MANAGEMENT OF COVER PLANTS IMPACTED THE COMPOSITION OF CABERNET SAUVIGNON RED WINES IN A TEMPERATE REGION OF BRAZIL

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Abstract:

Context and purpose of the study - Several practices can be applied to vineyards in order to ensure good healthy for grapevines, adequate yield and fruit quality. Among them, the use of cover crops is a relevant option for soil management. It increases the organic matter, improves water infiltration, reduces risks of soil erosion and greenhouse gas emissions, in addition improving biodiversity in the vineyard. Studies have shown that the application of fertilizers in the vine rows can influence the availability of nutrients in the soil, reflecting on the nutritional status, yield and composition of the grapes. But in our knowledge, there is a lack of reports about the application of fertilizers on cover crops and its effect on the wine composition. Therefore, this study aimed to evaluate the influence of fertilization in different cover plants on physical chemical and phenolic composition of Cabernet Sauvignon wines from a temperate climate in the South of Brazil.

Material and methods - The study was carried out in an experimental area located at Embrapa Uva e Vinho, in Bento Gonçalves-RS, with declivity around 15%. Cabernet Sauvignon grafted onto Paulsen 1103 was panted in 2010, and two consecutive vintages were evaluated, 2020 and 2021. The field design was in randomized blocks with 8 treatments and 3 replications, each plot consisted by 18 plants. The following treatments were applied: T1: without plants and without fertilization; T2: without plants and with fertilization; T3: vetch without fertilization; T4: vetch with fertilization; T5: grasses without fertilization; T6: grasses with fertilization; T7: consortium (50% vetch/50% grass) without fertilization; and T8: consortium with fertilization. The same quantity of fertilizer was used in all treatments. The yield was determined. The wines were elaborated using the traditional method (with 6 days of maceration) using 40 kg of grapes from each treatment. After 30 days of bottling, the physical chemical parameters (pH, total acidity, alcohol content, total polyphenols, anthocyanins and total tannins, intensity and hue color); minerals by atomic absorption (K, Ca, Na, P, Cu, Fe, Mg and Mn) and phenolic composition by UPLC-MS (anthocyanins, flavonols, flavanols and estilbene) were analyzed.

Results - The results were evaluated individually per vintage, because there was a high variation in the meteorological data between the two years. The climate effect was the most significant, followed by treatments. Yield was higher in T1, and lower in T6 and T7, in 2020, while in 2021 no significant differences were observed. T1 and T8 presented the highest alcohol content in 2020 and 2021, respectively. Treatments T5 and T7 presented the highest concentration of total phenol index, while T5, T6, T7 and T8 presented higher total anthocyanins in 2020. In 2021, T2, T5 and T7 higher concentration of total anthocyanins. K presented the highest concentration in wines from T7 and T8 in 2020, and T7 in 2021. Other minerals were differently influenced by treatments. Treatments T1 and T2 presented erosion and loss of around 10-20 cm of superficial layer. It is recommended to used vetch or grass

cover plant in slope vineyards at Serra Gaúcha to avoid erosion, while the type of cover crop can impact on wine physico chemical composition, which choice depends on the winery, to make joung or aging red wines.

Keywords: Grapevine, organic matter, minerals, phenolic compounds, typicality.