

The cultural history of wine - theoretical background to wine therapy

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Abstract: The knowledge of grape and wine is as old as the cultural history of mankind. Moderate consumption of wine can be beneficial in healthy individuals. It is also known from ancient times that it can cause acute and chronic damage when consumed in great quantities. The disinfectant effect of its use in ointments has been observed already in the antiquity. Polyphenols, among them resveratrol, have generated a great amount of scientific research due to their in vivo and in vitro antioxidant capabilities. For decades, red wine was thought to have beneficial effects on cardiovascular health. This relation was clearly established in the French Paradox phenomenon as well as in the Mediterranean diet. The French Paradox is defined as a low incidence of coronary heart disease, while consuming a diet rich in saturated fat. The cause of this phenomenon is the usually wine drinking in small quantity, supposingly in the consequence of polyphenols in red wine. The use of ointments containing polyphenols of wine and the cosmetic treatments with them can be advantageous in the treatment and prevention of some diseases of the skin and the joints, due to its free radical scavenging effect. In healthy individuals the consumption of a moderate amount of 1 to 2 dl wine a day may reduce the mortality of cardiovascular diseases. However, also this quantity can be associated with detrimental effects in pregnant women, in children and in patients with various organic, particularly hepatic, diseases as well as in case of regular administration of certain medicines.

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1 Introduction

Wine is the beverage most extensively consumed by mankind for pleasure since many millenaries; evidence shows that about ten thousand years. In addition to this role, its

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various uses for remedial purposes also accompany human history. Scientific investigation of the beneficial effects of moderate alcohol consumption on cardiovascular mortality began since about 30 years. The recognition of the 'French paradox' gave a substantial impetus to the promising biological studies of wine.

By moderate alcohol consumption we mean drinking of 1 to 4 units of alcoholic beverage daily. As the female sex is more susceptible to the organic injury caused by alcohol, therefore daily consumption of 1 to 2 units in women and 2 to 4 units in men may be beneficial if people are healthy. However, in case of an existing disease also this amount may cause an injury to the organs and tissues of the body. One unit means about 10 to 12 g of alcohol, corresponding to 3.3 dl beer, 1 to 1.2 dl wine, and 0.3 to 0.4 dl hard spirit of average alcohol content. Regular consumption of alcoholic beverages in excess of the above mentioned moderate amounts can already be harmful for the human organism. The double of these values should be considered as critical quantity. This means that regular consumption of alcoholic drinks containing more than 20 to 40 g a day in women or more than 40 to 80 g a day in men causes hepatic cirrhosis, i.e. irreversible impairment of the liver in half of the affected persons within approximately 10 to 15 years. Not only the liver, but also other organs, such as the cardiovascular system, the gastrointestinal tract, and the brain tissue may become disordered due to the regular consumption of greater amounts of alcoholic drinks [1–11].

2 The cultural history of wine

Our knowledge concerning wine is about ten thousand years old. Grapevine is our oldest cultivated plant. According to the Bible (Old Testament, Genesis, 9, 20–21) Noah planted grapevine after the Flood, and then he made wine. He became inebriated by the wine, obviously due to the excessive consumption of fermented grape juice. Jacob blunted the vigilance of Isaac with wine, and King Solomon has deemed wine the second greatest pleasure for mankind after the kiss of lovers in the Song of Songs. Isaiah however condemns people who drink from morning till they catch fire. Several data refer to the knowledge of alcohol and wine in the antiquity. According to Sir John Malcolm (1789–1833) the first authentic historic evidence on the production of the noble liquid originating from wine comes from the age of the Persian culture. This is suggested by the Damascene vessel that served for storing bunches of grapes. In the Gilgamesh epic (3–4000 BC) the god Utnapishtim advises survivors to plant grapevine after the flood.

In the Babilonian Nippur tablet (by 2200 years BC), that can also be considered as the oldest pharmacopoeia of the world, we can already read about using ointments mixed with wine against cutaneous diseases. On the Egyptian Ebers Papyri (1500 BC) wine and preparations mixed with wine are recommended against asthma, constipation, dyspepsia as well as for the treatment of epilepsy, and surprisingly for the prevention of jaundice. The latter can be interpreted as, under the poor hygienic conditions, the infectious (A and E) hepatitis could be prevented by consuming wine containing no virus instead of drinking water that was contaminated with hepatitis virus.

In the three and half millennia old Talmud there is a praise of wine: 'Wine is the best medicament, if it is lacking, there may be a need for medicine.' Hippocrates, the outstanding medical personality of the ancient Greek culture (460-370 BC) recommended the wine for treatment of wound, for strengthening physically worn people, as well as for diuretic, purgative and sedative purposes. In the Greek mythology Dionysus was the god of wine.

In the Old Testament, whose origin can be dated to the 180s BC, the following can be read: 'Wine consumed within bounds is the joy of body and heart, the moderate drink is health for body and soul', but some lines thereafter it reads: 'Over-indulgence in wine causes fear, anger and much misfortune' (Book of Sirach). Asclepiades (124-40 BC), the physician of Cicero, recommended wine in addition to diet, physical exercise, bathing, massage, air therapy, and listening to music for refreshment of the organism. Celsus (25 BC-37 AD) has already distinguished old and young, dry and sweet, spiced and natural wines.

In the Roman Empire the military surgeon of Nero, Dioscorides (80 AD) recommended wine for wound disinfection, anaesthesia, and to prevent suppuration. Galen (131-201 AD), who at first was the physician of gladiators and then court physician of Marcus Aurelius, observed that wounds treated with wine showed no suppuration. He compounded numerous preparations including several medicines dissolved in or mixed with wine. A multitude of galenic preparations can be found in Pharmacopoeias also nowadays [11]. Bacchus was reputed to the god of wine, and there are several historical and literary descriptions of the orgies organised by his priestesses, the bacchantes.

Moreover, the Romans used herbs such as thyme, rosemary, myrtle, and celery for spicing wine, and then the selection has been widened by the Venetian merchants who imported cardamom, cinnamon, ginger, sandalwood and myrrh to Europe from East-Africa, India and Indonesia [2].

Pure alcohol was probably made from wine in Italy in the eleventh century, and soon it was used for almost all diseases and sold under the names of *aqua vitae*, *aqua ardens*, and *spiritus vini*. At the beginning of the fourteenth century *Arnoldus de Villanova* (1234-1311) has also produced pure alcohol, and included the alcoholic drink made by himself into the known Pharmacopoeia of the Middle Ages. Villanova was a Catalan physician and professor of the Montpellier University, and he wrote a book on wine under the title *Liber de vinis*, where he recommended wine for therapeutic purposes in several diseases for cure as well as for prevention. So he considered it beneficial against melancholy, he thought that it cleans the blood, widens the vessels, heats the inner parts of the body, enhances thinking, and prevents greying of the hair. He also considered it useful for the prevention of the hepatic diseases (the latter can be endorsed also now obviously as in the age of the Egyptian culture: consuming wine instead of water contaminated with viruses can protect against infectious viral hepatitis). Ambroise Paré (1509-1590), doubtless the most outstanding surgeon of the Renaissance, dealt much with the disinfectant effect of wine. He began working as a barber at the age of 13 years, and when he was 19-year-old, he joined the army and he wrote a book on the treatment of wounds caused by firearms

that was translated into many languages. In the battle of Piémont he treated the wounds of the injured with an ointment made of egg yolk, rose oil and turpentine, mixed in wine, in order to protect them against infections.

In the Europe of Middle Ages spiced wines were produced in the Italian, German, and French wine regions, but from the second half of the eighteenth century Turin in Italy has become the centre for manufacturing this produce. During the production of vermouths, additives of plant origin that can be used for food - or alcoholic extracts obtained from these - are given to the basic wine.

Based on the experience gained during the centuries, the spectrum of herbs used has increased extraordinarily in comparison to the originally utilized absinth. The plants and drugs used contain no toxic components; however a significant amount of volatile compounds and aromatic substances is present well dissolved in the alcoholic milieu and resulting in the special taste and aroma of the product. Most plants used possess considerable polyphenol content, and therefore - in addition to having attained a pleasant and harmonic aromatising effect - vermouths contain these significant health-protecting phytochemicals in greater amounts as compared to the wine used as basic material.

3 The French Paradox

The epidemiological data from France highly suggest a protective effect of red wine despite a high-fat diet (the 'French paradox'). This idea was established by St Leger *et al.* [12] who in 1979 found an inverse relation between coronary heart disease mortality and wine consumption, with France having the lowest mortality. Indirect evidence favouring the 'French paradox' and the red wine hypothesis is that the French habitually drink wine with their meals (which are often fatty) and this wine is most often red. Furthermore, there are several other explanations for the French paradox, including the 'time lag' hypothesis which states that the French diet had low fat in the past and that it takes about 30 years for any dietary pattern to manifest itself in mortality data [13]. Most large-scale epidemiological data coming from North America suggest that there is no difference between white and red wine [14], thus concluding that alcohol intake rather than wine colour predicts the eventual cardiovascular outcome.

According to several observational studies performed in various populations and published at the end of the seventies in the last century, moderate alcohol consumption has increased the high density (HDL) cholesterol in the blood significantly and the triglyceride level to a small degree. It reduces the amount of low density (LDL) cholesterol less markedly but continuously. In the recent years causes of death have been analysed and compared to the alcohol consumption per man-year of the population in numerous developed countries. A close and special negative correlation has been found between cardiovascular mortality and alcohol consumption. Later this was confirmed by studies performed in populations of several hundreds of thousands: moderate alcohol consumers had a lower cardiovascular mortality in contrast to the abstinent and the heavily drinking people [15–18]. Their conclusion seems to be supported by a series of several subsequent

comparative prospective case-control studies performed in different populations during the previous one and a half decade [19–24, 24]. In a recent study performed in a population of more than a hundred thousand persons the protective effect of red and white wine, as well as liqueur and beer has been analysed in relation to the cardiovascular mortality [26–28]. A protective effect against coronary heart disease has been found in case of all varieties of drinks [29–31].

French authors have described that according to the statistical report of the World Health Organisation for the year of 1989, cardiovascular mortality in the population of 35 to 64 years of age was much lower in France than in the similarly industrialised USA or UK in spite of the fact that the per capita consumption of alcoholic beverages in a year was the highest in France (corresponding to 15 litres of pure alcohol yearly). At the same time the other risk factors such as serum cholesterol level, average blood pressure, extent of smoking, and body mass index were similar in the age group studied. This phenomenon, so called French paradox is attributed to the high consumption of wine by the French people [32–36]. This presumption seems to be confirmed by the fact that the populations with the longest life expectancy - Cretan and Japanese people - regularly consume moderate amounts of alcohol, namely 20 and 28 g a day respectively; the former as wine, and the latter as beer. The correlation between alcohol consumption and the risk of mortality can be represented by a U- or J-shaped curve in the system of co-ordinates (Figure 1). The mortality risk of the alcoholics is high, while in the moderate drinkers it is lower than that of the abstinent people [37–40].

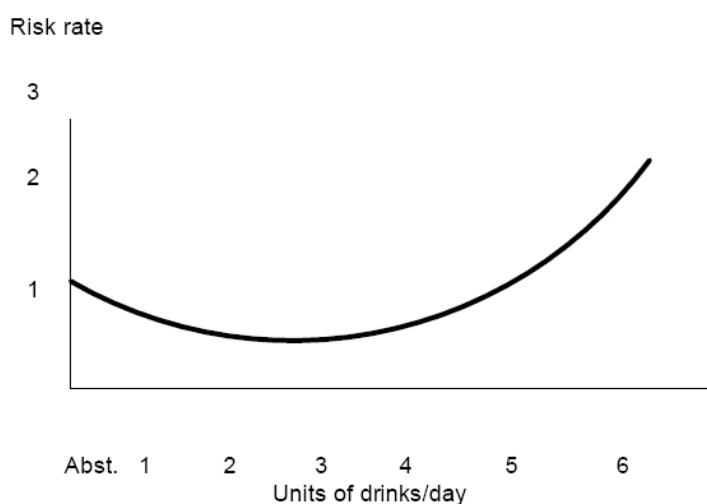


Fig. 1 Correlation between the risk of cardiovascular mortality and the per capita alcohol consumption (after Lorimier).

In order to investigate the relationship between alcohol consumption and cardiovascular diseases, Rimm *et al.* [41] have performed a prospective 10-year-long trial with 51,529 healthy male individuals in the framework of the 'Health Professional Follow-up Study'. The participants consumed drinks corresponding to one and half to two units a

day. Two years later their risk for cardiovascular diseases has been reduced by 26% in comparison to that of the abstinent people. In the majority of investigations, a J-shaped correlation could be demonstrated between alcohol intake and the sum total of cardiovascular diseases, and the nadir of the curve lied approximately at two drinks daily. An inverse downward linear correlation has been found between moderate wine consumption and the risk of cardiovascular diseases. Higher concentrations of HDL-cholesterol and apolipoprotein A1 as well as lower concentrations of fibrinogen have been observed in moderate consumers of wine as a constant phenomenon. No conclusive correlation was found between alcohol and triglyceride levels. The reduction in the risk of cardiovascular diseases was found to be 10 to 40%, in average 24.7%, and was attributed to the effects of alcohol on lipids and coagulation factors. Beyond these more than 75 experimental studies investigated the effects exerted by alcohol on vitamins, glucose, insulin, and lipid peroxidation. Based on all these, about a half of the beneficial effect of moderate alcohol intake is attributed to the elevation of HDL cholesterol levels [42–45].

In addition to the quality and quantity of beverages consumed daily, the success of cultured moderate alcohol consumption aiming at the prevention of cardiovascular diseases is also influenced by other factors as well, such as socioeconomic and cultural circumstances, lifestyle, age, individual diet, physical activity, sports, smoking, obesity, characteristics inherited from the parents, and the standard of health care [46–53].

4 The Essence of Wine Therapy

Wine therapy is essentially a new 'therapeutic' modality that has come into favour from France and is used in a few countries up to now. Basically the procedure is as follows: the person to be treated is laid into a well-prepared bathtub filled with a fluid devoid of alcohol but containing the other ingredients of wine (mainly polyphenols). Then massage is applied with ointments that contain oil obtained from grape pips by cold pressure, followed by a special compress with skins of the pressed grape. Cosmetic treatments are performed with ointments of polyphenols made of wine. All this is associated with a carefully prepared diet containing plenty of fruits, salads and fishes. Quality wines are offered to the meals in the above recommended small quantities. Of course, all these are accompanied by the natural environment of the institutes of such type and the friendly atmosphere of hospitality as external factors.

As the most important part of wine therapy is comprised of the several polyphenol-type substances present in wine, we will deal with these in greater detail. The beneficial physiological effects of wine, especially red wine, are attributed to the polyphenol-type compounds originating from the grape. The presumptive mechanisms for the health-protecting effect of polyphenol components of wine origin can be arranged around several biochemical reactions. One of their most essential and most extensively studied properties is their antioxidant and radical-scavenging effect. Several working groups reported the inhibitory effect of phenolic components of wine origin on LDL-oxidation. The oxidised LDL derivatives can be made responsible for the development of cells with foamy plasma

in the first stage of arteriosclerosis. Polyphenols of the red wine probably are synergists of the tocopherol (Vitamin E) and ascorbic acid (Vitamin C), thus they inhibit lipid peroxidation - i.e. the enhanced oxidation of the lipids in cell membrane and cell constituents - and consequently the permeability of the membranes to a greater degree so that they prevent the rapid decay of the cells.

In risk reduction of cardiac diseases due to vascular obstruction, the beneficial effect of the phenol components originated from wine may prevail via anticoagulant mechanisms as well. Polyphenols of the wine inhibit platelet and macrophage cyclooxygenase and lipoxigenase enzyme activity, thus making the process of coagulation slower. Through their radical-scavenging i.e. antioxidant properties they inhibit the damage of endothelial prostacyclin and endothelium-dependent relaxation factor caused by lipid peroxidation [36, 48, 54–56].

The alcohol content of red wines varies between 10 to 15%. Their compounds with antioxidant properties suffer little damage in the course of processing, and they contain no carcinogenic ingredients according to our current knowledge. Their appetising and digestive effects have been well-known for a long time. Owing to the alcohol content, polyphenol compounds can be easily absorbed through the alimentary tract [8, 49, 52]. The polyphenol contents of some wines commercially available in Hungary are shown in Figure 2. It is important to note that not only the red but also white vines exert an influence on certain functions of the organism, such as on endothelial function of the vessels in the extremities in cardiovascular diseases [57]. Complex binding capacity of some Hungarian wines based on our data are demonstrated in Figure 3.

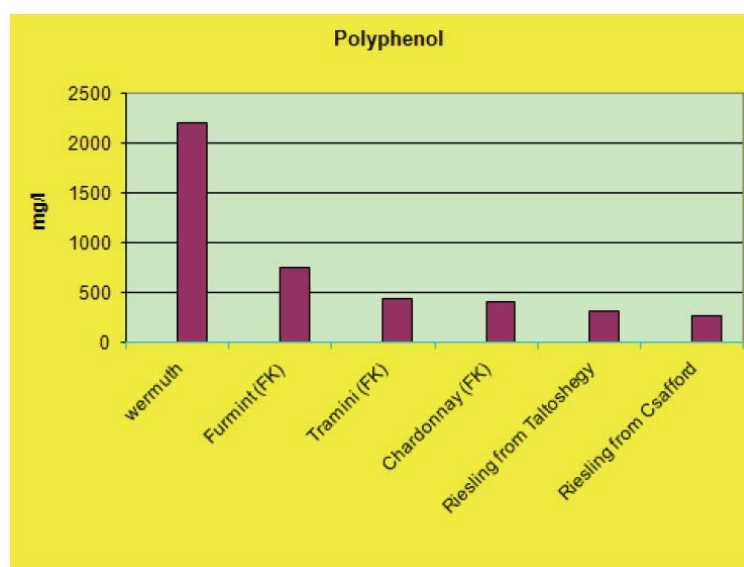


Fig. 2 Polyphenol content of some bottled wine varieties commercially available in Hungary (based on the data of J. Feher and A. Lugasi).

Among the polyphenols the resveratrol has got a special effect on the different tissues and cells both in animals and human [58]. Its some specific molecular biologic effects are demonstrated in Table 1 together with the references [59–62]. It is necessary to

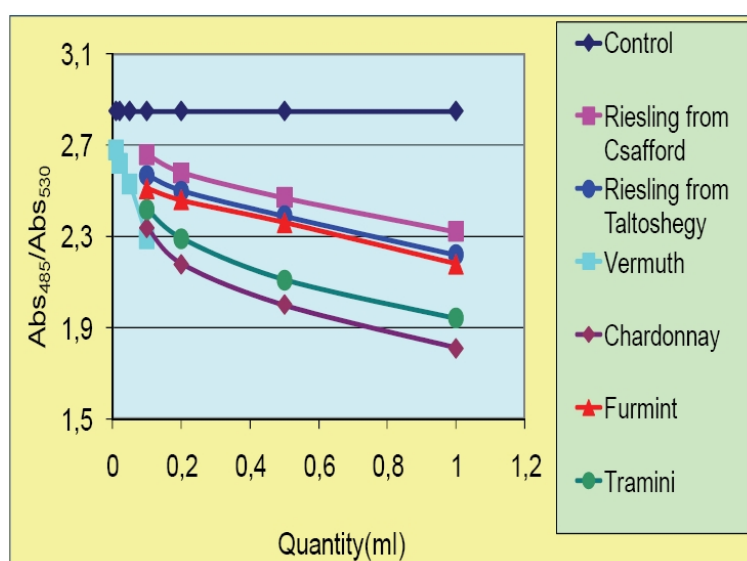


Fig. 3 Complex binding capacity of some Hungarian wines (based on the data of J. Fehér and A. Lugasi).

mention that other content of the food is very important in the reduction of cardiovascular mortality [63]. The polyphenol nutrition [64] like the poly pill treatment is able to reduce the mortality rate by 76 percent (Figure 4).

Table 1 Cardiovascular effects of resveratrol on isolated tissues or organs.

Method of trial	effect	reference
Ischaemic-reperfused rat heart	Expression of anti-apoptotic Bcl-2	[59]
Rat cardiac fibroblasts	mediated by A-II, epidermal and inhibition of signalling pathways transforming growth factors	[60]
Human platelets	Reduced platelet aggregation	[61]
Human coronary artery endothelial cells	Inhibits TNF- α -induced NF- κ -B activation and inflammatory markers	[62]

As demonstrated above, the polyphenol compounds of grape origin play an essential role in the beneficial effects of wines. Some wine-producing techniques offer a possibility for increasing the polyphenol content. Well known, polyphenol content of the red wines is substantially higher than that of the white ones; this follows from differences both in basic material and in wine-processing technology. The polyphenol content of wines can also be increased by adding components from other plants. Vermouths of excellent quality and pleasant aroma can be produced with extracts of herbs and spices or their mixtures. Vermouth occupies an intermediate position between dessert wines and liqueurs, and essentially it is an aromatised dessert wine with a bouquet dominated by the odour and flavour of absinth and other substances that give a bitter taste [65].

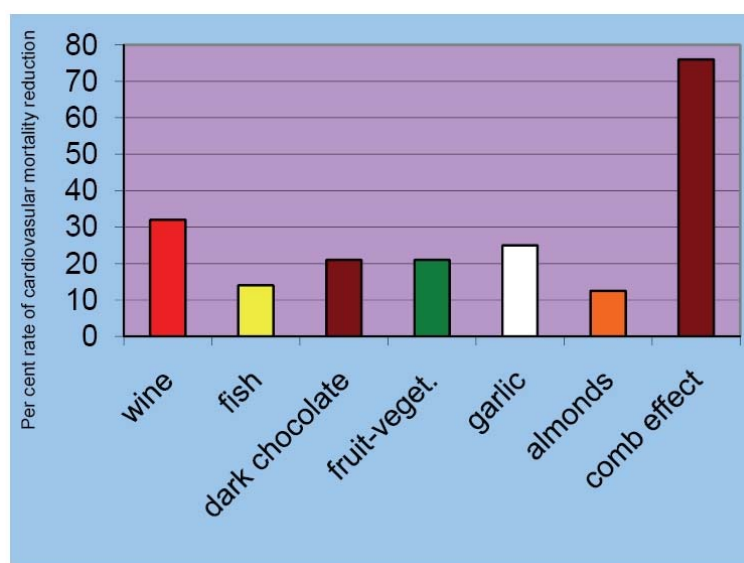


Fig. 4 Reduction rate of cardiovascular mortality after polymeal nutrition.

5 Conclusions

In the treatment and prevention of some dermatological diseases the use of ointments containing polyphenols of wine and cosmetic treatments with them may be beneficial due to their free radical scavenging effect. In healthy people the consumption of a moderate amount of 1 to 2 dl wine a day can reduce cardiovascular mortality. However, also this amount can be harmful in pregnant women, in children, and in patients with various organic - particularly hepatic - diseases, as well as in association with the regular administration of certain medicines. Therefore, whatever benefit seems to be attributed to the moderate consumption of wine; caution is warranted in certain cases.

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