

étaient plus petits que le paramètre établi comme sûr par l'Organisation mondiale de la santé (inférieure 10.000) pour tous les échantillons dans lesquels ces composés ont été détectés. Malgré l'acétaldéhyde et furfural ont été trouvés dans des niveaux élevés dans certains échantillons, en fonction de la marge calculée d'exposition (MOE), ils ne présentent aucun risque pour la santé des consommateurs. Cependant, une attention accrue devrait être accordée à la présence d'acétaldéhyde dans les boissons alcoolisées et de la nourriture, en particulier parce que l'acétaldéhyde est formé après l'ingestion de boissons alcoolisées par le métabolisme hépatique de l'éthanol. L'exposition au formaldéhyde par la consommation de vin n'a pas posé un risque pour la santé des consommateurs sur la base de cette évaluation. Les stratégies pour réduire la formation de ces composés toxiques devraient être développés, en particulier en ce qui concerne le furane, l'acroléine et le carbamate d'éthyle, qui ont fait le risque pour la santé des consommateurs. En outre, les données générées par cette étude peuvent contribuer à l'établissement de normes réglementaires brésiliennes liées aux limites maximales admissibles pour ces composés dans le vin, ainsi que des programmes de contrôle de la qualité du vin liés à ces composés toxiques.

2016-1292 INFLUENCE OF STAGE OF RIPENESS AND TIME OF MACERATION OF SYRAH GRAPES ON LEVELS OF TOXIC COMPOUNDS IN WINES

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Levels considered ideal of soluble solids and acidity in grapes can be achieved in a shorter time with a combination of high temperature and incidence of intense solar radiation on the vine. These conditions are typical of the Sub-middle São Francisco Valley, Brazil, where Syrah grape cultivation is predominant. The harvest of grapes in the technological ripeness stage, which includes soluble solids content of 22 °Brix and titratable acidity of 6-8 g/L, has been recommended to obtain wines with alcoholic degree lower than is established as maximum (14 % at 20 °C) by Brazilian legislation. In this situation, the grapes can have not achieved the optimal phenolic ripeness characterized by the balance of tannins between skin and seed and that result in a "harmonious" wine, pleasant to the taste and with balance of astringency and bitterness. The enological quality is satisfactory when the grape is harvested in the technological and phenolic ripeness stages, which are independent stages and do not necessarily coincide. In addition to the suitable stage of ripeness for harvesting grapes, the time of maceration during the winemaking is also a critical step to define the wine style and resolve problems arising from insufficient phenolic ripeness of the grapes at harvest. In this way, the ripeness stage of the grape and time of maceration of the wine can influence the chemical profile of wines, including the presence of toxic compounds. Acetaldehyde, formaldehyde, ethyl carbamate, furan, furfural and acrolein may be produced during vinification. These compounds are hepatotoxic and may have association with cancer. The aim of this study was to evaluate the influence of ripeness stage and time of maceration of Syrah grapes on the levels of six toxic compounds (formaldehyde, acetaldehyde, ethyl carbamate, furan, furfural and acrolein) formed during the vinification. Syrah grapes harvested at three ripeness stages [T1: before technological ripeness (20 °Brix), T2: ideal ripeness (22 °Brix), T3: overripening (24 °Brix)] and macerated for 3 periods (C1: 10 days, C2: 20 days, and C3: 30 days) were evaluated in relation to the levels of toxic compounds. The vinifications were conducted in triplicate with eight different combinations of ripeness stages and maceration times resulting in the following experiments: T1_C1, T1_C2, T2_C1, T2_C2, T2_C3, T3_C1, T3_C2 and T3_C3. The wines were analyzed using headspace-solid phase microextraction (HS-SPME) and comprehensive two-dimensional gas chromatography coupled to time-of-flight mass spectrometric detection (GC×GC/TOFMS). The lowest levels of all toxic compounds were observed in wines of experiment "T1C1" (grapes harvested before technological ripening and macerated for 10 days). In contrast, wines "T3_C2" (overripening grapes and 20 days of maceration) showed the highest levels of all toxic compounds, especially a high amount of acetaldehyde (962 µg/L) was produced under these conditions. The advancement of the degree of grape ripeness and longer maceration times seem to increase the levels of toxic compounds. "T3_C3" was the only experiment to provide wines that have not followed this trend due to the possible degradation reactions of toxic compounds or of their precursors, which probably occurs due to the combination of overripening grapes and excessive time of maceration (30 days). The levels of toxic compounds among the experiments T1_C1, T1_C2, T2_C1, T2_C2 and T2_C3 were not statistically different ($p > 0.05$). Although Brazilian legislation has not regulated maximum allowed levels in wine, population exposure should be as low as possible due to toxic effect of these compounds. Therefore, deciding among these five combinations of ripeness and maceration time of the grapes may be supported only on their sensory profile of these wines.