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PERCEPTION OF BIODYNAMIC WINES PERCEPCIJA BIODINAMIČKIH VINA

Abstract. *Biodynamic wines are more than just a trend in Slovenia; they represent the pinnacle of sustainable farming, where the winegrower acts as the steward of the entire ecosystem. In recent decades, biodynamic viticulture has increasingly established itself as a sustainable and holistic form of farming. Although they were once the domain of only a few enthusiasts, Slovenian biodynamic wines are now internationally recognised and indispensable in the finest restaurants, even though they still represent a niche segment of the market. In this article, we sought to determine how the actual perception of biodynamics differs from its theoretical foundations, and to assess the acceptability of and attitudes towards biodynamic wines.*

The research involved surveying 104 participants. The main finding of the research is that knowledge of biodynamics within the surveyed sample is limited. It focuses primarily on the most recognisable concepts. In general, curiosity and a positive attitude prevail, though it is not deeply rooted.

Key words: *biodynamics, biodynamic wine, Rudolf Steiner, Demeter, Slovenia*

Introduction

Biodynamic wines are more than just a trend in Slovenia; they represent the pinnacle of sustainable farming, where the winegrower acts as the keeper of the entire ecosystem. Although they were once the domain of only a few enthusiasts, Slovenian biodynamic wines are now internationally recognised and

Apstrakt. *U Sloveniji su biološko-dinamička vina više od pukog trenda; ona predstavljaju vrhunac ekološki prihvatljive poljoprivrede, u kojoj vinogradar deluje kao upravnik čitavog ekosistema. U poslednjim decenijama se biodinamičko vinogradarstvo sve više uspostavlja kao održiva i holistička forma poljoprivrede. Iako su nekada bila rezervisana za nekolicinu entuzijasta, slovenačka biodinamička vina su sada međunarodno priznata i nepogrešiva ponuda u najboljim restoranima, iako i dalje predstavljaju butični segment tržišta. U ovom radu smo nastojali da utvrdimo kako se stvarna percepcija biodinamike razlikuje od njenih teorijskih osnova i da procenimo prihvatljivost i stavove prema biodinamičkim vinima. Istraživanje je obuhvatilo anketiranje 104 učesnika. Utvrdili smo da je znanje o biodinamici među ispitanicima ograničeno. Ono se uglavnom fokusira na najpoznatije koncepte. Uopšteno, vladaju znatiželja i pozitivan stav, iako to nije duboko ukorenjeno.*

Ključne reči: *biodinamika, biodinamičko vino, Rudolf Štajner, Demeter, Slovenija*

a staple in the finest restaurants, even though they still represent a niche segment of the market. Biodynamics is not merely a method of production, but a philosophy that views the vine not as a plant in an industrial plant, but as part of a holistic ecosystem, where growth is also influenced by cosmic rhythms. Slovenia ranks among the world's best in terms of the quality of biodynamic production

relative to its population. Awareness is growing among Slovenian consumers, mainly due to the trend for “orange” (macerated white) wines, which are often produced precisely according to biodynamic principles (Sajovic, 2020). Nevertheless, the general public still sometimes confuses biodynamics with merely “local” or “organic” wine. Slovenian biodynamic wines are often better recognised abroad than in an average Slovenian shop. They form the backbone of the wine list in Michelin-starred restaurants. The strictest standard in biodynamics is the Demeter certification. In Slovenia, the number of certified winemakers is steadily growing. Slovenia is considered one of the world’s leading powers in the field of sustainable wines, which includes biodynamic, orange and natural wines.

Under the new Slovenian Wine Act (February 2026) and agricultural policy, the Slovenian government is increasingly supporting the transition to organic and biodynamic viticulture, as this enhances the added value of Slovenian wines on the global market. Although biodynamics remains a voluntary farming method, the new law introduces several key changes that directly affect biodynamic winemakers: stricter labelling requirements, double verification (the winemaker must first meet the conditions for organic certification (which is the legal basis), and then a private standard (such as Demeter)). The law now draws a clearer distinction between conventional, organic and other sustainable production methods, with biodynamics representing an extension of organic production. One of the major innovations is also digitalisation, which will enable better traceability and verifiability, as well as less bureaucracy for smaller (boutique) farms. It is also worth mentioning the introduction of mechanisms for adapting to climate change, which are crucial for biodynamic farmers (assistance in the event of natural disasters – extreme weather conditions – and the promotion of the use of resistant varieties). The new law also opens up new market channels for wines with lower alcohol content (including alcohol-free), which is a

growing trend (Zakon o vinu, 2026).

The aim of this paper is to determine the level of knowledge and understanding of biodynamic wines and general habits related to wine.

The objectives of the paper are to determine how the actual perception of biodynamics differs from its theoretical foundations and to assess the acceptability of biodynamic wines among respondents.

The tasks of this paper are a theoretical examination of the basic principles of biodynamics, its historical development and significance in viticulture, an analysis of knowledge and understanding of the fundamental differences between alternative wine production methods, and an analysis of attitudes towards key claims regarding biodynamics.

Literature review

Biodynamics

The biodynamic method, based on Rudolf Steiner’s lectures from 1924, has been regaining significance in recent decades. It is a method developed a hundred years ago. The revival of the biodynamic method reflects a growing need for environmental awareness.

A key role in this is played by a new generation of farmers and winegrowers who are committed to respecting nature and seeking sustainable solutions. Many younger producers are experimenting with organic and biodynamic approaches, as they wish to form their own opinion on the best way to farm. Despite the growing interest in this type of farming, biodynamics is often misunderstood or superficially interpreted (Castellini et al., 2017). Consequently, biodynamics is frequently treated merely as a marketing label, whilst the high level of commitment and rigour required by this method of viticulture remains overlooked. In the context of a modern, urbanised society, wine could well represent one of the last points of direct connection between humans and the earth (Lepetit de la Bigne, 2013)



Biodynamics in viticulture

In recent decades, viticulture has increasingly been defined by production methods, not just by geographical origin or wine style. Alongside conventional methods, alternative forms of farming are gaining ground, including natural, organic and biodynamic wines (Cravero, 2019; Maykish et al., 2021). Whilst the term “natural wine” is not legally defined in many places, the terms “organic” and “biodynamic” are included in official certification schemes. By 2015, approximately six percent of the world’s vineyards had switched to organic or biodynamic production, with the highest numbers in France, Italy, Spain, Germany and Austria. Although biodynamics is expanding, it is also accompanied by doubts regarding its scientific basis, as it involves special preparations and takes cosmic rhythms into account. Its advocates emphasise that it offers solutions to modern challenges: depleted soils, reduced plant vitality, and a loss of wine’s distinctiveness. Biodynamics represents a sustainable and innovative approach, according to which wine is not merely a product, but a symbol of a responsible attitude towards nature, the land and wine culture (Waldin, 2016).

The biodynamic method in viticulture emphasises the importance of maintaining healthy and living soil. It is not merely a matter of adding nutrients, but of introducing vital forces into the soil. The process involves several stages: from appropriate soil cultivation and green manuring to the composting of plant residues using biodynamic preparations and the application of composted manure. Preparations play a key role, as they are intended to connect earthly and cosmic influences and restore balance in the soil (Florin, 2021).

Winegrowers decide to switch to biodynamic viticulture for various reasons. They seek greater personal involvement, improved wine quality, preservation of the terroir and a reduction in the use of oenological additives. They often observe better soil structure, greater plant vitality and a reduced need for pesticides.

Some, however, also see biodynamics as an opportunity for better economic returns (Florin, 2021).

An important part of the biodynamic approach is working in harmony with celestial rhythms. Maria Thun linked the growth of different parts of plants to the Moon’s journey through the zodiacal constellations and the four elements. Thus, roots are said to grow in connection with the earth signs – leaves with the water signs, flowers with the air signs, and fruits and seeds with the fire signs. Biodynamic sowing calendars are based on this (Waldin, 2016).

In the biodynamic understanding, celestial rhythms, such as the phases of the Moon, the Moon’s transit through the zodiacal constellations, and the movement of the planets, are an expression of broader cosmic influences. These rhythms enable agricultural tasks to be timed in accordance with forces believed to support plant growth, resilience and fertility (Steiner, 2012; Waldin, 2016).

The rapid expansion of biodynamics in viticulture has led to the establishment of several associations, such as Demeter, Biodyvin and Renaissance des Appellations. Demeter sets international standards and carries out certification. Biodyvin brings together winegrowers who emphasise the quality of wines and the expression of terroir. Renaissance des Appellations focuses on promoting the authenticity of biodynamic wines, however, it does not carry out certification. Due to the lack of clear regulations at European Union level, certificates play a key role in ensuring the reliability of biodynamic practices for consumers (Lepetit de la Bigne, 2013; Delmas et al., 2010).

Biodynamic viticulture in Slovenia still accounts for a relatively small share of the sector, but interest in it has been gradually increasing over the last two decades. Some Slovenian winemakers have obtained Demeter certification, which confirms compliance with international standards for biodynamic farming (Demeter International, 2024). Most of these producers operate on smaller, family-run estates, where the emphasis is on working sustainably with nature, soil

vitality and expressing the character of the terroir. Currently, the fundamental principles of biodynamics are being implemented on the following biodynamic farms: Guerila, Bogovič, Šuman, Vina Altum, Vinarstvo Batič, Reia, Urbajs, Santei vina, Ajster, Zorjan, Keltis, Burja, and Leben (Demeter, 2025; Bogovič Fizovič, 2026).

Methodology

Design of the questionnaire

For the purposes of the research, a quantitative online survey method was used, conducted anonymously on a sample of 104 participants of various ages, as this proved to be the most appropriate choice for obtaining the necessary information. The questionnaire consists of 8 questions, divided into three sections.

The first set of questions concerned the respondents' socio-demographic details (gender, age) and their wine-drinking habits (how they purchase wine and how often they drink it). The second set of questions concerned self-assessed knowledge of various terms, such as organic/ecological wine, biodynamic wine and natural/eco-friendly wine, as well as knowledge of the characteristics of each of these alternative approaches to wine production. The third part of the questionnaire was designed to gather data on respondents' general knowledge of biodynamic wines and contained eleven statements to which respondents replied by rating their agreement on a Likert scale from 1 to 5 (1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, 5 – strongly agree). We then examined the ways in which they obtain information about biodynamic wines.

Results and discussion

Analysis of the socio-demographic characteristics and consumer habits of respondents

The online survey, which forms the basis for this analysis, was completed by 104 adults, of

whom 55 were women (52.9%) and 49 were men (47.1%). Young adults in the 18–35 age group predominated (44.2%), a slightly smaller proportion (35.6%) of respondents belong in the 36–50 age group. The smallest proportion (20.2%) were those aged 51 and over.

We were interested in the frequency of wine consumption and found that it is relatively common. Based on the results, we divided them into two groups: **occasional** (once a month, several times a month, rarely, and never) and **regular** (every day, 3 to 5 times a week, and once a week) wine drinkers.

The largest group of respondents consists of occasional drinkers (51.9%). Within this group, 22.1% drink wine several times a month, 16.3% rarely, and 13.5% once a month. The second significant group consists of regular drinkers (42.3%) who drink wine at least once a week. Among them, 23.1% drink wine once a week, 15.4% 3 to 5 times a week, and 3.8% every day. Those who never drink wine represent the smallest group, which account for 5.8% of respondents. This distribution shows that wine is an integral part of the lifestyle for the majority of respondents, but only a few consume it on a daily basis.

We also identified the methods used to purchase wine (Table 1). The most common shopping channel is the supermarket or shop. This is by far the most important source, as a total of 53.8% of respondents “always” or “often” buy wine there. Specialised channels, such as wine shops and direct purchases from winemakers, are also important, but less common. In wine shops, 27.9% of respondents buy wine “occasionally”, whilst 37.5% never visit them. When buying directly from winemakers, 23.0% of respondents buy wine there “occasionally”, and 26.9% “rarely”.

This indicates that direct contact with the winemaker is valued, however, is not the primary channel for regular purchases. Online wine sales are the least common among respondents, as 72.1% stated that they never buy wine in this way. The same applies to the “other” category, where 77.9% of respondents answered “never”. The remaining respondents explained under this category that they obtain



wine through non-commercial channels, such as their own production, gifts, and wine from family and friends. Although they represent a minority, these informal channels constitute a significant part of the overall picture of wine acquisition.

Table 1. Analysis of wine purchasing habits

Where they buy wine	Number of responses and percentage (%)				
	Always	Often	Occasionally	Rarely	Never
supermarket/shop	29 (27.88%)	27 (25.96%)	11 (10.58%)	19 (18.27%)	18 (17.31%)
wine shop	3 (2.88%)	14 (13.46%)	29 (27.88%)	19 (18.27%)	39 (37.50%)
at the winery	6 (5.77%)	14 (13.46%)	24 (23.08%)	28 (26.92%)	32 (30.77%)
online sales	2 (1.92%)	4 (3.85%)	5 (4.81%)	18 (17.31%)	75 (72.12%)
other	6 (5.77%)	7 (6.73%)	5 (4.81%)	5 (4.81%)	81 (77.88%)

Source: author's research

Analysis of self-assessment of knowledge of terms related to alternative approaches to wine production, as well as understanding of individual approaches

The second set of questions concerned self-assessment of knowledge of various terms,

such as organic/ecological wine, biodynamic wine and natural/eco-friendly wine. When asked how well they knew the terms listed, respondents could choose one of three possible answers: I know it well, I know it to some extent, and I do not know it (Table 2).

Table 2. Respondents' self-assessment of their knowledge of alternative wine terms

Knowledge of terms	very familiar with it		somewhat familiar		unfamiliar	
	number of responses	percentage (%)	number of responses	percentage (%)	number of responses	percentage
Organic/ecological	37	35.58	47	45.19	20	19.23
Biodynamic wine	31	29.81	31	29.81	42	40.38
Natural/semi-natural	22	21.15	43	41.35	39	37.50

Source: author's research

From the responses, we found that respondents were most familiar with the term “organic or ecological wine”. Around 35.6% of respondents stated that they were very familiar with the term, 45.2% were somewhat familiar with it, whilst 19.2% of respondents described the term as unfamiliar.

The terms “biodynamic” and “natural wine” are significantly less well known. 40.4% of respondents are unfamiliar with biodynamic wine. The results are similar for natural wine – 37.5% of respondents are unfamiliar with this term. 29.8% of respondents are very familiar with biodynamic wine, and the same applies to those who are “somewhat familiar”. 21.2% are very familiar with natural/eco-friendly wine, whilst 41.3% are somewhat familiar.

The term “organic”, which is more widely recognised by the public and legally regulated, has demonstrated greater recognition. In contrast, the terms “biodynamic” and “natural/eco-friendly” remain unknown to a large

proportion of respondents. These terms are, in fact, more niche and less formally defined. This situation indicates an opportunity for further consumer education.

Within the same set of questions, we subsequently presented respondents with several key terms associated with different methods of wine production (conventional, biodynamic, organic and natural). The following key concepts were available: “Rudolf Steiner, Austrian philosopher”, “Use of preparations to enrich the soil (e.g. horn manure, horn silica)”, “Considering the influence of the Moon and planets”, “The farm functions as a living organism”, “Preservation of biodiversity in the vineyard”, “Use of selected yeasts in fermentation”, “Prohibition of the use of chemical agents”, and “Minimal intervention in the cellar and in the wine (e.g. no filtration)”. We wanted to determine whether respondents would recognise/understand them in connection with the

Table 3. Analysis of awareness of the key principles of alternative approaches to wine production

Key concepts	Percentage of associations (%)			
	Conventional	Biodynamic	Organic	Natural
Rudolf Steiner, Austrian philosopher	16.35	72.12	13.46	23.08
Use of preparations (horn manure...)	22.12	62.50	29.81	25.00
Considering the influence of the Moon and planets	9.62	81.73	17.31	38.46
The farm functions as a living organism	12.50	69.23	52.88	47.12
Preserving biodiversity in the vineyard	9.62	64.42	70.19	60.58
Use of selected yeasts in fermentation	54.81	34.62	25.96	20.19
Prohibition on the use of chemical agents	11.54	54.81	65.38	61.54
Minimal intervention in the cellar and in the wine	14.42	63.46	45.19	65.38

Source: author's research

aforementioned alternative approaches to wine production (Table 3). We found that respondents demonstrated a high level of knowledge regarding the unique, philosophical foundations of biodynamic cultivation. By far the largest proportion, 81.73% of respondents, correctly associated this method with the key concept: "Considering the influence of the Moon and the planets". Rudolf Steiner, the founder of biodynamics, was correctly associated with biodynamic wine production by 72.12% of respondents. A high level of recognition was also achieved by the principles of biodynamics "the farm functions as a living organism" (69.23% of respondents), and "the use of special biodynamic preparations, such as horn manure" (62.50% of respondents). These data clearly show that respondents who are familiar with biodynamics understand its most specific elements. We also found that, when it comes to more general ecological principles, respondents correctly recognise that these are common to various approaches. A high proportion of respondents associated the statements "Prohibition of the use of chemical agents" and "Preservation of biodiversity in the vineyard" with all three alternative methods, as they all received between 54% and 70% of the associations.

This confirms our observation that respondents understand that care for the environment is the common denominator of all three philosophies. The key concept that distinguishes natural wines from others is "Minimal intervention in the cellar and in the wine". Respondents correctly identified this and most frequently associated it with natural wines (65.38%). Interestingly, almost the same proportion (63.46%) also associated this concept with biodynamic wines, indicating a perception that the two approaches to winemaking practices are very similar.

However, the question regarding the use of selected yeasts revealed a potentially significant knowledge gap. Although most of these approaches encourage spontaneous fermentation with wild yeasts, between 20% and 35% of respondents mistakenly believed that the use of selected yeasts is a characteristic

of these methods. This indicates a lack of knowledge regarding specific oenological procedures.

Analysis of general attitudes/interest in biodynamic wines

The third part of the questionnaire was designed to gather data on respondents' general attitude towards biodynamic wines; it contained eleven statements to which respondents replied to by rating their agreement on a Likert scale from 1 to 5 (1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, 5 – strongly agree) (Table 4).

Based on the results in Table 4 and the analysis of individual statements, we identified a mix of interest, respect and uncertainty regarding biodynamic wines. The highest level of agreement (3.8) was for the statement that the production of biodynamic wines requires a great deal of knowledge and skill, followed by the statement that the price of biodynamic wines is usually high (3.53) and that this type of production has a positive effect on the environment (3.47). We also observed a high level of agreement regarding opinions on taste and quality, with respondents believing (3.44) that these wines are of high quality and that they taste very good (3.38). The lowest ratings were given to the statements regarding familiarity with biodynamic wines (2.57) and regarding the familiarity with the taste of biodynamic wines (2.93).

In this set of questions, we examined the ways in which respondents obtain information about biodynamic wines (Table 5).

The analysis revealed a clear hierarchy of sources, with personal contacts and direct experience playing a key role. We found that the most important source of information is personal acquaintances, such as friends, acquaintances and family members. For this source, 28 respondents (26.9%) stated that they obtain a lot of information, and a further 36 respondents (34.6%) "some information", meaning that more than 60% of respondents

Table 4. Respondents' knowledge of and attitudes towards biodynamic wines

Statements	1	2	3	4	5	Average rating (M)
I am familiar with the taste of biodynamic wines.	23	19	15	36	11	2.93
I am very familiar with biodynamic wines.	26	29	21	20	8	2.57
I am very interested in biodynamic wines.	15	10	32	32	15	3.21
The production of biodynamic wines is based more on philosophy and spirituality than on a scientific approach.	13	18	40	24	9	2.98
Producing biodynamic wines requires a great deal of work and expertise.	5	4	24	45	26	3.80
Biodynamic wines have a positive effect on health.	8	6	53	25	12	3.26
The taste of biodynamic wines is very good.	9	5	40	37	13	3.38
Biodynamic wines are of high quality.	6	4	47	32	15	3.44
The price of biodynamic wines is usually high.	5	6	35	45	13	3.53
Only wines bearing the Demeter label can be biodynamic.	13	7	61	12	11	3.01
The production of biodynamic wines has a positive impact on the environment.	6	4	48	27	19	3.47

Source: author's research

**Table 5.** *Ways of obtaining information about biodynamic wines*

Sources of information	A lot of information		Some information		Little information		I do not use this source	
	number of responses	%	number of responses	%	number of responses	%	number of responses	%
Winemakers / tastings	33	31.73	17	16.35	13	12.50	41	39.42
Specialist wine shops	12	11.54	23	22.12	20	19.23	49	47.12
Winemakers' websites	12	11.54	27	25.96	11	10.58	54	51.92
Social media	8	7.69	26	25.00	27	25.96	43	41.35
Print media	7	6.73	14	13.46	22	21.15	61	58.65
Educational process	10	9.62	11	10.58	15	14.42	68	65.38
Friends, acquaintances, family	28	26.92	36	34.62	17	16.35	23	22.12
Wine fairs / events	15	14.42	29	27.88	17	16.35	43	41.35
Restaurants / bars	12	11.54	34	32.69	27	25.96	31	29.81

Source: author's research

use this channel for information. Direct contact with winemakers at tastings and visits to wine fairs also ranked highly. 33 respondents (31.7%) obtain a lot of information directly from winemakers, whilst 15 respondents (14.4%) do so at fairs. Online sources proved to be a secondary source with limited reach. Winemakers' websites provide a lot of information for only 12 respondents (11.5%), whilst 54 respondents (51.9%) do not use this channel. The same applies to social media, where 8 respondents (7.7%) obtain a lot of information, but 43 respondents (41.3%) do not use it. Among the least-used sources are print media and the educational process. The former is not used at all by 61 respondents (58.7%), and the latter by as many as 68 respondents

(65.4%), confirming that these traditional and formal channels do not have a significant influence. The result for restaurants and bars is interesting: whilst 12 respondents (11.5%) cite them as a major source of information, the proportion of respondents who do not use this source is relatively low compared to others. Indeed, only 31 respondents (29.8%) do not use this source, which indicates the important role of hospitality professionals in providing information.

Overall, the results show that direct contact (people, winemakers, events) remains the most reliable source of information on biodynamic wines, whilst digital, print and formal channels have a considerably smaller reach.

Conclusion

In this paper, we investigated the perception, knowledge and attitude towards biodynamic wines among Slovenian respondents. We sought to examine how respondents understand this complex method of production. The respondents were mostly regular or occasional wine drinkers.

The empirical research yielded several key findings that paint a complex picture of the perception of biodynamics. The main finding is a marked discrepancy between favourability and actual knowledge. On the one hand, respondents show a high level of interest and respect for the demanding nature of the production process and believe in its positive impact on the environment; on the other hand, their knowledge of the fundamental principles is limited. There appears to be a lack of understanding of the philosophical background and uncertainty regarding the Demeter certification. More than half of the respondents admit that they do not know the wines well.

The analysis also revealed a surprisingly good recognition of certain practices. Among these are the consideration of the moon's influence and the connection to Rudolf Steiner. This indicates the existence of a certain cultural knowledge. This knowledge, however, stops at details, such as the mistaken belief regarding the use of selected yeasts.

The key sources of information are personal contacts and direct experience. Digital and print media play a significantly smaller role. The survey findings point to a market that is curious and receptive, yet under-informed. The survey shows that respondents value the effort and care for the environment. The main sources of information are personal recommendations and direct experiences. These include tastings and events. This confirms that genuine contact with the consumer is crucial for biodynamics. This is particularly important for smaller, lesser-

known winemakers, as they can build their brand recognition through these channels.

There is a disconnect between the recognition of practices and a lack of understanding of the theory. This suggests that knowledge of biodynamics spreads more through practical examples than through educational processes. Therefore, winemakers' stories, their work in the vineyard and the final product are the most powerful tools for educating the market.

When interpreting the results, the limitations of the study must be considered. A sample of 104 participants is not representative of the entire Slovenian population, so the findings cannot be generalised. The online survey increased the likelihood of self-selection and thus potential sample bias. It is likely that individuals with an above-average interest in wine participated in the survey. Furthermore, the quantitative method of closed-ended questions does not allow for a deeper understanding of attitudes. The findings and limitations of this study open possibilities for further work. To obtain a more comprehensive picture of the situation in Slovenia, it would be useful to expand the quantitative part of the research to a larger sample. Qualitative research would also be beneficial for understanding deeper motivations, for example in the form of in-depth interviews. A comparative analysis of perceptions between organic, biodynamic and natural wines would also be interesting.

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