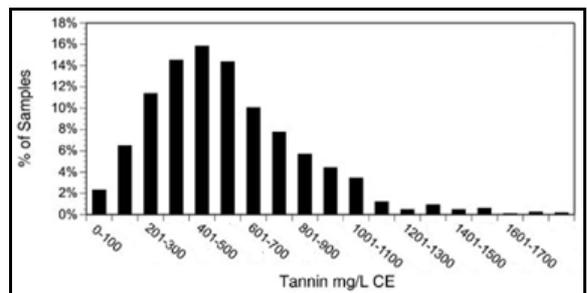




Research outputs

- Red wines are rich in polyphenols which are powerful antioxidants that are thought to protect against cancer and heart disease by destroying molecules that would otherwise damage cells. How the polyphenols in wine exercise their beneficial effects is not understood as they do not seem to travel in any quantity from the stomach into the bloodstream. Now a group of researchers in Israel has shown, by feeding rats red meat with and without red wine, that the red wine polyphenols could convert the normal peroxidation processes involved in the digestion of red meat to antioxidation processes. The researchers found that the digestion of high-fat foods such as red meat could increase lipid peroxidation in the stomach and the absorption of cytotoxic lipid peroxidation products into the body, with the stomach and the gastrointestinal tract possibly constituting the main biological sites of action for these compounds. Addition of red wine to the meal significantly reduced the concentration of the harmful hydroperoxides and malondialdehyde in the stomach. The researchers believe that their findings explain the important benefit of consuming dietary polyphenols during meals. <http://dx.doi.org/10.1021/jf703700d>
- Tannins generally comprise the largest phenolic component in red wines and are critically important to the quality of the wine because of their astringency. A study used five different analytical methods to determine the tannin concentration of 40 red wines, and the astringency of each was assessed by a panel of 5 tasters. The analytical methods that had the strongest correlations with perceived astringency were protein precipitation (viz. the original format of the A-H tannin assay) ($r^2 = 0.82$), phloroglucinolysis ($r^2 = 0.73$) and gel permeation chromatography ($r^2 = 0.74$). Results indicated that absorption of light at 280nm ($r^2 = 0.40$) and reaction with DMCA (4-dimethylaminocinnamaldehyde) ($r^2 = 0.46$) were not acceptable methods for tannin determination. Given the equipment availability of most wineries, it was determined that protein precipitation was the most useful analytical method for astringency assessment. <http://www.ajevonline.org/cgi/content/abstract/57/4/481>
- Quantification of red grape tannin and red wine tannin using two methods of protein precipitation, methyl cellulose precipitable (MCP) tannin assay and the longer to perform Adams-Harbertson (A-H) tannin assay, were investigated. Forty-one commercially available Australian dry red wines were selected with a broad range of tannin concentrations. They included five wine varieties: Cabernet Sauvignon, Shiraz, Merlot, Pinot Noir, and Durif, spanning vintages 1991 to 2006 from a wide range of regions. A strong correlation between the two analytical techniques was observed when quantifying grape tannin ($r^2 = 0.96$), and a good correlation was observed for wine tannins ($r^2 = 0.80$). However, significant differences in the actual tannin values for the analytical techniques were observed - approximately 3-fold, with the MCP assay giving the much higher values. For a subset of 20 wines (Shiraz and Cabernet Sauvignon) from the study, the relationship between tannin quantification and wine astringency (estimated by a panel of 12 tasters) was assessed for the MCP and A-H tannin assays, and both showed strong correlations with perceived wine astringency ($r^2 = 0.83$ and $r^2 = 0.90$, respectively). The reasons for the differences in values between the MCP and A-H tannin assays remains unclear, and further work in this area is required. <http://dx.doi.org/10.1021/jf8008266>
- A large number (1 325) of commercial red wines were analyzed for tannin concentration by a protein precipitation method. There were 55 from the Bordeaux region of France, 364 Cabernet Sauvignon wines from Washington and California, 197 Merlot wines from Washington, 261 Pinot noir wines from Oregon and California, 266 Syrah wines from California, Washington, and Australia, and 182 Zinfandel wines from California. The concentration of tannins ranged from 30 to 1 895 mg/L catechin equivalents (CE), with a mean concentration of 544 mg/L CE and a standard deviation of 293. The variability of tannin concentration within a single wine type was up to 33-fold, and usually the standard deviation was very large (at least half of the mean value). Despite the wide variation, the population means of the different wine types were statistically different from each other except Cabernet Sauvignon and Zinfandel. This does not imply it is possible to identify wine type by measuring tannin concentration alone; there is too much overlap between the populations for such identification. The tannin concentrations of a wine type made in different regions were generally quite similar, such as Cabernet Sauvignon from Washington and California and Pinot noir from California and Oregon. However, Syrah wines from Washington and several states in Australia were different from those from California. <http://www.ajevonline.org/cgi/content/abstract/59/2/210>



Local research results

- A study has been carried out to determine the effect of vine structure and climatic region on the phenolic composition, total antioxidant capacity (TAC) and colour of Pinotage wines in three climatic regions of the Western Cape. It was found that the aforementioned parameters were significantly affected by climatic region and vine structure treatments, while the trunk height of the vine had few significant effects. In general, the warmer climatic regions produced lighter coloured wines with lower TAC, mainly due to lower total phenol content. Wines from bush vines were generally darker, with slightly higher TAC, than wines from trellised vines, although the latter wines had higher monomeric anthocyanin concentrations. Consequently cultivation of Pinotage bush vines in cooler climatic regions is recommended when a higher TAC is a requirement. Denser canopies are recommended in warm and dry regions to prevent excessive exposure of bunches to direct sunlight. No broad recommendation for vine structure to be used in specific climate regions could be made as significant differences in the wine quality of these different vine structures were found at farm level, proving that terroir is important when deciding to establish bush or trellised Pinotage. www.sawislibrary.co.za/dbtextimages/FinalReport138.pdf
- Infection by *Botrytis cinerea* in grapes is usually controlled by canopy management, preharvest spraying with fungicides and postharvest sulphur dioxide fumigation. However, sulphur dioxide causes bleaching of the berries and its residues can be allergenic, while fungicides have little effect if weather conditions promote infection. A recent study evaluated extracts from rooibos (*Aspalathus linearis*) and honeybush (*Cyclopia* species), two indigenous plants rich in antioxidants, as potential antifungal agents against *B. cinerea*. The extracts inhibited spore germination of *B. cinerea* but caused very significant biomass production of *B. cinerea*. The study suggests that the tea extracts contain active compounds that should be further investigated for their potential as natural anti-fungal agents. However, these active compounds need to be isolated, identified and evaluated individually to ascertain their effect on *B. cinerea*. A better understanding of the active compounds will also assist in elucidating the apparent conflicting effects on *B. cinerea* (inhibition of spore germination, and increased biomass production). The results of the research have been included in a patent, 'Plant extract having antimicrobial activity', (ZA2007/08879) www.sasev.org/journal/sajev-articles/volume-29-1/Coetzee%20Marx%20Pengilly%20Bushula%20Joubert%20Bloom%20vol%2029%20pages%2033%20to%2038.pdf
- By law, South African brandy can only be made from grapes and must be made from potstill brandy and wine spirits, blended in the ratio 30:70. A project to create an isotopic databank of authentic South African brandies to prove botanical and geographical origin, and which can be used to identify adulterated brandies has been completed. The database includes all variations caused by grape cultivar, geographic location, still design and vintage, and deuterium/hydrogen, carbon-isotope and oxygen-isotope (for wine) contents for authentic South African brandies. By measuring the deuterium/hydrogen ratios and the carbon and oxygen isotope ratios of a given sample the authenticity or otherwise of the sample can be determined from the database. Its geographical origin and dilution (of the wine) can be established. In addition the adulteration by flavoured grain spirits, cane spirits or synthetic spirits can be detected. www.sawislibrary.co.za/dbtextimages/FinalReport133.pdf

Environmental Considerations

- The Biodiversity & Wine Initiative (BWI), a pioneering partnership between the South African wine industry and the conservation sector, has recently released its identifying label. The majority of South Africa's wine region falls within the highly sensitive Cape Floral Kingdom and this conservation initiative in the wine industry works with committed wine farmers to set aside highly threatened natural habitat on their farms for conservation, while also ensuring that these members farm in an environmentally sensitive and sustainable manner. In May 2008 the total area conserved was 70 412 hectares, which is 70% of the total area under vineyards in the Cape winelands. The label, to be displayed prominently on wine bottles, identifies wines which have been produced in accordance with BWI's conservation requirements. www.bwi.co.za
- From September 2008 all foodstuffs intended for human or animal consumption in the European Union (EU) will be subject to a maximum residue level (MRL) of pesticides in order to protect animal and human health. http://ec.europa.eu/food/plant/protection/pesticides/index_en.htm In addition, there is a default maximum level, which is 0.01 mg/kg for all cases where an MRL has not been specifically set. The list includes table grapes and wine grapes, with MRLs specified for a number of pesticides. Prior to this regulation, each EU member state applied its own maximum residue levels for pesticides. Many agricultural scientists argue that the change will have widespread, alarming consequences for farming, and will lead to further increases in food prices at a time when they are already uncomfortably high. ADAS, a British environmental and rural consultancy, has produced a report which claims that these regulations could reduce food production by a quarter, and which confirmed an earlier estimate from Italy. www.economist.com/science/displaystory.cfm?story_id=11662567



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