Arbutus unedo L. fruit distillates and the requirement for further quality specifications

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Introduction

Arbutus unedo L. (figure 1) fruit distillates (Aguardente de medronho) are produced in few countries/regions in Europe, namely Greece, Sardinia, Galicia (recently) and Portugal [1-3]. Portugal is the only possessing two protection geographical indications: "Medronho do Algarve" and "Medronho do Buçaco" [4]. Furthermore, Portugal has a specific law to protect the authenticity of arbutus fruit distillates [5]. This distillate is important from the economic point of view, particularly in the mountain areas, and is also of great historical importance for the entire Algarve region. In the last 20 years several projects have been developed in order to optimize the production process, first on a laboratory scale and later directly by several local producers [6].

Figure 1 – *Arbutus unedo* L.

Currently, over one hundred traditional producers optimized their processes, by implement HACCP systems and by legalizing the production, which leaded to the preparation of high quality spirits in Algarve. In the centre of Portugal, the other protected geographical area, many producers are implementing similar systems as well. Alcohol degree content, total acidity, copper and macro-volatile components are the parameters required for the quality control of distillates by current legislation. However other parameters are needed in order to differentiate high quality spirits and to create an identity for each geographical origin or country.

The aim of the work was to identify potential aromatic compounds markers of *Arbutus unedo* L. fruit distillates, among different locations.

Material and Methods

Six random samples of each locality " Serra de Monchique" and " Serra do Caldeirão" from Algarve and six random samples from Coimbra region were chosen from micro-components analysis.

The quantification of macro-compounds was done using a GC PerkinElmer Clarus 400 equipped with a FID detector. A BP 20 capillary column (30 m x 0.32 mm I.D. x 1.0 µm film thickness; SGE, Australia) was used with the following oven temperature program: 5 min at 40 ºC, 5 ºC min^{-1} increase until 210 ºC. The injector was set to 250 ºC, the injections were made in the split mode and the detector was set to 270 ºC. The quantification was done using the internal standard 4-methyl-2-pentanol.

The identification and quantification of the micro volatiles in distillates was performed by HS-GC-MS or GC-MS using a Hewlett Packard 5890 Series II gas chromatograph equipped with a 5971 series mass selective detector (E.I. 70 eV). An AT-WAX MS capillary column with 30 m length, 0.25 mm I.D. and 0.25 µm film thickness was used with the following oven temperature program: 45 ºC for 5 min, 10 ºC min^{-1} until a final temperature of 240 ºC. The injector temperature was 240 ºC and the quantification was done using the internal standard 2-octanol. Also a ZB – 5MS capillary column with 20 m length, 0.25 mm I.D. and 0.25 µm film thickness and a CHIRASIL-DEX CB capillary columns with 25 m length, 0.25 mm I.D and 0.25 µm film thickness were used with the same chromatographic conditions.

GC results

The quantification of the most abundant compounds, does not allow differential distilled from different places, as shown in Figure 2.

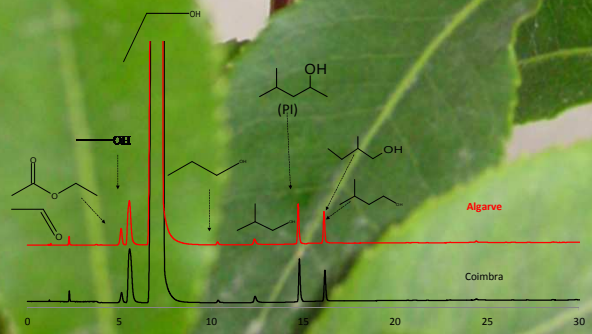

Figure 2: GC chromatograms of two arbutus distillates from different places (Algarve e Coimbra).

GC-MS results

Selected-ion monitoring (SIM) chromatogram was used to detected potential aromatic compounds markers among arbutus distillates from places. The study compound that present the greatest differences was the cis-3-Hexen-1-ol, which is consistent with the more herbaceous perception previously indicated by taters. Figure 3 shows 3-hexen-1-ol (m/Z = 82) behaviour for 2 distillates from different locations.

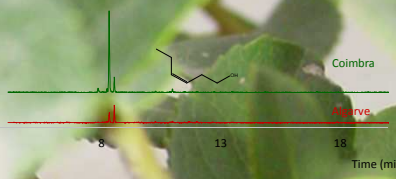

Figure 3: Selected ion chromatograms (m/Z = 82) for arbutus distillate from Algarve and Coimbra.

Although there are variations of the cis-3-hexen-1-ol related to the ripeness of the fruits [7], the Coimbra region arbutus distillate present, on average, 4.5 times higher than the two groups of distillates from Algarve, (table 1).

The two group Algarve samples results for the quantification of cis-3-hexen-1-ol are in agreement with those obtained by G. Versini (0.670 ± 0.303 mg/100 ml p.a) [8] before distillate study started in the region.

Table 1: Mean levels of cis-3-hexen-1-ol, in groups of 6 samples, from different locations.

	Monchique	Caldeirão	Coimbra
Mean (mg/100 ml P.A.)	0.45 ± 0.17	0.49 ± 0.21	2.12 ± 1.13

Discussion

- The typical ions is an alternative to study the distillates genuineness and quality.
- Cis-3-hexen-1-ol is a potential marker for differentiate arbutus distillate from region of south and the centre of Portugal.

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