

Synonyms and homonyms of 'Malvasía' cultivars (*Vitis vinifera* L.) existing in Spain

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Abstract

"Malvasía" is a common name for different grape cultivars that have long been grown in Spain. In many cases, these cultivars are noted as being aromatic, sweet, and similar to Muscat in flavour. However, not all grapes that share this name exhibit these characteristics. This study compares the Malvasía cultivars in the Spanish Denominations of Origin with those grape cultivars grown in the grapevine collection of El Encín (Alcalá de Henares, Spain) using morphological, isoenzymatic, and microsatellite analysis as well as a large bibliographic search of the studied cultivars. Despite their Malvasía denomination, some cultivars have been identified as synonyms of 'Macabeo', 'Alarije', 'Doña Blanca', 'Chasselas', or 'Planta Nova', all included on the official Spanish list of commercial grape cultivars. 'Malvasía de Sitges' and 'Malvasía de Lanzarote' have the characteristic flavour of Malvasía grapes and no synonyms were found among the cultivars grown in Spain, whereas 'Malvasía Rosada' resulted from a colour mutation in 'Malvasía de Sitges'.

Additional key words: ampelography, aromatic grapes, grapevine, microsatellites.

Resumen

Sinonimias y homonimias de los cultivares de 'Malvasía' (*Vitis vinifera* L.) existentes en España

'Malvasía' es un nombre usado para designar las diferentes variedades de vid que desde antiguo se cultivan en España. En muchos casos, estas variedades son aromáticas, dulces y con sabor amoscotelado, pero en algunas ocasiones no supone más que un nombre que no asegura dichas características. Este estudio compara las variedades denominadas como 'Malvasía' en las Denominaciones de Origen españolas con otras variedades cultivadas en la Colección de Variedades de Vid de El Encín, empleando análisis morfológicos, isoenzimáticos y moleculares (microsatélites), así como una amplia revisión bibliográfica sobre las variedades estudiadas. A pesar de su denominación como 'Malvasía', algunas variedades han sido identificadas como 'Macabeo', 'Alarije', 'Doña Blanca', 'Chasselas' o 'Planta Nova' (nombres incluidos en el Registro de Variedades Comerciales de Vid). Los cultivares 'Malvasía de Sitges' y 'Malvasía de Lanzarote' tienen el sabor característico de 'Malvasía', y no se encontraron sinonimias entre las cultivadas en España. El cultivar 'Malvasía Rosada' resultó ser una mutación de color de 'Malvasía de Sitges'.

Palabras clave adicionales: ampelografía, variedades aromáticas, microsatélites, vid.

Introduction

Many hypotheses link the culture of *Vitis vinifera* L. Malvasía vines with the ancestral viticulture of Spain,

but there is scant reliable biographical information supporting this. The first description of a cultivar called 'Malvasía' was noted by Herrera in 1513: *There are other grapes called 'Malvasía', with dense but not long*

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bunches, round, not too small berries; it requires thick, poor, and non humid soils because it has a tender grape and rots; the best wine come from poor soils.

It is not a recent mistake to call other grape cultivars by the name ‘Malvasía’, as Abela y Sáenz de Andino reviewed in his work (1885): *The ampelography of Rovasenda mentions seventy six names of different Malvasia, with white, green, pink, violet, and black berries. The Italian ampelographer, writing about the great diversity of cultivars called Malvasia, says that he does not pretend to set up the identity or differences among the cultivars known with this name. He added that the name of Malvasía must be assigned to aromatic grapes with the special Muscat flavour, slightly bitter, although grapes without this special characteristic have been included in this cultivar.*

Taking this into account, it is easy to understand how naming a cultivar Malvasía was enough to attribute to it characteristics of aromatic berries with a slightly bitter Muscat flavour. Nevertheless, many cultivars with this name do not possess such characteristics.

Before discussing the arrival of Malvasia grapes in Spain, it is necessary to historically review the different people living in the Iberian Peninsula since ancient times, especially those who migrated from the eastern Mediterranean and may have contributed to the expansion of Malvasia cultivation among the Mediterranean countries from Monemvasia (Malvasia in Greek), a region located in the south of Greece.

It is necessary to go back to the 5th century BCE when the Phocaeians founded Emporion (known now as Ampurias); and Rhode (known now as Rosas) were the only Greek cities in Spain. This establishment of new cities encouraged trade between both Mediterranean shores. During the 5th and 4th centuries BCE, these cities developed a flourishing economy that attracted Punic and Greek Mediterranean merchants. Emporion, which means “market,” became the political, economic, and financial hub of Greek commerce on the Iberian Peninsula. It is possible that the Greeks extended their commercial networks and influence from Emporion to the eastern and southern coasts of the Iberian Peninsula, reaching Tartessos and into Andalusia. Thus, the first hypothesis is that Greek grape cultivars were brought to Spain during that time, although there is no written evidence.

The quality of wine from Malvasia cultivars was well known in ancient times even though the first reference of wine from Monemvasia dates from 1214. As early as 1278, the Venetians became interested in exporting “vinum de Malvasia,” and they began to grow vines in

Creta (Candia), which was ruled by the city-state of Venice from 1204 to 1669. The consumption and export of wine from both zones to Eastern Europe increased so much that the planting of this cultivar was extended to other Aegean Sea zones, including Chio Island (Galet, 2000). The control of the trade by merchants from Italy, Catalonia, and Provence along the Asiatic and African Mediterranean coasts during the 12th and 13th centuries contributed to the expansion of grape cultivars from the eastern Mediterranean (Greece, Chio Island, Creta) to Italy and Spain. This trade could have been a second way of spreading Malvasia to the Iberian Peninsula.

The introduction of Malvasia to the Iberian Peninsula may also have its roots in religion, rather than commerce. Zerolo *et al.* (1897) wrote about Malvasia: *From Malvasia (Monemvasia), city of Morea, near Argos; a type of very sweet and fragrant grape produced by a variety taken from Chio Island by the Catalonians during the times of the crusades. The variety is grown in different zones of Spain, especially in Villanueva de Sitges.*

However, the oldest reference to the Malvasia wine from Sitges was written by Favá (2001). Therein, a reference to Gual Camarena (1976) is made that tells of a Greek wine or Malvasia entering Alcira in 1318. Furthermore, a new press to make Greek wine was also described in Sitges in the middle of the 15th century. There is also evidence that Malvasia grapes had been grown in Sitges since the 18th century (Comenge, 1942).

Malvasia could have arrived at the Canary Islands from the nearby Island of Madeira; the first colonists from the Iberian Peninsula had only religious interests (Macías, 2002). Pereira (1989) stated that the introduction of Malvasia in Madeira is shown in the stories of the Venetian Cadamosto in 1455, specifying that he was ordered to take vines from Candia, which was under the protection of Enrique the navigator. At the end of the 15th century, the colonisation of Madeira was finished, and the Canary Islands offered better growing conditions for the colonists’ vineyards (Macías, 2002). Many people from Madeira bought land in the Tenerife, La Palma, and Gran Canaria islands for growing their grape cultivars.

According to the 2007 Spanish Inventory, 6269 ha of ‘Malvasía’ are currently grown in Spain (Ministerio de Medio Ambiente y Medio Rural y Marino, 2008), and their distributions by region are as follows: Castile and León 2271 ha, Canary Islands 1970 ha, Comunidad Valenciana 1312 ha, Castile-La Mancha 396 ha, Aragón 186 ha, La Rioja 41 ha, and Catalonia 23 ha. A decrease in ‘Malvasía’ cultivation has occurred since 1979, when 18,779 ha were grown in Spain.

The aim of this work is to identify the grape cultivars included in the Spanish Denominations of Origin (DO) that contains the local name 'Malvasía' by means of their comparison with the cultivars grown in Spain and belonging to the grapevine collection of El Encín (Madrid). Denominations of Origin are part of a Protected Geographical Status system in the European Union guarding the integrity of European wines by carefully legislating the labeling. So different cultivar names should be used in the labeling if it is proved that they are really different cultivars.

Material and methods

Studies were carried out on the wine cultivars listed in Table 1. All of the cultivars studied are catalogued as 'Malvasía', or include the term in their names, in differ-

ent Spanish DO and were obtained from two sources: the collection of grape cultivars at El Encín, which is held by IMIDRA at Alcalá de Henares (Madrid, Spain), and material collected *in situ* by the authors (advised by local technicians) from registered DO plantations.

One variety per DO was sampled with the exception of Cataluña (called 'Malvasía' or 'Subirant Parent' and 'Malvasía de Sitges' or 'Malvasía Grossa'). It was not possible to collect Malvasia material from DO Jumilla.

The identification and comparison analyses were carried out using morphological, biochemical, and molecular methods. The morphological characterization was done using 39 descriptors taken from the *OIV Descriptor List for Grapevine Varieties and Vitis Species* (Dettweiler-Münch, 1999) (Table 2). The majority of the descriptors refer to organ morphology, but some morphometrical and phenological measurements, such as

Table 1. Spanish denominations of origin that include Malvasía in the cultivar name

Denomination of origin	Cultivar	Comments
Abona	'Malvasía'	new plantations
Abona	'Malvasía Rosada'	almost nonexistent, no new plantations
Bierzo	'Malvasía'	traditional
Calatayud	'Malvasía'	
Cataluña	'Malvasía' or 'Subirant Parent'	
Cataluña	'Malvasía de Sitges' or 'Malvasía Grossa'	traditional
El Hierro	'Malvasía'	almost nonexistent, no new plantations
El Hierro	'Malvasía Rosada'	almost nonexistent, no new plantations
Gran Canaria	'Malvasía'	new plantations
Gran Canaria	'Malvasía Rosada'	almost nonexistent, no new plantations
Jumilla	'Malvasía'	none plantation found
La Gomera	'Malvasía'	almost non existent, no new plantations
La Gomera	'Malvasía Rosada'	almost nonexistent, no new plantations
La Palma	'Malvasía'	traditional
La Palma	'Malvasía Rosada'	almost nonexistent, no new plantations
Lanzarote	'Malvasía'	
Navarra	'Malvasía'	
Rioja	'Malvasía Riojana	traditional
Tacoronte-Acentejo	'Malvasía '	traditional
Tacoronte-Acentejo	'Malvasía Rosada'	almost nonexistent, no new plantations
Tarragona	'Malvasía' or 'Subirant Parent'	
Toro	'Malvasía'	traditional
Valencia	'Malvasía'	
Valle de Güímar	'Malvasía'	almost nonexistent, no new plantations
Valle de Güímar	'Malvasía Rosada'	almost nonexistent, no new plantations
Valle de la Orotava	'Malvasía'	almost nonexistent, no new plantations
Valle de la Orotava	'Malvasía Rosada'	almost nonexistent, no new plantations
Ycoden Daute Isora	'Malvasía'	almost nonexistent, no new plantations
Ycoden Daute Isora	'Malvasía Rosada'	almost nonexistent, no new plantations
Yecla	'Malvasía'	

Table 2. Patterns in the cultivars studied according to the morphological results

Ampelographic descriptors	Pattern							
	A	B	C	D	E	F	G	H
002 Distribution of anthocyanin coloration on the shoot tip	2	3	3	2	3	1	1	2
003 Intensity of anthocyanin coloration on the shoot tip	7	7	7	6	5	1	3	7
004 Density of prostrate hairs on the shoot tip	5	3	3	3	7	1	9	1
007 Color of the dorsal side of internodes	1	2	2	2	1	2	1	1
008 Color of the ventral side of internodes	1	2	2	2	1	2	1	1
015 Anthocyanin coloration on the bud scales	1	4	4	5	1	1	1	1
051 Young leaf: color of upper side of blade	3	4	4	4	3	3	1	4
053 Young leaf: density of prostrate hairs between main veins on lower side	5	1	1	3	7	1		
		9	1					
067 Mature leaf: shape of blade	2	3	3	3	3	3	3	2
068 Mature leaf: number of lobes	3	4	4	3	4	3	3	2
070 Mature leaf: area of anthocyanin coloration of main veins on upper side	1	1	1	1	1	1		
		1	1					
072 Mature leaf: goffering of blade	1	1	1	2	4	2	2	2
074 Mature leaf: pro-file in cross section	5	1	1	2	5	5	5	2
075 Mature leaf: blis-tering of upper side	3	2	2	4	4	3	3	3
076 Mature leaf: shape of teeth	3	4	4	3	2	3	3	2
079 Mature leaf: degree of opening / overlapping of petiole sinus	2	2	2	3	2	2	2	2
080 Mature leaf: shape of base of petiole sinus	1	2	2	3	2	2	2	3
081-1 Mature leaf: teeth in the petiole sinus	2	1	1	1	1	1	1	1
081-2 Mature leaf: petiole sinus base limited by vein	1	1	1	1	1	1	1	1
082 Mature leaf: degree of opening / overlapping of upper lateral sinuses	4	4	4	3	4	4	4	1
083-1 Mature leaf: shape of the base of upper lateral sinuses	2	2	2	2	2	2	2	3
083-2 Mature leaf: teeth in the upper lateral sinuses	1	2	2	1	1	1	2	1
084 Mature leaf: density of prostrate hairs between main veins on lower side	2	1	1	1	6	1	5	1
087 Mature leaf: density of erect hairs on main veins on lower side	2	6	6	3	3	5	1	1
202 Bunch: length	6	5	5	3	4	4	5	7
203 Bunch: width	5	3	3	3	4	3	4	6
204 Bunch: density	7	5	5	5	7	4	7	8
206 Bunch: length of peduncle	3	2	2	1	1	1	1	1
208 Bunch: shape	2	2	2	1	3	2	2	1
209 Bunch: number of wings	3	1	1	2	3	2	2	2
220 Berry: length	5	5	5	5	5	3	5	7
221 Berry: width	5	5	5	5	5	3	5	5
223 Berry: shape	2	3	3	2	3	2	2	6
225 Berry: color of skin	1	1	2	1	1	1	1	1
230 Berry: intensity of flesh anthocyanin coloration	1	1	1	1	1	1	1	1
236 Berry: particular flavour	1	5	5	1	1	5	1	1
241 Berry: formation of seeds	3	3	3	3	3	3	3	3
244 Berry: transversal ridges on dorsal side of seeds	1	1	1	1	1	1	1	1
503 Berry: single berry weight	3	2	2	3	3	2	2	4

the length of the bunch, berry weight, or the time of bud burst, were also described.

Biochemical characterization was done according to the method recommended by Rodríguez-Torres (2001). The isozymes extracted from the wood were applied to polyacrylamide gels, followed by electrophoresis. The gels were dyed in order to reveal the following isoenzy-

matic systems: acid phosphatase (ACP, E.C.3.1.3.2), catechol oxidase (CO, E.C.1.10.3.1), glutamate oxaloacetate transaminase (GOT, E.C.2.6.1.1), and superoxide dismutase (SOD, E.C.1.15.1.1).

The DNA analysis of grape leaves was carried out as described by Ibáñez *et al.* (2003). Thirteen different microsatellites were amplified using PCR: VVS2,

VVS5, VVS29, VVMD5, VVMD7, VVMD27, VVMD28, *ssrVrZAG29*, *ssrVrZAG62*, *ssrVrZAG67*, *ssrVrZAG79*, *ssrVrZAG83*, and *ssrVrZAG112*. The PCR products were separated by capillary electrophoresis and analysed using a fluorescence-based detection system (ABI PRISM 310 Genetic Analyzer).

Results and discussion

The ampelographic results clearly pointed out that the 31 samples of Malvasia studied correspond to eight different cultivars, which are identified as A, B, C, D, E, F, G, and H in Table 2. The only morphological difference between patterns B and C was the skin colour of the berry (descriptor 225), which was green-yellow (note 1) in pattern B and rose (note 2) in pattern C. This

difference may be associated with a retrotransposon in the *VvmybA1* gene promoter (Lijavetzky *et al.*, 2006), particularly because both cultivars are grown mixed in old traditional vineyards.

Microsatellite analysis (Table 3) showed only seven different genotypes because the colour mutation was not detected by the molecular technique. The isoenzymatic results also show seven patterns that match the molecular data (Figure 1).

Table 4 shows the morphology, isoenzyme, and microsatellite patterns corresponding to the cultivars studied. From these results, it can be stated that eight different cultivars are grown in Spain under the local name of 'Malvasia'. All samples matched with the following cultivars existing in the collection at El Encín that are also included in the Spanish Registry of Commercial Grape Varieties with different names and synonyms (BOE, 2002):

Table 3. Microsatellite genotypes obtained in the studied cultivars

Locus	Genotype						
	A	B	C	D	E	F	G
<i>ssrVrZAG67</i>	129	151	123	123	151	137	123
	153	151	151	137	151	151	147
VVMD27	182	176	182	178	176	186	176
	191	180	186	178	180	191	191
VVMD5	231	222	224	219	222	231	222
	233	222	233	231	233	233	224
<i>ssrVrZAG29</i>	109	109	109	109	109	109	109
	109	109	113	109	109	109	109
<i>ssrVrZAG62</i>	185	187	193	185	187	187	187
	187	201	203	203	187	187	187
<i>ssrVrZAG112</i>	227	227	238	227	227	227	232
	232	240	240	238	227	232	232
VVS2	140	140	130	134	142	130	124
	142	142	140	149	142	142	147
<i>ssrVrZAG83</i>	192	195	192	190	195	192	190
	195	195	201	192	195	195	192
VVMD28	232	234	216	226	234	234	234
	256	256	266	246	262	256	242
VVS5	96	83	107	120	83	105	116
	148	120	- ^a	120	116	148	- ^a
VVS29	168	168	177	168	168	168	168
	168	177	179	177	168	168	177
VVMD7	238	241	238	238	241	238	238
	238	247	245	247	241	238	238
<i>ssrVrZAG79</i>	251	241	248	245	241	241	245
	255	245	256	245	249	245	255

^a The existence of null alleles in VVS5 (Thomas *et al.*, 1994) does not allow to differentiate between homozygous and heterozygous with a null allele.

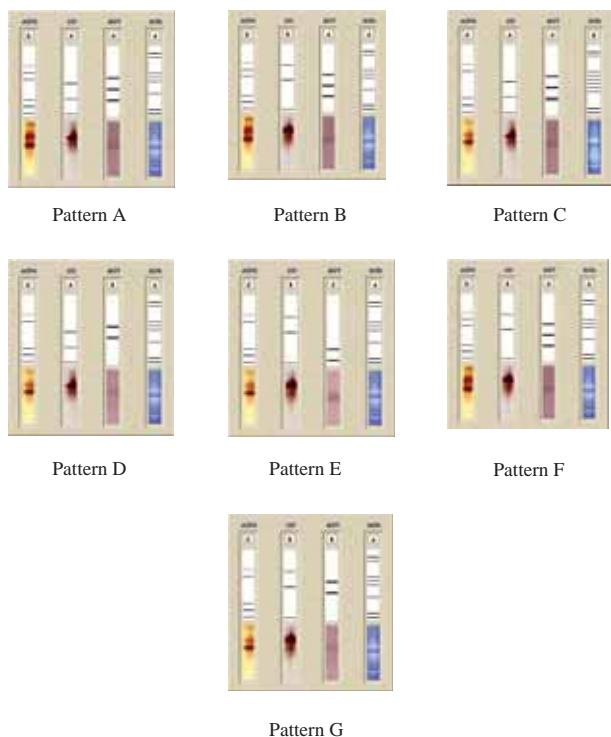


Figure 1. Isoenzymatic patterns found in the studied cultivars.

1. 'Alarije' (Aris, 'Malvasía Riojana', Rojal, 'Subirat Parent')

This cultivar appears under the name of 'Malvasía' in several Spanish DOs, including Calatayud and Navarra ('Malvasía'), Cataluña and Tarragona ('Malvasía' and 'Subirat Parent') and Rioja ('Malvasía Riojana'). This cultivar is known in other Spanish DOs by the name 'Alarije' (DO Ribera del Guadiana), 'Torrontés' (DO Vinos de Madrid) or 'Aris' (DO Mondéjar).

This cultivar is neither sweet nor aromatic and with no special flavour, so it does not seem to be the ancient 'Malvasía' cited by Herrera (1513) and Abela y Sáinz de Andino (1885).

Some old references confirm these results. For example, Marcilla (1954) wrote the following about this cultivar: *'Malvasía de Rioja' is a different cultivar from other Malvasia grown in other Spanish regions.* García de los Salmenes (1914) wrote: *'Malvasía de Rioja' is not similar to other ones from Zamora or Madrid.* Clemente (1807) described the cultivar as *a vine with white wood, middle and yellow leaves, white and gold grapes with slightly darker spots.* The first description of 'Alarije' is attributed to Herrera (1513): *'Alarije' is a cultivar with tall vines, the berries are eaten by the bees, and the wine from this cultivar is not very good.*

2. and 3. 'Malvasía de Sitges' and 'Malvasía Rosada'

'Malvasía Rosada' is, in all probability, a colour mutation of 'Malvasía de Sitges' and, thus, also corresponds to an authentic Malvasia (aromatic grapes with the special Muscat flavour, slightly bitter).

These cultivars are grown within the DOs Abona, El Hierro, Gran Canaria, La Gomera, La Palma, Tacoronte-Acentejo, Valle de Güímar, Valle de la Orotava, and Ycoden Daute Isora (Canary Islands) under the names of 'Malvasía' and/or 'Malvasía Rosada', and in the DO Cataluña as 'Malvasía de Sitges' or 'Malvasía Grossa'.

'Malvasía de Sitges' is very different from the other cultivars studied here, but it was found to be very similar to 'Malvasia delle Lipari', 'Malvasia di Sardegna', 'Greco di Gerace' (Italy), 'Malvasia dubrovacka' (Croatia), and 'Malvasía de Banyalbufar' (Mallorca, Spain), as concluded by Crespan *et al.* (2006). This cultivar is also like 'Malvasia Candida' grown in Madeira (Rodríguez-Torres *et al.*, 2006). This cultivar has shoots that are semi-drooping, the mature leaves are small with marked lobes, the bunch is also small and dense, and the berries have a nice flavour. Thus, it corresponds to an authentic Malvasia and may be the most common cultivar described by ampelographers using the name 'Malvasía'.

Herrera (1513) wrote about this Malvasia as being *dense and having no large bunches, spherical berries, and it requires sandy and not humid soils because the berries are sensitive to diseases.* Later, in 1885, Abela y Sáinz de Andino described a Malvasia that could be 'Malvasía de Sitges': *very sweet, with short, erect, white-reddish, and hard wood; large to medium sized and lobed leaves with palm shaped, middle sized, spherical, and white berries with a sweet flavour.*

4. 'Chasselas'

This is the cultivar listed in the DO Bierzo under the name of 'Malvasía'. Other synonyms found in the grapevine collection at El Encín are 'Albillo' (from Salamanca), 'Temprano Blanco' (Valladolid), and 'Temprano' (Valladolid). These berries do not have the special, sweet, and aromatic character of 'Malvasía' cited by Herrera (1513) or Abela y Sáinz de Andino (1885).

In the province of León, García de los Salmenes (1914) described this cultivar in the following manner: *It seems to me to be a true 'Chasselas' with wings in the clusters, spherical and golden berries with thin skin ('Chasselas Doré'), with low resistance to diseases and low yields. There is early defoliation, and green leaves on both sides. It has thin woody shoots with long internodes, round and cottoned buds.*

Table 4. Identification of the different 'Malvasia' studied, classified according to the results of the morphology, DNA and isoenzymatic analysis and their comparison with true-to-type cultivars from the collection at El Encín

Denomination of Origin	Local name(s)	Morphology pattern	Molecular pattern	Isoenzyme pattern	Cultivar name (Spanish Registry)
Calatayud	'Malvasía'	A	A	A	'Alarije'
Navarra	'Malvasía'	A	A	A	'Alarije'
Cataluña	'Malvasía'/'Subirat Parent'	A	A	A	'Alarije'
Tarragona	'Malvasía'/'Subirat Parent'	A	A	A	'Alarije'
Rioja	'Malvasía Riojana'	A	A	A	'Alarije'
Abona	'Malvasía'	B	B	B	'Malvasía de Sitges'
El Hierro	'Malvasía'	B	B	B	'Malvasía de Sitges'
La Gomera	'Malvasía'	B	B	B	'Malvasía de Sitges'
La Palma	'Malvasía'	B	B	B	'Malvasía de Sitges'
Tacoronte-Acentejo	'Malvasía'	B	B	B	'Malvasía de Sitges'
Valle de la Orotava	'Malvasía'	B	B	B	'Malvasía de Sitges'
Ycoden Daute Isora	'Malvasía'	B	B	B	'Malvasía de Sitges'
Cataluña	'Malvasía de Sitges' or 'Malvasía Grossa'	B	B	B	'Malvasía de Sitges'
Abona	'Malvasía Rosada'	C	B	B	'Malvasía Rosada'
El Hierro	'Malvasía Rosada'	C	B	B	'Malvasía Rosada'
Gran Canaria	'Malvasía Rosada'	C	B	B	'Malvasía Rosada'
La Gomera	'Malvasía Rosada'	C	B	B	'Malvasía Rosada'
La Palma	'Malvasía Rosada'	C	B	B	'Malvasía Rosada'
Tacoronte-Acentejo	'Malvasía Rosada'	C	B	B	'Malvasía Rosada'
Valle de Güímar	'Malvasía Rosada'	C	B	B	'Malvasía Rosada'
Valle de la Orotava	'Malvasía Rosada'	C	B	B	'Malvasía Rosada'
Ycoden Daute Isora	'Malvasía Rosada'	C	B	B	'Malvasía Rosada'
Bierzo	'Malvasía'	D	C	C	'Chasselas'
Toro	'Malvasía'	E	D	D	'Doña Blanca'
Gran Canaria	'Malvasía'	F	E	E	'Malvasía de Lanzarote'
La Palma	'Malvasía'	F	E	E	'Malvasía de Lanzarote'
Lanzarote	'Malvasía'	F	E	E	'Malvasía de Lanzarote'
Tacoronte-Acentejo	'Malvasía'	F	E	E	'Malvasía de Lanzarote'
Valle de Güímar	'Malvasía'	F	E	E	'Malvasía de Lanzarote'
Valencia	'Malvasía'	G	F	F	'Macabeo'
Yecla	'Malvasía'	H	G	G	'Planta Nova'

This description confirms that 'Chasselas' is not the same cultivar as that of the ancient Malvasia.

5. 'Doña Blanca' ('Cigüente', 'Dona Branca')

This cultivar is found in the DO Toro under the name 'Malvasía'. Other synonyms found in the grapevine collection at El Encín are 'Blanca Extra' (from Asturias), 'Valenciana' (León), 'Blanco del País' (Soria), 'Cigüente' (Extremadura), 'Dona Blanca' (Orense), and 'Moza Fresca' (Orense).

These berries lack any particular flavour, so they are not aromatic like Malvasia is considered to be.

Herrera (1513) wrote about this cultivar stating: *It is a kind of grape similar to 'Albillas', but it requires*

warmer and sandier soil because they are more sensitive to diseases with a thinner skin than 'Albillas'. The wine from this cultivar is flavoured and clear, and it is long conserved.

García de los Salmenes (1914) described this accession at length, and it could be this synonym: *We have written about 'Malvasía Blanca' relating it with 'Moza Fresca', 'Dona Blanca', or 'Uva de Valencia' and 'Valdeorrana'.* Thus, for more than a century, they have been considered synonymous.

6. 'Malvasía de Lanzarote'

This cultivar is not included in the *Spanish Registry of Commercial Varieties*. However, we have found it in

several Canary DO with the name of ‘Malvasía’ in Lanzarote, Gran Canaria, and Valle de Güímar, and with other names in La Palma (‘Malvasía Portuguesa’ and/or ‘Sebastián García’) and Tacoronte-Acentejo (‘Málaga’). Another synonym found in the grapevine collection of El Encín is ‘Perejil’ (from Lanzarote Island).

This cultivar has small leaves with five lobes, and bunches that are small but not dense. In addition, the grape has the characteristic flavour of Malvasía, so it is another authentic Malvasía and not a misnamed cultivar. José Esteve Martí (Martínez, 1998) cited ‘Malvasía Canaria’ as a variety with white or light golden berries and as being completely different from ‘Malvasía de Sitges’.

This cultivar is more resistant to infections by viruses, pests, and diseases than ‘Malvasía de Sitges’. Furthermore, the microsatellite results of the present study agree with Zerolo *et al.* (2006), who suggested that ‘Malvasía de Lanzarote’ could be the progeny of a cross between two cultivars cultivated in the Canary Islands: ‘Malvasía de Sitges’ (also known as cv. ‘Malvasía de la Palma’) and ‘Marmajuelo’. For this reason, ‘Malvasía de Sitges’ is considered to be the oldest Malvasía on the Canary Islands, and it is cultivated mainly in areas dedicated to export.

7. ‘Macabeo’ (Viura)

This cultivar is found under the name of ‘Malvasía’ in DO Valencia, and it is not known for having much flavour. Castellet (1886) describes ‘Macabeo’: *Its bunches have high levels of sugar and the wines obtained from it are fine and golden yellow in colour. Although the vines show a medium fertility, farmers do not spread the cultivar because they prefer to continue growing cultivars from their ancestors.*

8. ‘Planta Nova’ (‘Tardana’, ‘Tortozón’)

This is the cultivar listed in the DO Yecla under the name ‘Malvasía’. Other synonyms found in the grapevine collection at El Encín are ‘Tardana’ and ‘Tortozón’ (from Valencia). The wines from this cultivar are not aromatic. Valcárcel (1791) wrote about ‘Planta Tardana’: *It produces berries that are round with a hard skin. They are not good for making wines because the ripening time is very late.*

Chirivella *et al.* (1995) describe ‘Planta Nova’: *This variety has semi-dropping shoots, brownish woody shoots, white or lightly rose buds, medium-large and wedge-shaped leaves with five lobes, and an absence of prostrated hairs on both sides of the blade; the bunches*

are large but dense, the berries are spherical, and the ripening time very late.

These descriptions suggest that this cultivar is not an authentic Malvasía.

Conclusions

The name Malvasía corresponds to aromatic grape cultivars with a slightly bitter, Muscat-like aroma, but many cultivars lacking this characteristic have claimed the name. This study concludes that, of all the Malvasías included in Spanish Denominations of Origin, there are only eight different cultivars: ‘Alarije’, ‘Malvasía de Sitges’, ‘Malvasía Rosada’, ‘Chasselas’, ‘Doña Blanca’, ‘Malvasía de Lanzarote’, ‘Macabeo’, and ‘Planta Nova’; of which, only three can be considered true Malvasía: ‘Malvasía de Sitges’, ‘Malvasía de Lanzarote’ and ‘Malvasía Rosada’. Eleven of the 19 DOs include at least one of the true Malvasía, and all but one (Cataluña) are located in the Canary Islands.

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References

- ABELA Y SÁINZ DE ANDINO E.J., 1885. El libro del viticultor. Ed. Manuel G. Hernández. Madrid. 326 pp. [In Spanish].
- BOE, 2002. Orden APA/748/2002 por la que se dispone la inscripción de variedades y portainjertos de vid en la lista de variedades comerciales de plantas. Boletín Oficial del Estado N° 84, 13351-13353. Madrid. [In Spanish].
- CASTELLET B., 1886. Viticultura y Enología. Trabajo sobre el cultivo de la vid y los vinos de España. Ed. R. Ortega, Valencia. 414 pp. [In Spanish].
- CHIRIVELLA C., MÉNDEZ-SÁNCHEZ J.V., HABA M., 1995. Ecología vitícola varietal. Aptitudes enológicas. Ed. Generalitat Valenciana, Valencia. 245 pp. [In Spanish].
- CLEMENTE S.R., 1807. Ensayo sobre las variedades de viñas que vegetan en Andalucía. Ed. Poulet, Madrid. 420 pp. [In Spanish].

- COMENGE M., 1942. La vid y los vinos españoles. Ed. Marsiega, Madrid. 235 pp. [In Spanish].
- CRESPAN M., CABELLO F., GIANNETTO S., IBÁÑEZ J., KAROGLAN KONTIK J., MALETIC E., PEJIC I., RODRÍGUEZ-TORRES I., ANTONACCI D., 2006. Malvasia delle Lipari, Malvasia di Sardegna, Greco di Gerace, Malvasia di Sitges and Malvasia Dubrovacka – synonyms of an old and famous grape cultivar. *Vitis* 45, 69-73.
- DETTWEILER-MÜNCH E., 1999. Primary descriptor list for grapevine cultivars and species (*Vitis* L.). Institut für Rebenzüchtung Geilweilerhof, Siebekdingen, Germany, 101 pp.
- FAVÁ X., 2001. Diccionario de los nombres de cepas y racimos. Ed. Instituto de Estudios Catalanes, Barcelona. 456 pp. [In Spanish].
- GALET P., 2000. Dictionnaire encyclopédique des cépages. Ed. Hachette, Paris. 1024 pp. [In French].
- GARCÍA DE LOS SALMONES N., 1914. Memoria general de las sesiones del Congreso y ponencias presentadas. Congreso Nacional de Viticultura. Ed. J. Ezquerro, Pamplona. pp. 391-533. [In Spanish].
- GUAL CAMARENA M., 1976. Vocabulario del comercio medieval. Ed. El Albir, Barcelona. 531 pp. [In Spanish].
- HERRERA A., 1513. Agricultura general. Ed. Imprenta Real, Madrid. 1941 pp. [In Spanish].
- IBÁÑEZ J., DE ANDRÉS M.T., MOLINO A., BORREGO J., 2003. Genetic study of key Spanish grapevine varieties using microsatellite analysis. *Am J Enol Viticult* 54, 22-30.
- LIJAVETZKY D., RUIZ-GARCIA L., CABEZAS J.A., DE ANDRÉS M.T., BRAVO G., IBÁÑEZ A., CARRENO J., CABELLO F., IBÁÑEZ J., MARTINEZ-ZAPATER J.M., 2006. Molecular genetics of berry colour variation in table grape. *Mol Genet Genomics* 276(5), 427-435. doi: 10.1007/s00438-006-0149-1
- MACÍAS A.M., 2002. Colonización y viticultura. El caso de Canarias, 1350-1550. *Douro-Estudos & Documentos* VIII (13-3), 285-296. [In Spanish].
- MARCILLA J., 1954. Tratado práctico de viticultura y enología españolas. Tomo I Viticultura. Ed. SAETA, Madrid. 375 pp. [In Spanish].
- MARTÍNEZ P.M., 1998. La vid y el vino en Tenerife en la primera mitad del siglo XVI. Ed. Instituto de Estudios Canarios, La Laguna, Tenerife. 952 pp. [In Spanish].
- MINISTERIO DE MEDIO AMBIENTE Y MEDIO RURAL Y MARINO, 2008. Inventario del potencial vitícola 2007. Work document for internal use, sent to the European Commission. [In Spanish].
- PEREIRA E.C.N., 1989. Ilhas de Zargo, 2 ed., Ed. Câmara Municipal do Funchal. Funchal. [In Portuguese].
- RODRÍGUEZ-TORRES I., 2001. Caracterización de variedades de vid por métodos ampelográficos y bioquímicos. Resolución de homonimias y sinonimias. Tesis Doctoral. Universidad Politécnica de Madrid. 349 pp. [In Spanish].
- RODRÍGUEZ-TORRES I., GONZÁLEZ-GUILLÉN C., CABELLO F., BORREGO J., MUÑOZ G., DE ANDRÉS M.T., ZEROLO J., IBÁÑEZ J., 2006. Comparison between Malvasias from Madeira and Spain. *Rivista Italiana di Viticultura e di Enologia* 59(2-3), 57-62.
- THOMAS M.R., CAIN P., SCOUT N.S., 1994. DNA typing of grapevines: A universal methodology and database for describing cultivars and evaluating genetic relatedness. *Plant Mol Biol* 25, 939-349.
- VALCÁRCEL J.A., 1791. Agricultura general. Tomo VIII. Ed. Joseph Estevan y Cervera, Valencia. pp. 290-295. [In Spanish].
- ZEROLO E., DEL TORO M., ISAZA E., 1897. Diccionario de lengua castellana. Garnier Hermanos, Libreros Editores, Madrid. 2000 pp. [In Spanish].
- ZEROLO J., CABELLO F., ESPINO A., BORREGO J., IBÁÑEZ J., RODRÍGUEZ-TORRES I., MUÑOZ-ORGANERO G., RUBIO C., HERNÁNDEZ M., 2006. Variedades de vid de cultivo tradicional en Canarias. Ed. Instituto Canario de Calidad Agroalimentaria, Santa Cruz de Tenerife. 222 pp. [In Spanish].