The main components of a wine are water and ethanol, typically representing >98% of its volume. The other two percent lead to the bewildering range of flavours and styles that are available to the consumer today. Within this two percent nearly every known naturally occurring element has been found in at least some wines, at concentrations ranging from parts per trillion for some of the rare earth elements, through to hundreds of grams per litre for oxygen. Modern techniques such as inductively coupled plasma mass spectrometry (ICP-MS) provide a clear picture of the elemental make-up of wine and start to shed light on the significant impacts of the 2%.

The vineyard: Most metals can be found in grapes originating from water and soils. Some metals, however, such as copper are stripped during fermentation by yeast.

The winery: Iron, chromium and vanadium can come from the stainless steel used in storage vessels, copper and zinc can come from old brass fittings. Bentonite fining can add lead, aluminium, arsenic, manganese, calcium and sodium.

The package: Sn can be contributed by screw cap liners and levels are increased in wines packaged in cans. Glass does not contribute significantly to Silicon and Boron levels.

• Potassium and calcium influence wine buffering, pH and tartrate stability.
• Copper, iron, aluminium, manganese and zinc can influence the production of negative (reductive) sulfur compounds as well the loss varietal thiols.
• Copper and iron are also key to oxidation processes in wine and the loss of sulfur dioxide during storage.
• Copper, iron, lead, arsenic, manganese, boron and sodium have all been involved in wines being rejected in some export markets based on local regulations.

Note that the ranges shown above are the average seen across a wide range of wines and any given wine may not contain all the elements indicated.