

## QUALITY EVALUATION OF DENDALION WINE

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### Abstract

*The world tendencies are pronounced to attach significance to production of natural fermentation alcohol drinks. The fanciers of drinks take interest in the production of homemade drinks, and especially healthy drinks.*

*Production of original and even health friendly drinks has been recently a matter of increased interest among amateur producers and drink manufacturers in Europe as well. Dandelion wine is one of the drinks produced by use of different amounts of various ingredients and available equipment in the fermentation laboratory. The following characteristics are determined upon the main fermentation in the matured and clarified wine:*

- *sensory indicators (color, appearance and clearness; aroma and bouquets, taste and texture, and aftertaste),*
- *analytical indicators (alcoholic strength by volume, determination of sugars, total acidity, volatile acidity).*

*Dandelions wine is most distinguished by its flavor characteristics.*

Keywords: dandelion wine, sensory analysis, analytical Wine indicators, methods.

### 1. RELEVANCE OF THE TOPIC

Drink lovers all over the world are not satisfied with industrially produced beverages and cherish ambitions to enjoy self made drinks produced at home. Being members of various clubs and associations, they organize degustation, workshops and conferences. This movement is very popular in Austria, Germany, France, Italy, USA, Canada and in other countries [2]. In recent years this kind of movement has intensified in Lithuania. The National Association of Lithuania's winemaker brings together wine fans who produce fruit, berry and grape wines. Lithuania's winemakers participate in various exhibitions, fairs and festivals to present the necessary wine production accessories, introduce people to the wine making traditions and subtleties, and cooperate with other wine producers [9].

Lithuanian climate is unfavorable for growing grape varieties suitable for wine production, but is appropriate for many kinds of fruits and berries. Home-made wine produced from apples, black currants, red currants and other fruits and berries has old traditions [4]. In order to develop a range of assortment, home made wine lovers do not only use traditional raw materials and herbs, but also various plants and even vegetables. There is big interest in the

potential of wild plants and fruit characteristics to produce wines of exceptional flavor [2]. Many of these materials have a favorable impact on health, so they partially soften the negative effects of alcohol to the body [13].

Medical use of alcohol was mentioned in the ancient Sumerian and Egyptian historical records. In the Hebrew Bible, in 2100 B.C., alcohol drink was recommended to be given to sick and dying patients so that they could forget their sufferings and misfortunes [13]. In Medieval Europe, alcohol containing beverage was the main antiseptic to prevent water-borne diseases where poor sanitary conditions could cause illness.

Dandelion is one of the most common plants, all with unique properties and has long been used in folk medicine and for food [9]

### 2. AIM OF THE STUDY

Evaluation of the qualitative indicators of wines produced with dandelions.

### 3. OBJECTIVES OF THE STUDY

- to develop a production technology of dandelion wine and produce the assortment of the drink;

- to evaluate the qualitative indicators of dandelion wine, including:
  - sensory indicators: appearance, aroma, bouquets, taste, texture and aftertaste
  - analytical indicators: alcoholic strength by volume, determination of sugars, total acidity, volatile acidity.

#### 4. METHODS

Special equipment and household appliances from the fermentation laboratory were used. To evaluate the technological process and quality parameters of the produced wines, the following laboratory equipment and instruments were used: sacharometer, alcoholmeter, thermometer, pycnometer, pH meter, refractometer, distillation and titration apparatus, laboratory instruments (measuring cylinders, beakers, flasks, drips, the glass rods, pipettes) and reagents [3, 11].

The analytical indicators of the produced drinks (alcoholic strength by volume, total acidity, volatile acidity) were measured in accordance with the European Commission Regulation (EEC) N<sup>o</sup>2676/90, and determination of sugars to national LST 1969:2004 requirements [5, 6].

Sensory characteristics, such as color, clarity, aroma and taste were evaluated by the appearance, aroma and taste tests using the 20-point assessment scale [10, 7].

55 assessors took part in evaluation of sensory characteristics of dandelion wine. All assessors: students (20 persons) and lecturers (35 persons) of Food Technology Department Kaunas college were trained during three - hour sessions prior testing. Assessors were requested not to smoke or eat and drink for 1 h prior to the sensory test. The wines were served 15 min before the sensory test. Each sample contained 30 - 40 ml of wine were presented in the same order at room temperature in clear ISO tasting wine glasses.

The test was conducted in white separate booths under fluorescent lighting in 20°C air conditioned rooms [8].

Communication between assessors while scoring was prohibited.

## 5. RESULTS

### 5.1 Facilities

The Fermentation laboratory of Kaunas college is equipped in accordance with the required standards: there is water supply, drainage, minimum laboratory furniture and necessary equipment for preparation of different products.

### 5.2 Materials

The materials used for production process included:

- dandelion flowers (from which an extract was prepared and, with the addition of different ingredients, a coupage or dandelion must was prepared. Dandelions contain materials that provide a distinctive flavor to the drink and are characterized by the physiological effects [1, 2].

- The water used for dandelion wine production had perfect sensory characteristics and corresponded to the quality requirements for drinking water.

- *Saccharomyces vini* yeasts were used. At the end of fermentation yeast settle on the bottom, while precipitating the suspended particles to make the wine clear [12];

- The addition of sugar provides strength and sweetness to the drink;

In order to expand the assortment of dandelion wine and give it a distinctive taste, various additives are used including honey, apple, blackberry and cranberry concentrates, citric acid, orange and lemon [2]. Six dandelion wine coupages were produced: "Dandelion Blossoms", "Dandelion Honey", "Dandelion - Apple", "Dandelion - Lemon", "Dandelion - Cranberry", and "Dandelion - Blackberry".

### 5.3 Technological process of dandelion wine production

Dandelion wine production included the following technological operations: a) preparation of fermentation container, b) dandelion extract preparation, c) coupage

(dandelion must preparation), d) reactivation of yeast, e) coupage fermentation, f) pouring off precipitates, g) wine storing, h) wine cleaning and filtering [3].

#### 5.4 Evaluation of quality indicators

Clarified beverages are analyzed by evaluating their quality indicators. Analytical indicators are determined using equipment available in food quality laboratory and by physical and

chemical methods of analysis, (Tables 1 and 2). The sensory characteristics were assessed by applying the 20-point rating scale [10]. The following indicators were assessed - appearance (color, transparency), the aroma and bouquets, taste and texture, aftertaste, the additional (up to 2) a single point.

The evaluation results are presented in Table 3 and Figure 1, and the descriptions of sensory characteristics of dandelion wine, in Table 4.

**Table 1. Evaluation of the wine analytical indicators**

Indicators	Method	Equipments and reagents	Principle of method
alcoholic strength by volume	Areometer Regulation (EEC) N <sup>o</sup> 2676/90	distillation apparatus, alcoholometer, thermometer, measuring cylinder	The method is based on distillation of a wine sample and analysis of the obtained distillate by glass areometer.
determination of sugars	Titration LST 1969:2004	titration apparatus, flasks, pipettes, reagents, indicator	The method is based on oxidation of inverted sugar by Feling solutions
total acidity	Titration Regulation (EEC) 2676/90	titration apparatus, flasks, reagent and indicator	The method is based on titrating acids in a wine sample up to neutral reaction using indicator.
volatile acidity	Titration Regulation (EEC) 2676/90	Steam distillation apparatus, flasks, pipettes, reagents, indicator	Titration of the volatile acids separated from the wine by steam distillation and titration of the distillate using indicator .

**Table 2. Dandelion wine analytical parameters**

Quality parameters	Dandelion Blossoms	Dandelion Honey	Dandelion Apple	Dandelion Citrus	Dandelion Cranberry	Dandelion Blackberry
alcoholic strength by volume, % vol	11,6	11,3	11,3	9,6	13,2	9,1
determination of sugars, g/l	28	72	54	89	65	73
total acidity, g/dl	3,3	3,15	4,02	4,8	3,65	3,6
volatile acidity, g/l	1,1	1,1	1,12	1,14	1,16	1,2

**Table 3. Dandelion wine sensory characteristics evaluation results**

Evaluation criteria	Max	Dandelion Blossoms	Dandelion Honey	Dandelion Apple	Dandelion Citrus	Dandelion Cranberry	Dandelion Blackberry
Appearance: clarity and color	3	2,7	2,7	1,6	2,4	2, 5	2,4
Aroma / Bouquet	6	4,8	5,4	3,8	5,1	4,8	4,7
Taste / Texture	6	4,8	5,4	4,0	5,0	5,0	4,9
Aftertaste	3	2,2	2,5	1,5	2,2	2,2	2,1
Overall Impression	iki 2	1	2	0	1	1	1
Total Score	Max 20	15,5	18,0	10,9	15,8	15,6,	15,2
		Good Wine	Excellent Wine	Commer - cial Wine	Good Wine	Good Wine	Good Wine

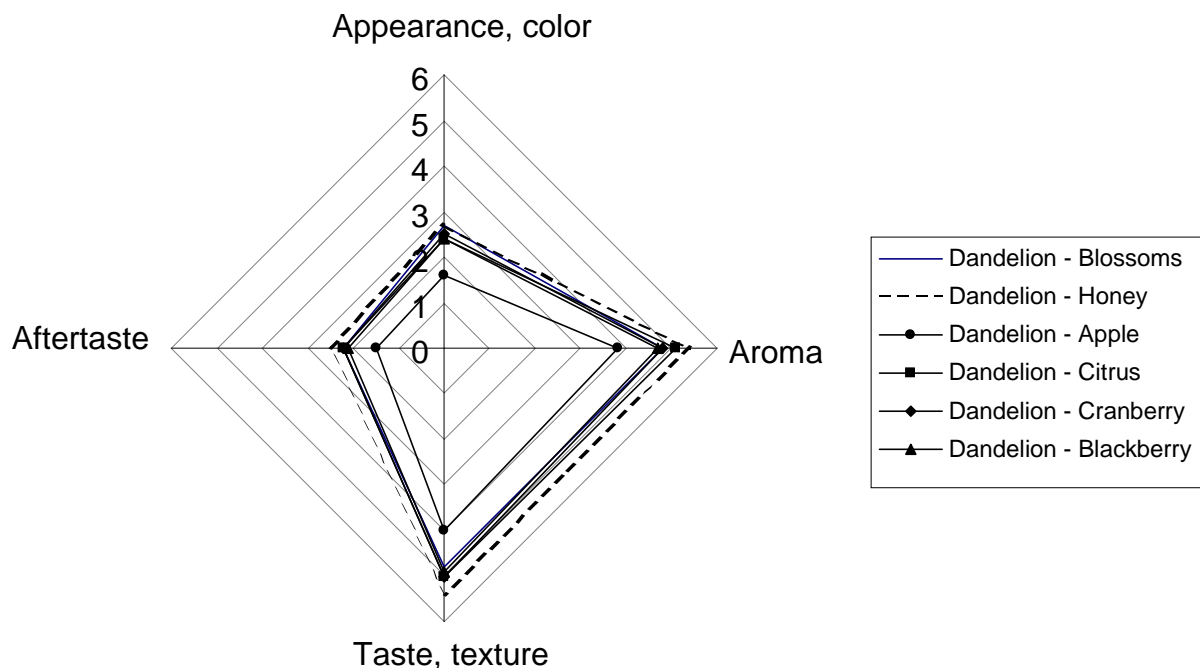


Figure 1. Profiles of Sensory Indicators of Dandelion Wine

Table 4. Sensory Indicators of Dandelion Wine

Wine variety	Sensory Indicators
Dandelion Blossoms	Color – pale yeallow, straw color, clear Taste – sour sweet with a specific dandelion tartness Aroma – slight wine, sweet
Dandelion Honey	Color – amber, clear Taste – sour sweet honey with a pleasant dandelion tartness, Aroma – honey
Dandelion Apple	Color – amber, the „bees wing“ opolescence Taste – sour-sweet with a specific dandelion tartness Aroma – slight wine
Dandelion Citrus	Color – yellowish, clear Taste – sour-sweet, with freshness and dandelion tartness Aroma – harmonious, with a citrus savor
Dandelion Cranberry	Color – pink, clear Taste – sour-sweet with a pleasant tartness Aroma – harmonious, wine, pleasant
Dandelion Blackberry	Color – bright pink, clear Taste – sour-sweet with a specific dandelion tartness Aroma – slight wine, pleasant

## 6. CONCLUSIONS

Various sources of information were reviewed to learn about dandelion wine production and wine quality assessment. After assessment of the collected information the following conclusions were drawn:

1. Six dandelion wine varieties were produced: "Dandelion - Blossoms", "Dandelion Honey," "Dandelion - Apple," "Dandelion - Citrus,"

"Dandelion - Cranberry," and "Dandelion – Blackberry;

2. The studied analytical indicators reflected a coupage of ingredients and their composition impact on metabolic processes of yeast fermentation. As a result, maximum concentrations of ethyl alcohol were determined in the "Dandelion - Cranberry," "Dandelion Blossoms", "Dandelion Honey" and "Dandelion – Apple" wine varieties. Thus, the

most significant decrease of dry extract was observed in these wines (except for the "Dandelion Honey").

3. The sensory analysis of the wines has proved the following:

a) the "Dandelion Honey" wine variety was found to have the highest number of points with regard to the evaluation of individual indicators and overall assessment of the drink, using the 20-point rating scale;

b) The descriptive tests showed that:

- The "Dandelion – Honey" wine was found to be most clear;
- A specific pale straw and rich amber color possessed the "Dandelion Blossoms" and "Dandelion – Honey" wines;
- The "Dandelion – Honey" wine possessed a delicate taste and aroma.

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