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CARACTERIZACIÓN DE VINOS TINTOS DE VARIAS DENOMINACIONES DE ORIGEN CATALANAS EN BASE A LOS VINOS PRESENTES EN EL MERCADO. DO TARRAGONA, DO CONCA DE BARBERÀ Y DOQ PRIORAT.

TESIS DOCTORAL

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ABSTRACT

For many years, analytical techniques have been used in order to try to prove objectively the varietal and even technological origin of wine. Several research studies have proposed characterising wines using analysis tools based on color and phenolic compounds. Similarly, the International Wine Organisation (OIV, 2006) has expressed in resolution VITI 4/2006 the importance the organization attaches to zoning wine as well as the need to develop the necessary technical studies to deepen their knowledge.

Phenolic compounds are of particular importance in the characteristics and quality of wine because they give it a specificity which relates to their chromatic characteristics, organoleptic qualities (sense of astringency and bitterness) and chemical composition. Volatile aromatic compounds also have great importance in the characterization of wines, both in flavor and odor characteristics and in their varietal characterization.

"Terroir" can be defined as a geographic area which is planned and managed to protect a specific wine type. Historically zoning arises from an agronomic approach linked to the soil and climatic characteristics of certain territories to include vintner action as a factor of variability of the model.

Characterisation can be defined as the determination of particular attributes of a subject or group of subjects so as to be clearly distinguishable from another set of elements. This definition is not tied to the concept of "quality", as it relates to those preferences, oftentimes subjective, that the pubic final consumer has in relation to a particular product.

In the case of wine there are three main lines of research found in the literature: the first line is oriented to the characterization of a certain type of wine based on grape varieties that compose it. The second line of research focuses on the use of various statistical tools to determine the qualitative differences of wines of identical varieties obtained from different winemaking techniques. The third line of study would be the analysis of the influence of *terroir* on wine produced in bounded areas, which aims to obtain differentiation systems for wines produced in specific areas.

Based on these premises, it seems certain that there is a benefit in using colorimetric determinations to assess and relate the color and richness of wine phenolic and to reinforcing the links between the product offered to the final consumer and the place of origin of the wine in question. Understandably there is growing interest in the wine sector in developing an analytical model that allows the characterization of phenolic wines, to establish objectively the wines of each area, an important tool to maintain the quality and prestige of the wines from each Denomination of Origin (DO).

This thesis aims to propose an easily accessible tool for the Regulatory Councils of three DO of Tarragona which will enable them on the one hand to characterize wines from different varieties and sub-areas to allows the different DO's to present to the public real differentiation based on products actually available on the market and, secondly, provide them with the capacity to defend their merits relative to output from other production areas. Thus the work plan consists on three case studies. In the first one an inter-DO characterization of the wine of DO Tarragona, DO Conca de Barberà and DOQ Priorat is carried out. The second case study consists on an intra-DO characterization in which wines of the DOQ Priorat are clasified attending to subareas ("vi de villa"), whereas the third case study consists on the differentiation of wines from DO Tarragona based on the combination of their geographical origin (municipality of Rodonyà and outskirts) and on the varietal composition.

To this aim, over five seasons analytical determinations were made on all wine samples subjected to quality checks by the wineries that are part of the three DOs (DO Tarragona, DO Conca de Barberà and DOQ Priorat). The fact that the samples used in the study are all submitted to qualification as suitable for marketing as Denomination of Origin wine has the advantage that all the red wines of every DO that subsequently reach the market for final consumption undergo analysis. It also provides a large number of samples, and these in turn represent the production reality of each DO within reach of the consumer. But on the other hand, it cannot discriminate between varieties of grapes used, since the vast majority of wines are "coupatges" of different varieties, due to processing methods and/or elaboration.

We chose a total of 31 color-related parameters, the phenolic content, the ability to mature and defined measurable characteristics for consideration as wines suitable for marketing under the category of wine with designation of origin. These parameters were selected because they gave more information about the technical aspects that impact on wine quality. These consisted mainly in espectophotometric analysis, simple and inexpensive techniques to enable their application in their own DO. Indices were sought to reflect the following:

The statistical tool applied has been discriminant analysis, which generates discriminant functions of the variables in a data set and the values returned by those functions in each case. This analysis assumes that the variables are drawn from populations with normal distributions and present equal variances. Discriminant analysis objectives can be summarized into two points: analyze intergroup differences according to their behavior with respect to the analyzed variables and to describe classification procedures for individuals of unknown origin between the study groups.

A database has been generated of 1874 samples and 56,109 analyzed parameters values for the three DO. The creation and maintenance of a database as comprehensive as possible is essential for a good description and allocation of samples to different aggregation groups.

For the Inter-DO case, comparing red wines of the DO Tarragona, DO Conca de Barbera and DOQ Priorat, the chosen procedure correctly classified using discriminant functions, "step by step" parameter input and 97.3% cross validation samples of the DOQ Priorat, 76.4% of DO Tarragona and 72.3% of the wines of the DO Conca de Barbera.

In the case of zoning of the DOQ Priorat ("vi de villa") the significant difference in the number of samples supplied by each study area led to the comparative study of these based on two groups. The model demonstrates its own strength, as it achieved correct classifications ranging from 60% for samples from the La Vilella Baixa to 70% for samples of local wines Gratallops.

In the differentiation of wines from the DO Tarragona analyzed based on the combination of their geographic area of origin (Rodonyà Township and vicinity) and varietal composition (monovarietal Sumoll or not) correct classifications reach 100% for monovarietal wines from Sumoll in the Rodonyà area.

The numbers of correctly classified samples make the proposed model inapplicable in the field of Inspection and Control since the percentage of incorrect assignments is too high to be used where there are administrative consequences.

However, the model does allow assessing the "terroir" variable, understood as a set of effects (land, varieties, climate, cultural practices and oenological practices) that lead to a quantitative impact on the wines presented under the control of the DO Qualification studied. With that differentiation being able to be allocated to each DO, the system of geographical differentiation that is based on European standards of quality wines produced in specified regions (VCPRD) is confirmed.