, color, aroma, acidity, and sweetness). Tasters could evaluate the cherry wines with points (from 1 to 5). The results were averaged to rank the wines.

The tasting committee examined the cherry wines for taste so I had to measure the residual sugar content of each cherry wine individually to determine if the wine was indeed a sweet wine or it is sweet just because of its low acidity. The residual sugar content of cherry wines is determined in grams per liter. However, not only the residual sugar content that determines the wine's category (dry, semi-dry, semi-sweet, sweet) but also the proportion of acidity. Dry wine has 4-9 grams per liter of residual sugar content. Semi-dry wine has 4-12 grams per liter of residual sugar content. Its maximum limit is 18 grams per liter. Semi sweet wine has 12-45 grams per liter, sweet wine has more than 45 grams per liter of residual sugar content.

### **4.1. Results of black cherry wines based on various recipes**

Method 1.: As I expected, I got a very dry and coarsely acidic wine, which has a slightly sour aroma and a deep burgundy color. Its maturation was quite fast, lasting only two weeks. The solid deposit was 4 cm high. The residual sugar content was 7 grams per liter, so this batch was a dry wine.

Method 2.: The added 20 decagrams of sour cherry seeds worked its way into a very dry bitter aftertaste with a dark red color and a pleasant aroma. It was a slightly bitter aftertaste thanks to the seeds, which enhanced the enjoyment of the cherry wine. It has a two weeks long maturation time, too. The deposit was dense and circa 6 cm high due to the seeds. The residual sugar content was 6 grams per liter, so this batch was a dry wine.

Method 3.: Due to the 30 decagrams of sour cherry seeds, this wine was simply undrinkable, dry and sour. It had a brownish color. Although its strong, cherry aroma was especially pleasant. The deposit consisted of two parts: below a 12 cm high solid part with the seeds, and above a 5-6 cm high floating deposit. The residual sugar content was 7 grams per liter, so this batch was a dry wine.

Method 4.: This cherry wine, unlike the first method, was rather semi-sweet than I expected. It was a tasty, not so acidic wine. It had a fruity, a little bit spicy aroma. Its color was deep red. The deposit was solid and 6-7 cm high. The maturation lasted more than two weeks. The residual sugar content was 32 grams per liter, so this batch was a semi-sweet wine.

Method 5.: This wine was tasted like a sweet one. It was tasted like real cherry with a slightly bitter aftertaste, but it had pleasant acidity. Its aroma was similar to cherry with a hint of almond. It had a deep purple color. It had thick glycerin. The deposit was quite thick (6-7 cm high) due to the high amount of sugar. Its maturation time was three weeks and very impressive. The residual sugar content was 46 grams per liter, so this batch was a sweet wine.

Method 6.: As I expected, this cherry wine was the sweetest one. It has sour cherry in its flavor, but the sugar suppressed it in the same way as its acid or other flavors. Its aroma was similar to sour cherry and cherry. It was full-bodied, dense like a liqueur and had a very thick layer of glycerin. It had a deep purple, almost black color. The deposit was 8-9 cm high. The fermentation started hard and it took a long time (about 4 weeks) before I saw any sign of fermentation. The residual sugar content was 52 grams per liter, so this batch was a sweet wine. Points of the recipes can be seen on Table 1.

Table 1. Points of the recipes

	<i>taste</i>	<i>color</i>	<i>aroma</i>	<i>acidity</i>	<i>sweetness</i>
1st:	1.7	3.7	3.5	4.4	1
2nd:	2.3	4.4	3.6	4.7	1.3
3rd:	1	2.5	4.3	5	1
4th:	3.5	4.3	4.2	3.2	3.7
5th:	4.4	4.2	4.4	2.9	4.5
6th:	4.5	4.5	4.6	1.3	5

The following figures shows the average score of each wine in the evaluation of each criterion. I asked the tasters to rate the wines by giving them a higher score for the attribute they feel good.

I came to the conclusion that tasters liked recipe 6th (the sweetest wine) the most. Figure 2. shows the average for taste. The recipe 5th was not far behind recipe 6th, as it also became a pleasant sweet wine.

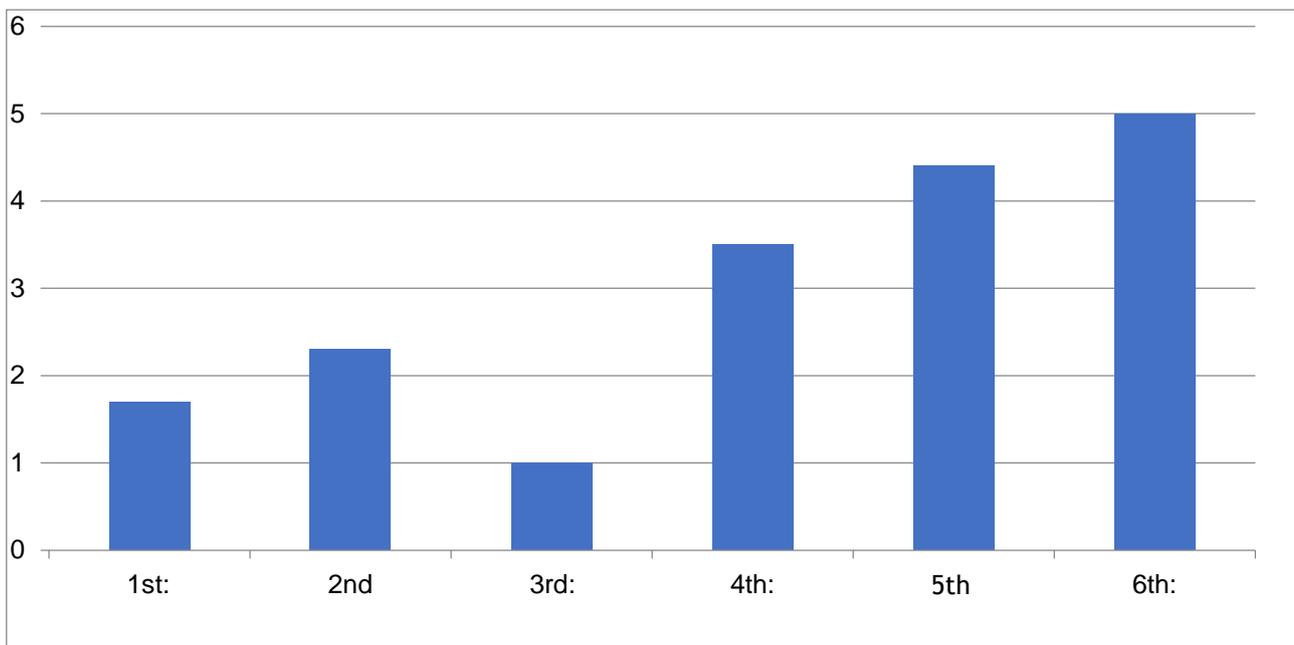


Figure 2. Average scores of the recipe in the aspect of taste

On this figure I highlighted what I consider to be the most important value attribute (taste and scores). The figure shows that the sweeter wines have a better taste. For drier, more acidic wines, it was said that no vinegar occurred, only the acids remained so sharp without sugar that their values had ceased to the limit.

Figure 3. shows the diversity of the results. As you can see, almost all of the wines have a good aroma and color, as each wine has the characteristic sour cherry aroma and color. It is also easy to see the direction in which certain recipes are moving, and the fact that wines produced by a similar process are moving in the same direction only to a different degree. For example, method 3rd which is shown by the gray line. It got only one score for the taste and also for the sweetness because the wine has become very acidic as shown in the figure.

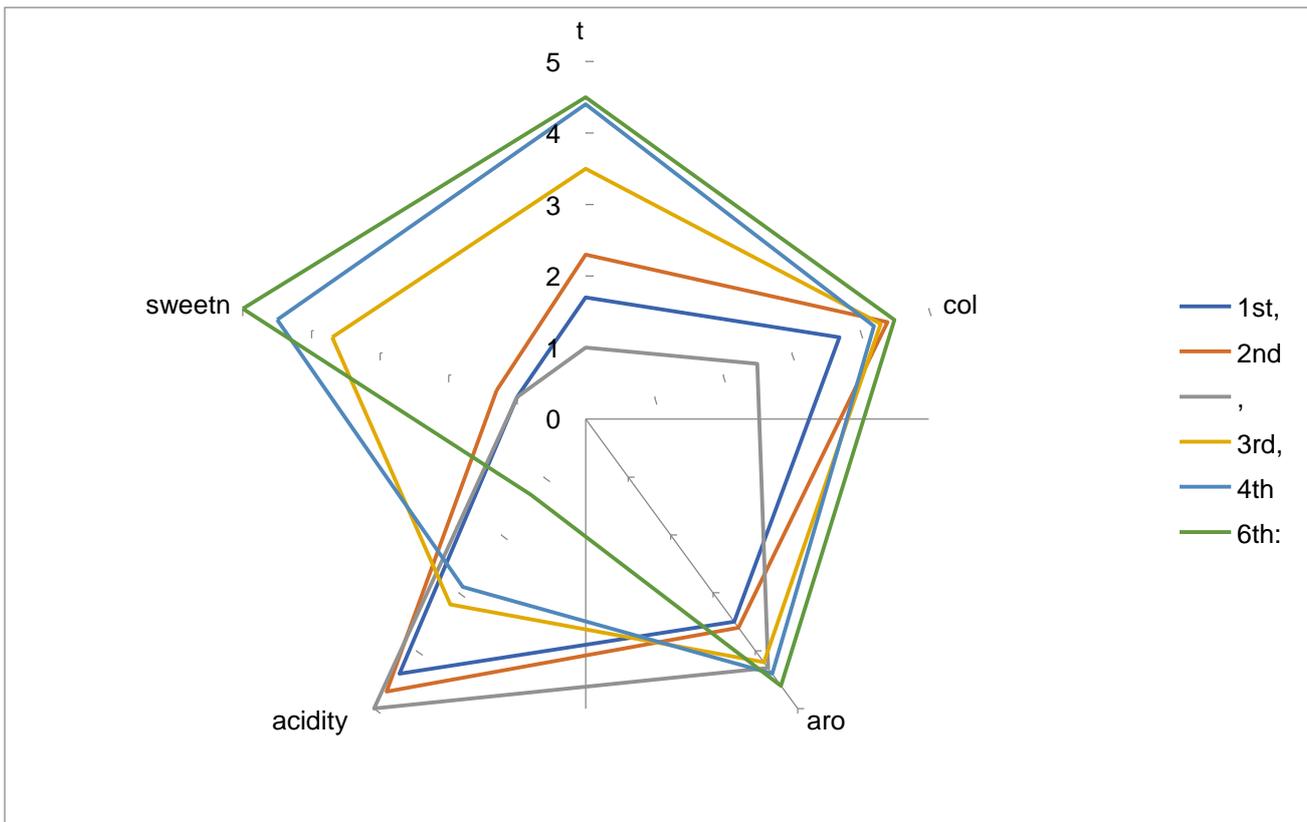


Figure 3. The average score of the recipes according to the test criteria

## 5. Conclusions

In my experiment the taste of wines made from different sour cherry varieties was very different. The sensory evaluation was made by students. Their evaluation was rather subjective than objective. It would be needed to introduce the wines to experts. Experts could recognize the defects and diseases in the wines. Whatever the case, I believe that the consumer's opinion matters ultimately.

The experiments need to be repeated once more to obtain reliable results. Since the experiments were small in number, much different from the practice of wine making, in my opinion, these recipes would be worth trying in larger quantities under the guidance of knowledgeable winemakers.

Residual sugars must be carefully considered by the winemaker, as this can regulate the shelf-life and stability of the product. Too much residual sugar will make the wine unattractive with a syrupy

texture. If it could be enriched with carbonic acid, we can get a cider-like drink, which could have a chance to break into the Hungarian market in the summer.

In my opinion, if we choose the right sour cherry variety for wine, it would be a variety that has characteristic acids with a high sugar content. Thus we can produce a very characteristic complex wine with little expense (e.g. added sugar).

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