

El proyecto ha sido convenientemente difundido entre el público en general.

Artículos científicos:

Boso, S; Gago, P.; Santiago, J.L.; Rodríguez-Canas E.; Martínez, M.C. (2018). New monovarietal grape seed oils derived from white grape bagasse generated on an industrial scale at a winemaking plant. LWT- Food Science and Technology (Aceptada, en prensa)

Available on line: <https://doi.org/10.1016/j.lwt.2018.02.055>

<https://www.sciencedirect.com/science/article/pii/S0023643818301944>

Comunicaciones a congresos

Santiago, J.L.; Boso, S.; Gago, P.; Rodríguez, E., Martínez M.C. (2017). Organoleptic comparison of the wines of three white grape varieties with the oils obtained from their seeds. Póster. 40th World Congress of Vine and Wine, 29/05/2017- 02/06/2017, Sofía (Bulgaria).

ORGANOLEPTIC COMPARISON OF THE WINES OF THREE WHITE GRAPE VARIETIES WITH THE OILS OBTAINED FROM THEIR SEEDS

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PRODUCTION OF OIL FROM GRAPEVINE SEEDS OF WHITE VARIETIES

Albariño, Caiño Blanco and Loureiro (*Vitis vinifera* L.) are three white wine grapevine varieties (*Vitis vinifera* L.) native to the northwest of Spain. The elaboration of white wines from grapes of these varieties produces a great quantity of by-products, including bagasse. This bagasse, due to the particular process of elaboration of white wines, contains great quantity of seeds that preserve their natural aromas. The present work compares the organoleptic characteristics of the wine of each of the above varieties with the oils produced by the cold pressing of the seeds in their bagasse.



RESULTS OF THE TASTING

	WINE	GRAPE VINE SEEDS OIL
ALBARIÑO 	Aroma <p>Pineapple Pear Golden Apple Lime Anisette</p> <p>Intense aromas of tropical fruit. Delicate and fresh aromas of white ripe fruits. Subtle hints of lime and anisette background</p> Taste <p>In the mouth it is at the same time fresh and powerful. Wine well balanced with a wide retronasal sensation of white and tropical fruit</p>	Aroma <p>Pine Resin Citric Rubber Oregano Chamomile</p> <p>Pine resin and a background of citric aromas. Light aroma to rubber and dashes of oregano and chamomile. Good aromatic intensity</p> Taste <p>Pine resin and a background of citric aromas. Light aroma to rubber and dashes of oregano and chamomile. Good aromatic intensity</p>
CAIÑO BLANCO 	Aroma <p>Pineapple Urtic Mineral and earthy Aromatic Herbs Melon</p> <p>Tropical aromas. Notable minerality, with subtle earthy hints. Faint reminiscences of aromatic herbs and ripe melon</p> Taste <p>In the mouth it turns out to be full of flavors, with very good structure and body. High acidity that contributes to freshness</p>	Aroma <p>Stale fat Bacon and ham going bad Cheese Yoghurt Eucalyptus</p> <p>Bad aromas: stale fat and bacon or cured jam gone bad. Under those primary aromas lactic smells arise with a background of eucalyptus</p> Taste <p>Dense in the mouth but shows the stale fault. Retronasal stale and with hints of pitch</p>
LOUREIRO 	Aroma <p>Citrus fruits Peach Pineapple Orange Blossom/rose Mint and Eucalyptus</p> <p>Intense and agreeable citric aromas, ripe peach and pineapple. Reminiscences of orange blossom, rose, mint and eucalyptus</p> Taste <p>In the mouth is light and agreeable. Fresh but with character, showing a good balance. Mild acidity</p>	Aroma <p>Floral Citric Golden apple Salty/seaweed Earthy hints</p> <p>Correct aromatic intensity but not remarkable</p> Taste <p>In the mouth is silky very dense and tasteful. It fills the mouth in with fruity sensations. It does not present the typical bitter or spicy sensations of the olive oils. The retronasal is especially citric</p>

Póster. 40th World Congress of Vine and Wine, 29/05/ 2017. (Santiago, J.L.; Boso, S.; Gago, P.; Rodríguez, E., Martínez M.)



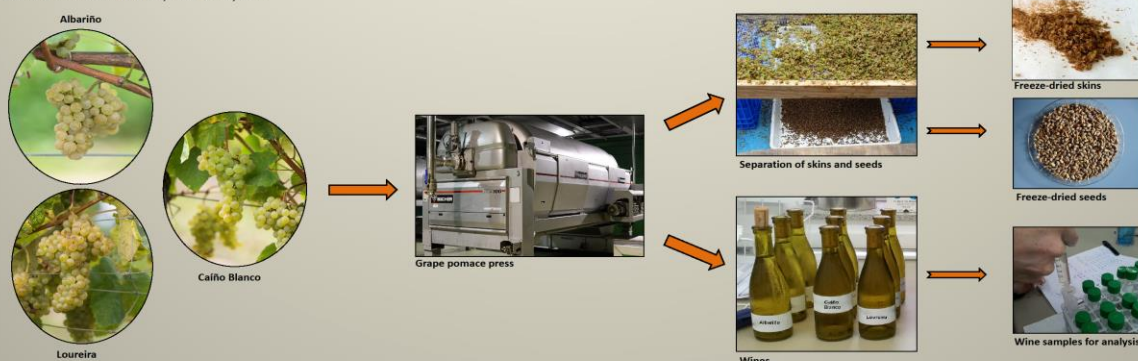
CONCENTRATIONS OF COMPOUNDS BENEFICIAL TO HEALTH IN THE SKINS, SEEDS AND WINES, MADE FROM THREE WHITE WINE GRAPE (*Vitis vinifera* L.) VARIETIES

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Vitis vinifera has been reported to possess many compounds with strong antioxidant, antitumoral, and immunostimulatory activity. In recent years, the presence of these compounds has been sought in the skins, seeds, and wines made from, different grape varieties. However, most of the work performed has involved red grapes.

The present work examines the protein, fibre, lipid, sugar, vitamin E, fatty acid and polyphenol contents of the skins, seeds, and wines made from, three white grape varieties (Albariño, Loureira and Caíño Blanco) over two years.



	CHEMICAL PROFILE - SKINS					
	ALBARIÑO		CAÍÑO BLANCO		LOUREIRO	
	2013	2014	2013	2014	2013	2014
Protein ^a (%)	7.34	9.28	6.33	6.31	9.29	6.30
Fibre ^b (%)	6.38	8.45	7.42	10.13	6.23	6.55
Lipid ^c (%)	9.93	9.96	9.66	1.50	6.65	3.11
Sugar ^d (%)	37.27	36.71	28.04	32.46	46.45	43.73
Acidity (g tartaric ac. % ^e)	17.68	18.05	16.35	16.18	16.00	16.27
Vitamin E (mg/kg ^f)	183.10	214.51	177.36	143.36	161.34	173.15

CHEMICAL PROFILE

Skins: Caíño Blanco grapes showed the highest fibre content and greatest acidity, those of the Albariño grapes showed the highest vitamin E concentrations, and those of the Loureira variety had the highest sugar content.

Seeds: The seeds of the Loureira variety had the highest lipid and sugar contents.

Wines: No significant differences were seen in terms of the fibre, lipid and vitamin E contents of the three wines. However, the Caíño Blanco wine showed the highest acidity values, and the Albariño had the highest sugar content

^a Kjeldahl method; ^b Gravimetry; ^c Liquid extraction and gravimetry; ^d Ultraviolet-Visible (UV-Vis) spectrophotometry; ^e Volumetry; ^f High performance liquid chromatography with photodiode array detection (HPLC-DAD)

	FATTY ACIDS					
	ALBARIÑO		CAÍÑO BLANCO		LOUREIRO	
	2013	2014	2013	2014	2013	2014
Hexanoic acid (C: 6)	0.18	0.35	0.55	0.17	0.62	0.11
Heptanoic acid (C: 7)	0.07	0.02	0.02	0.03	0.03	0.02
Octanoic acid (C: 8)	0.12	0.14	0.13	0.10	0.12	0.11
Nonanoic acid (C: 9)	0.08	0.09	0.09	0.08	0.09	0.08
Decanoic acid (C: 10)	0.05	0.05	0.05	0.05	0.05	0.05
Undecanoic acid (C: 11)	0.03	0.03	0.03	0.03	0.03	0.03
Dodecanoic acid (C: 12)	0.02	0.02	0.02	0.02	0.02	0.02
Tridecanoic acid (C: 13)	0.01	0.01	0.01	0.01	0.01	0.01
Tetradecanoic acid (C: 14)	0.01	0.01	0.01	0.01	0.01	0.01
Pentadecanoic acid (C: 15)	0.01	0.01	0.01	0.01	0.01	0.01
Hexadecanoic acid (C: 16)	0.01	0.01	0.01	0.01	0.01	0.01
Heptadecanoic acid (C: 17)	0.01	0.01	0.01	0.01	0.01	0.01
Octadecanoic acid (C: 18)	0.01	0.01	0.01	0.01	0.01	0.01
Stearic acid (C: 18)	0.01	0.01	0.01	0.01	0.01	0.01
Arachidic acid (C: 20)	0.01	0.01	0.01	0.01	0.01	0.01

43 different fatty acids were detected in skins and seeds, of which six were found in relatively high concentrations: oleic, linoleic, palmitic, stearic and arachidic acid. The first four of these compounds appeared in the highest concentrations in all three varieties. The skins contained larger quantities of long-chain fatty acids than the seeds

Skins: The Caíño Blanco had the highest proportion of linoleic acid (35.1-45% of the total). The proportions of the remaining fatty acids differed from year to year.

Seeds: In general, linoleic acid was the most abundant fatty acid in the seeds, reaching 72.5% of the total fatty acid content in Albariño and 71.1% of the total in Caíño Blanco.

Wines: No fatty acids were detected in any wine.

Acknowledgements

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POLYPHENOL CONTENT

POLYPHENOL COMPOUNDS ^a	SKINS (µg/g ^b freeze-dried)						SEEDS (µg/g ^b freeze-dried)						WINES (ng/ml ^b freeze-dried)					
	ALBARIÑO		CAÍÑO BLANCO		LOUREIRO		ALBARIÑO		CAÍÑO BLANCO		LOUREIRO		ALBARIÑO		CAÍÑO BLANCO		LOUREIRO	
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Anthocyanins	52.11	237.75	72.50	321.57	75.73	360.54	2.80	8.27	4.25	31.72	3.95	26.94	0.00	0.00	0.00	0.00	0.00	0.00
Flavonols	160.25	1284.13	795.51	1139.44	768.60	1284.08	137.95	112.94	89.55	136.47	129.29	110.14	252.20	76.08	46.20	86.52	42.14	25.57
Phenolic acids-hydroxycinnamic acids	81.77	777.50	222.84	1334.27	111.89	625.62	497.34	221.24	418.76	196.27	387.04	136.53	4866.33	2895.64	4872.51	30863.18	23884.21	12664.58
Aromatic hydrocarbons	4.71	76.88	7.44	54.55	6.99	77.96	5.89	1.67	4.35	2.57	4.34	3.86	79.83	78.20	1389.71	1359.30	644.76	791.21
Flavonols	286.09	1222.88	264.16	492.75	307.33	482.19	268.65	483.60	278.26	520.69	307.60	3186.52	2264.84	3377.24	1778.00	2945.00	826.59	826.59
Catechin	137.90	280.22	182.35	260.85	187.56	227.51	238.62	1463.29	1973.65	960.51	1973.95	2349.24	2996.24	1543.85	2394.79	1243.50	1375.52	829.11
Epicatechin	51.48	98.19	48.98	46.98	37.28	73.51	1334.14	311.61	393.53	446.49	1188.93	652.20	1378.96	854.80	393.11	1361.14	301.08	318.79
Procyanidin B1	22.80	184.14	56.89	87.22	18.71	36.62	889.85	126.51	462.84	184.70	270.22	1244.93	1892.21	101.98	437.97	284.23	128.48	26.21
Procyanidin B2	12.97	98.32	17.83	38.46	18.63	35.37	898.18	407.42	375.49	408.48	719.80	444.53	1184.61	8.09	110.89	42.89	31.58	16.55
Procyanidin B3	7.86	14.24	16.23	16.44	13.13	25.47	556.16	564.49	864.57	553.03	706.62	845.47	100.70	25.13	171.77	50.05	45.47	14.04
Flavonolignans	3.27	27.78	5.51	34.75	5.54	31.71	3.92	39.63	2.65	1.81	3.09	0.55	26.55	4.92	32.80	4.30	7.17	4.22
Epigallocatechin	6.60	6.08	6.97	6.09	5.11	6.09	6.07	4.97	6.98	2.98	6.99	6.25	35.20	8.99	12.77	3.97	35.12	5.11
TOTAL POLYPHENOLS	943.81	2894.04	1332.47	3395.35	1245.36	2079.80	5878.00	3886.12	5347.77	2932.39	5558.48	9484.85	53147.21	31008.00	55142.66	34897.29	24484.52	14427.31

Among the skins and seeds, those of the Caíño Blanco and Loureira grapes had the highest anthocyanin concentrations.

Skins: Caíño Blanco had the highest overall concentrations of phenolic acids and total polyphenols, while those of Loureira and Albariño had the highest concentrations of flavonols and aromatic hydrocarbons, especially in the second year. Small concentrations of proanthocyanidins were found in all varieties

Seeds: Albariño had the highest concentrations of phenolic acids, flavonols and total polyphenols. For all varieties, the highest proanthocyanidin concentrations were found in the seeds.

Wines: No anthocyanins were detected in any wine. The wines from Albariño and Caíño Blanco grapes showed the highest concentrations of total polyphenols. Catechin, epicatechin and procyanidin B1 were the most common proanthocyanidins in all wines. The decrease in flavanol concentration was more pronounced in Loureira.

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Secreto Industrial

Título: “Procedimiento para la elaboración de vinos blancos enriquecidos en proantocianidinas”

INVENTORES CSIC: Martínez, M. C., Boso, S., Gago, P., Santiago, J.L.

INVENTORES TERRAS GAUDA: Rodríguez-Canas, E.

FECHA SOLICITUD: 17 octubre 2016

FECHA COMUNICACIÓN A CSIC: 17 octubre 2016

Acta de Requerimiento de depósito ANTE NOTARIO: N°1617, firmada el 3 abril de 2017 ante el notario de Madrid Pedro Antonio Mateos Salgado

ENTIDAD TITULAR: Bodegas Terras Gauda S.A. - CSIC

PAIS: España

En relación a la presentación del Secreto Industrial fruto de los avances en la investigación del proyecto BIOFUNCIOGAL, hemos hecho una rueda de prensa en Bodegas Terras Gauda en la que los representantes de la dirección de la empresa, junto a la Dra. Carmen Martínez de la Misión Biológica de Galicia (CSIC) han informado a la prensa de este importante hito para la vitivinicultura española. Además, hemos concedido entrevistas en Radio y Televisión para hacer llegar estos avances al público en general.



RELACIÓN DE PUBLICACIONES Y ENTREVISTAS

➤ **Medios nacionales:**

1. EXPANSIÓN – NACIONAL (08/09/2017)
2. EXPANSIÓN – NACIONAL (23/09/2017)
3. EL MUNDO - METROPOLI
4. EL MUNDO DIGITAL - METROPOLI
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10. EXPANSIÓN – GALICIA (08/09/2017)
11. EXPANSIÓN – GALICIA (28/09/2017)

➤ **Medios autonómicos:**

12. CANARIAS 7
13. LA VOZ DE GALICIA – SUPLEMENTO HUM
(01/10/2017)
14. LA VOZ DE GALICIA – SUPLEMENTO HUM
(01/10/2017)
15. LA VOZ DE GALICIA – VIGO
16. FARO DE VIGO (29/08/2017)
17. FARO DE VIGO (08/09/2017)
18. FARO DE VIGO – GALICIA EN VINOS
19. EL CORREO GALLEGO

20. DIARIO DE PONTEVEDRA
21. DIARIO DE PONTEVEDRA – CONTRAPORTADA
(08/09/2017)
22. DIARIO DE PONTEVEDRA - CONTRAPORTADA
(11/09/2017)
23. EL PROGRESO (08/09/2017)
24. EL PROGRESO – CONTRAPORTADA (08/09/2017)
25. EL PROGRESO – CONTRAPORTADA (11/09/2017)
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- 43. TECNOVINO
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- 46. EL CORREO DEL VINO DIARIO
- 47. BODEGA CANARIA

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- 57. LA ALACENA ROJA (AGOSTO 2017)
- 58. LA ALACENA ROJA (07/09/2017)

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72. LA VOZ DE GALICIA – EXTRA VOZ HUM

73. LA VOZ DE GALICIA – VIGO (28/08/2017)

74. LA VOZ DE GALICIA – VIGO (07/09/2017)

75. FARO DE VIGO (29/08/2017)

76. FARO DE VIGO (08/09/2017)

77. FARO DE VIGO – GALICIA EN VINOS (28/08/2017)

78. FARO DE VIGO – GALICIA EN VINOS (07/09/2017)

79. FARO DE VIGO – GALICIA EN VINOS (10/09/2017)

80. FARO DE VIGO – GALICIA EN VINOS (17/09/2017)

81. EL CORREO GALLEGO

82. DIARIO DE PONTEVEDRA

83. EL PROGRESO (08/09/2017)

84. EL PROGRESO (11/09/2017)

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85. EUROPA PRESS GALICIA (28/08/2017)
86. EUROPA PRESS GALICIA (07/09/2017)
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91. 21 NOTICIAS (07/09/2017)
92. 21 NOTICIAS (10/09/2017)
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94. GALICIAÉ
95. NOTICIAS GALICIA
96. REVISTA DE ARTE
97. HOSTELERÍA GALEGA & TURISMO
98. GALICIA CONFIDENCIAL
99. IBERCIDE
100. HUELVA RED
101. NOTICIERO UNIVERSAL
102. CATALUNYA VANGUARDISTA
103. MAKE ME FEED

➤ **Televisiones**

104. TVE – INFORMATIVO TERRITORIAL GALICIA

TVE Galicia 08/09/2017:

<http://www.rtve.es/alcarta/videos/telexornal-galicia/>

Del 06:42 al 09:11

105. TVE – AGROSFERA

<http://www.rtve.es/alacarta/videos/agrosfera/>

Programa del sábado 16/09. Del 30:14 al 32:40

106. TVG – INFORMATIVOS GALICIA

<http://www.crtvg.es/informativos/descobren-un-proceso-para-potenciar-as-propiedad-biosaudables-do-vino>

107. TVG – INFORMATIVOS VIGO

<http://www.crtvg.es/tvg/a-carta/informacion-local-vigo-pontevedra-seran-464>
Del 00:06 al 00:38

➤ **Radios**

108. ES RADIO NACIONAL– EN CLAVE RURAL

109. RNE GALICIA

110. RADIO GALEGA VIGO

111. RADIO GALEGA – GALICIA POR DIANTE

112. ONDA CERO – GASTRONOMÍA EN LA ONDA

113. ONDA CERO – EFECTO NOVA

ENTREVISTA ONDA CERO – EFECTO NOVA

http://www.ondacero.es/emisoras/galicia/aqui-en-la-onda-galicia-efecto-nova-14092017_2017091459bac4930cf292df4131e5cf.html

Del 36:55 al 39:28

114. ONDA CERO – CORUÑA EN LA ONDA

115. ONDA CERO – AQUÍ EN LA ONDA ASTURIAS

116. CADENA SER – RADIO VIGO

Ser Vigo 07/09/2017:

http://play.cadenaser.com/audio/1504812487_338701/

Del 15:37 al 16:50

117. COPE VIGO

➤ **Facebook**

118. LA VOZ DE GALICIA - EDICIÓN VIGO

119. EL PROGRESO
120. DIARIO DE PONTEVEDRA
121. FARO DE VIGO - GALICIA EN VINOS
122. VINETUR
123. BODEGAS Y VINOS
124. OPERADORA GASTRONÓMICA
125. LA SEMANA VITIVINÍCOLA
126. LA ALACENA ROJA
127. INTEREMPRESAS
128. TECNOVINO

129. G CIENCIA
130. CAMPO GALEGO
131. COCINA PARA DOS

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133. FARO DE VIGO – GALICIA EN VINOS
134. DIARIO DE PONTEVEDRA
135. VINOS DE ESPAÑA
136. VINO TRAS VINO
137. REVISTA ENEO - INTEREMPRESAS
138. LA SEMANA VITIVINÍCOLA
139. ALIMARKET
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141. RESTAURACIÓN

142. REVISTA ORIGEN
143. LA ALACENA ROJA
144. TECNOHORECA
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147. ECONOMÍA DIGITAL GALICIA
148. TELEMARIÑAS
149. CSIC
150. GCIENCIA
151. NOTICIAS VIGO

152. REVISTA DE ARTE
153. ARTE 5 SENTIDOS
154. CAMPO GALEGO
155. WINESEQ SPAIN
156. TRACTUS
157. BELÉN DO CAMPO (XUNTA DE GALICIA)
158. TABERNAS DE MADRID
159. VINOS LA VEGUILLA
160. VINO DE TRASTERO