

Herbal Wine: A Review

Vaishali Rathi*

Lovely Profesional University, Phagwara, Punjab, India

Abstract

Wine is used as a base for medicinal preparations compounded with various herbs to treat specific diseases and disorders right from start of this century. Regular, but limited ingestion of these herbal wines tend in minimizing the need for synthetic medicines for treating various disorders by getting benefits of the herbal extracts. Numerous herbs are used to prepare herbal wine like amla, tulsi, ginger, aloe vera, tea, peppermint, and lemongrass; where either the herb is used solely as substrate or combinations of herbs are used or fruit juice is used as substrate (orange or apple juice). The combinations gave a novel product with better qualities, increased acceptability and wider applications. So, such fortifications need to be explored for developing products that could be included in the realm of health-specific products. They need to be explored more to open new doors in herbal wine industry.

Keywords: Wine; Herbal wine; Herbs; Health benefits; Extraction

Introduction

Wine comes under category of one of the fermented foods. It is stated that wine is the most ancient and most established fermented product. Right from the ancient era, the wine is produced from grapes, by fermenting the grapes to a specific duration of time, ageing them in oak barrels followed by storage in wood barrels covered with leather cloth. Grape juice is fermented with variety of yeast with subsequent ageing process yields alcoholic fruit wine. Different fruits like apple, apricot, kiwi, strawberry etc. are converted through yeast metabolic activity and changed through a process of time into wine [1,2]. These wines made from different fruits are made from either partial or complete fermentation process [3]. Wine contains different variety of polyphenols and other constituent such as bioactive compounds (bioactive peptides) which aids in health maintenance of consumer. During fermentation, these bioactive compounds are released into wine (aqueous ethanolic solution) making the polyphenols and bioactive components vulnerable, increasing their bioavailability, available during their absorption [4]. Wine gives the relaxation to body organs necessary for the metabolic activities like digestion and absorption of human diet [1].

Basic classification of wine:

Classified to 4 major categories as

Table wine: It includes the most popular and most selling wines i.e. red wine, white wine and cider (apple cider etc.) with sparkling wine that has the touch and appearance of carbonated beverage.

Medicinal wine: It is having medicinal properties, usually prepared with the incorporation of herbs and medicinal plants.

Fortified wine: It is known as aromatized wine with special essence and includes vermouth which is sparkling flavoured wine either flavoured with herbs or any other flavour inducing product. The vermouth could be dry vermouth or sweet vermouth.

Fruit wine: Prepared from fruits other than grapes like apple, banana, cherry, pear, plum, pomegranate, etc.

Classification of wine (on basis of fruit)

Grape wine: Grape wine falls under category of table wine and is prepared through alcoholic fermentation by using yeast cultures and grapes (could be black or green). It basically includes red wine and

white wine [5-8].

Non grape wine: Fruits are produced throughout the world depending on the climatic conditions and environmental support of the particular fruit. They are produced in surplus amount in their respective growing area and are really nutritious. Fruits are consumed worldwide and are exported-imported across the borders. During the glut period the fruits deteriorate excessively due to many obvious reasons like high temperatures, humidity, improper handling, bruising during handling and transportation, microbial contaminations, pests' rodents invasion in storage area etc. Thus they are not in position to be eaten; these semi or completely deteriorated fruits are used in wine making. These fruits not only contribute in making novel wine but also increase the waste management [9, 10]. Non grape has been already prepared from fruits like banana, apple, kiwi, strawberry, cherry, pineapple, jackfruit, jamun, raspberry, lychee, peach, pomegranate etc. (Table 1)

Herbal Wine

Before the revolution in medicinal area and rise of modern medicines, people were treated using the herbal formulations that were derived from plants [28]. Herbal infusions are trendy in wine these days. These herbs are either in powder form or completely dry form. Herbs have many positive effects on health and overall body of the human. These herbs tend to have anti-microbial; anti-cancerous properties. Herbal formulations confer the health benefit on host beyond the normal benefit. Host will be benefitted both physically and mentally. These herbal infusions in alcoholic drinks and beverages have tended to lower down the hypertension and increase overall body performance [29].

Different types and cosmopolitan variety of herbs play a vital role in flavour enhancement and wine production. The herbs used in herbal wine are having more tannins, polyphenols and lower titratable acidity. Herbal extracts have surplus esters and aldehydes making it

*Corresponding author: Vaishali Rathi, Lovely Profesional University, Phagwara, Punjab, India, Tel: +919501884591; E-mail: vaishali.rathi148@gmail.com

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Fruit (substrate)	Botanical name	Result (%alcohol)	Reference
Apple	<i>Malus domestica</i>	-	Wang et al. [5]
Banana	<i>Musa sapientum</i>	5 11.28	Akubor et al. [11] Kaur and Kaur [12]
Black raspberry	<i>Rubus occidentalis</i>	-	Jeong et al. [13]
Cherry	<i>Prunus cerasus</i>	10.81	Sun et al. [14]
Custard apple	<i>Annona squamosa</i>	11.90	Jagtap and Bapat [10]
Elder berry	<i>Sambucus nigra</i>	13.20	Schmitzer et al. [15]
Guava	<i>Psidium guajava</i>	8.3	Sevda and Rodrigues [16]
Jamun	<i>Syzygium cumini</i>	6 9.9-11.8	Chowdhury and Ray [17] Joshi et al. [18]
Kiwi	<i>Actinidia deliciosa</i>	13.5	Soufleros et al. [19]
Lychee	<i>Litchi chinensis</i>	12.42	Alves et al. [20]
Mango	<i>Mangifera indica</i>	8.5	Reddy and Reddy [21]
Orange	<i>Citrus sinensis</i>	90.38	Selli et al. [22]
Papaya	<i>Carica papaya</i>	55.23	Lee et al. [23]
Peach	<i>Prunus persica</i>	13.9	Davidović et al. [24]
Pineapple	<i>Ananas comosus</i>	10.2	Pino and Queris [25]
Pomegranate	<i>Punica granatum</i>	9.05	Mena et al. [26]
Raspberry	<i>Rubus idaeus</i>	74.4	Duarte et al. [27]

Table 1: Non grape wines prepared from fruits other than grapes

nutritional and medicinal. Tannins found in the herbs are astringent in nature; they have aroma enhancing and antioxidant properties. They contain hydroxyl groups and carboxyl groups to form strong complexes with proteins [30]. These are diverged to have polygamous roles like enhancers, preservatives and antioxidants. These antioxidants are found in flowers, fruits, stem, roots, bark and leaves. Many studies have shown that consuming red wine can delay ageing and is protective against many diseases [31]. Herbal wine's constituents are aromatic and helpful in maintaining the health of animals and human beings. Herbal wine has many health benefits like reduction in ovarian cancer, strengthening the bones and overall skeleton, cancer cells deterioration, prevention of heart strokes by keeping the coronary arteries clean, elevating the lung functionality. In a nutshell these herbs can deliver good anti-microbial, anti-bacterial properties, anti-mutagenic properties [32].

History of Herbal Wine

When the contemporary medicine was not in use, herbal formulations were tried on persons to heal and for body soothing. The earliest evidence of plant additives in fermented beverages were reported in China and Middle East. Chemical analysis data of earthenware gave the proof of herbal incorporation in ancient alcoholic beverages. Also, addition of tree resin in wine was reported to protect the consumer against wine disease. Evidences of tree fragrance additives along with native species like rice, wheat and millets in the alcoholic formulation were reported in china [33,34]. Vegetable, fruits and roots-bulbs like ginger, garlic and onion were subjected to fermentation in aqueous medium thus producing herbal formulation. These ingredients are macerated mixed together, steeped and strained for extracting herbal flavours. These ingredients are still part of Egyptian wine making and tradition and are effective against common ailments like cough, common cold and fever [35]. Researchers have started to report chemical and botanical evidence like herbal concoctions in alcoholic drinks. At the same time Abydos wine, herbal drink made of native rosemary and mint mixed with thyme added to fermented emmer wheat barley beverage from Spain came into reflection [36].

Flavour Extraction of Herbs

Direct extraction

It involves initial weighing of herbs followed by putting the desired

herb in the base wine and let the wine sit for several hours; allowing the complete flavour of herb to come in the base wine [37]. To increase the flavour flow from herbs in to the base wine, it is better to make fine powder of herbs. The base wine flavoured with spices or herbs could either be heated or kept at room temperature while moving forward. Wine heating is usually preferred for better mixing of flavours with base wine [38].

Concentrate extract method

Extract is prepared by placing the herbs and spices outside in a vessel and passing the base wine through that vessel till complete flavour come in the base wine [39].

Maceration

Macerating the mixtures of herbs in sherry at 60°C and allow it to stand for 3-4 weeks or by putting herbs and spices in solvents like ethanol (or any other solvent) and extracting the flavour out of herbs. Wine along with herbs is decanted and allowed to stand for 10 days [40].

Sonication assisted or microwave assisted extraction

This technique involves principle of maceration along with microwave or ultrasound waves to extract the herbal flavours so as to shorten the extraction time. This technique is generally applied for large scale extraction of small amount of materials [40].

Infusion

An extraction procedure where herbal material is immersed in the hot or cold liquid for a small period of duration so as to produce dilute liquid preparation [40, 41].

Decoction

By boiling the herbs or medicinal plant in water so that all the essence and aroma of herbs flow into the water [40]

Other methods

Involves crushing and grinding of the herbs followed by boiling them in water or putting herbs in the hot water [42] Commercially

available flavoured wine or brandy (extracted by direct method or concentrate method) could be used to flavour the base wine [42]. The extraction is generally carried out in one or two in-sealed vessels to minimize the loss of volatiles [43].

Herbs Used in Making Herbal Wine

Herbs act as enhancer, antioxidants, preservative in wine. Herbs aids in body weight management and good cardiovascular activity. Evidences of usage of herb from Palaeolithic period are there where the herbs are subjected to steeping and straining for flavour extraction and kept for fermentation or mixing with alcoholic beverage like beer. India has rooted evidences of expertise in Ayurveda where herbs, herbal powders and liquid herbal formulations were proved effective against diseases from common ailments to fatal diseases [44]. Herbs along with

liquid solutions (herbal formulations) were used for treatment of since the invasion of diseases on mother earth. Table 2 shows different types of herbs used in making herbal wine.

Health Benefits of Herbal Wine

Herbal wine prepared with incorporation of herbs possesses many health benefits. Herbs have natural anti-bacterial constituents. Most of the herbs have anti-cancerous, anti-diabetic, anti-microbial and anti-inflammatory properties. Herbal wine is prepared either solely from single herb like amla, holy basil etc. or it could be prepared by adding the mixture of multiple herbs like aloe-amlam and aloe-ginger wine [47]. These are solely the polyphenols in wine that potentiate the growth of probiotic bacteria, inhibit non-beneficial bacteria from the human micro biota, ultimately conferring health benefits to the host [55].

Name of the herb	Medicinal usage of herb	Quantity	Parts of herb or plant used	Result (%Ethanol/Remarks)	Reference
Holy basil (<i>Oscimum sanctum</i>)	Therapeutic properties against common ailments like cold, cough, chronic dysentery. Anti-cancerous, anti-oxidant, anti-diabetic and good gastro-intestinal effect.	15 gm herb in 200 ml water Giving 200 ml of extract	Stem , leaves of holy basil	Wine made from holy basil extract received the best views for flavour scored 15/20	Shiradhonkar et al. [41]
		Leaves were boiled in water	Stem , leaves of holy basil	Wine with 5.51% of ethanol produced	Kaur and Kaur [12]
Lemon grass (<i>Cymbopogon citratus</i>)	Medicinal properties against stomach disorders, fever, anti-cancerous	15 gm in 200 ml Giving 200 ml of extract	Herb itself	Pleasant aroma, scored max. Points 16/20 in aroma	Shiradhonkar et al. [41]
Peppermint (<i>Mentha arvensis</i>)	Antibacterial, antifungal, antiviral. Effective against respiratory congestions and common ailments like cough and cold	10 gm of leaves in 200 ml of water	Herb itself	-	(Shiradhonkar et al. [41])
		1%,3%,5%,7%,9% extracts used	Herb used	-	Joshi et al. [45]
Ginger (<i>Zinziber officinale</i>)	Antioxidant, regulation of glucose and lipid levels, anti-cancerous and antifungal effects. Effective against respiratory congestions and common ailments like cough and cold.	10 gm of roots Cut into pieces Boiled with 200 ml of water	Roots	-	(Shiradhonkar et al. [41])
Indian gooseberry (ANOLA) (<i>Emblica officinalis</i>)	Regulation of bowel movements, effective against constipation and stomach disorders. Good for eye sight and hair growth. Rich source of vitamin C	100 gm	berry	Ethanol:11.4%	Nandagopal and Nair [46]
		1%,3%,5%,7%,9% extracts used	Dried anola used	9% alcohol	Joshi et al. [45]
		-	Whole berry	12% alcohol	Soni et al. [47]
		-	berry	10% alcohol has highest polyphenols content. Gooseberry wine was better in terms of all sensory and biochemical aspects, withstand all quality parameters	Rana and Singh [48]
Aloe vera (<i>Aloe Barbadosis</i>)	Antibacterial, antifungal, antiviral, anti-inflammatory, tissue healing properties, gastro-intestinal effect, anti-arthritis effect.	100 ml of aloe vera juice	Aloe leaves and transparent slime	8.52 % ethanol	Trivedi et al. [49]
Garlic (<i>Allium Sativum</i>)	Effective against cardiovascular disease, Alzheimer's disease, hyperlipidemia and against hypertension. Anticancerous, antimicrobial, good dermatologic applications.	1%,3%,5%,7%,9% extracts used	Whole garlic by peeling off outer skin	Garlic wine has the highest yeast growth inhibiting property	Joshi et al. [45]
Hops (<i>Humulus Lupulus</i>)	Relaxing and sleep inducing activity, anti-inflammatory, against menopause symptoms, anti HIV 1 viral activity, anti-acne activity, aids in weight loss and effective in elevating cardiovascular health.	1%,3%,5%,7%,9% extracts used	By boiling the female flowers within apple wine so that flavour come in wine at 50-55°C	-	Joshi et al. [45]

Purple sweet potato (<i>Ipomoea batatas</i>) blending with 18 different herbs	Rich in anthocyanin and possess anti-oxidant activity.	100 gm	Root of purple sweet potato used and all the herbs were used as powder	Ethanol : 8.61% Wine has the medicinal flavour and dark colour was attractive. The wine is rich in antioxidants such as anthocyanin and phenols and possesses remedies for common ailments like cold, cough, skin diseases and dysentery.	Panda et al. [50]
Tea (<i>Camellia sinensis</i>)	Rich in polyphenols and astringent compounds like flavonoids that aids in protection against common ailments like cough, cold and fever. Anti-cancerous and anti-ageing property.	4 gm	Tea extract used	8.82% alcohol and wine possessed antimicrobial activity against <i>E.coli</i> , <i>enterococcus faecalis</i>	Kumar et al. [51]
Hibiscus petal (<i>Hibiscus rosa sinensis</i>)	Antifertility, wound healing, anti-depressant, anti-oxidant and anti-diabetic activity.	–	Dried crushed flowers petals	Ethanol: 11.50% MTCC no. 178 was found most potent of all the produced wine.	Tiwari et al. [52]
Blue water lily (<i>Nymphaea lotus</i>) used with cassava starch	Used for dysentery and dyspepsia, mainly used to treat indigestion. Its leaves act as cooling medicine in cutaneous diseases. Therapeutic effect against liver and urinary disorders along with menstrual problem.	1 gm of dried weight	Bud and stamen	Ethanol : 14% Nymphaea-cassava wine was the best among all the wines prepared combinations and had the most anti-oxidative properties. Good DPPH activity and TPC were detected from herbal wines prepared from the bud of <i>Nymphaea lotus</i> .	Amornpitak et al. [53]
Wild berries <i>Emblica officianalis</i> <i>Berberis lyceum</i> ; <i>Pyrus pashia</i> ; <i>Actinidia delisiosa</i> ; <i>Syzgium zambo</i> ; <i>Prunus cerasoidus</i> ; <i>Rubus ellipticus</i> ; <i>Cratagus spicicus</i> ; <i>Citrus karne</i>	When ingested in small concentrations they show positive results. Possessed effects of antifertility, wound healing, anti-depressant, anti-oxidant and anti-diabetic activity. Reduced increased kapha and pittha, helpful in conception by preparing and strengthening uterus. Effective dermatological properties.	1 kg	Berries used	Wine prepared from <i>Emblica officianalis</i> has highest amount of polyphenols measured as total phenol count. Wine prepared from <i>Emblica</i> and <i>Prunus cerasoidus</i> had shown the best results among all herbal wines prepared	Rana and Singh [48]
Base wine used as juice (orange juice, apple must, cane juice etc.)					
Holy basil, Lemon grass, Peppermint, Ginger (Supplemented with orange juice)	Antioxidant, regulation of glucose and lipid levels, anti-cancerous and antifungal effects. Effective against respiratory congestions and common ailments like cough and cold.	15 gm	Leaves	Lemon grass herbal wine had pleasant aroma and marked the best in all sensory parameters appreciation in taste.	Shiradhonkar et al. [41]
Aloe vera (Supplemented with cane sugar juice)	Anti-microbial properties, anti-ageing, laxative effect, effect on ulcers, dermatological effect and other cosmetic uses		Leaves	The wine has antimicrobial activities against foodborne pathogens and it provides digestive benefits and good intestinal health.	Trivedi et al. [49]
Tea (Apple juice)	Decreased Atherosclerosis, reduced risk of CHD, enhanced endothelial function, anti-inflammatory effect	4 g/100 ml	Tea extract	Best results with apple juice concentrate as sugar source, DAPH used as nitrogen source and showed anti-microbial activity.	Joshi and Kumar [54]

Table 2: Different types of herbs used in making herbal wine

Historic evidences support addition of coriander with beer or any sweet formulation like honey, flax for traditional use in several medicinal prescriptions for treatment of piles (blood in stool).

These herbal wines have the power to reduce the blood sugar level in the body. They also control this glucose level in the body. Herbs that are subjected proved to be so effective in the body that they aids in regulating the enzyme secretion. Herbal wine have numerous properties like anti-diabetic, anti-oxidant, gastro-protectant, pain killer (analgesic), nerve soothing, good intestinal motility and cardiac activity [56-58]. Herbal wine possesses antimicrobial and antibacterial activity against food borne pathogen [59]. These herbal wine and medicines are

reaching up to DNA level, and herbs have the ability to get under the nerve for protection against radiation induced chromosomal damage [60]. Table 3 illustrates all the health benefits possessed by herbal wine

Herbal Wine: A Better Approach

Homemade wines have relatively low alcohol content than the commercially available wine. Commercially available wines are having high alcohol percentage and are subjected to preservatives for storage. In homemade herbal wine formulations there is usage of neither any preservative nor additives, as these herbs are acting as preservatives so these herbal wines are not harmful for health and are acceptable

Effect possessed by herbal wine	Findings and remarks	Reference
Antimicrobial activity	Phenolic compounds found in amla wine or all the herbal wines (apple wine, <i>Ludwigia octovalvis</i> wine) are anti-microbial in nature, with increase in phenols concentration in wine, antibacterial activity get increased detected by various bacterial assays like zone of inhibition, disc diffusion method, Broth micro dilution method	Gayon and Glories [61]; Allah et al. [62]; Yakob et al. [63]; Cohen [55]; Kumar et al. [51]
	Antibacterial activity against food borne bacteria like <i>Typhimurium</i> , <i>S.aureus</i> , <i>E.coli</i> (food borne pathogens) and probiotic strains detected through MIC, MBC and time dependent bacterial assay values in aloe amla- aloe ginger wine and hibiscus petals herbal wine	Trivedi et al. [59]; Tiwari et al. [52]
	Antibacterial activity in apple tea wine possessed due to fermentation of apple naturally and in presence of yeast <i>Saccharomyces cerevisiae</i> that lead to antimicrobial activity	Kumar et al. [51]
	Antimicrobial activity possessed by herbal wine prepared by <i>Ludwigia octovalvis</i> checked on <i>E.coli strain O157:H7</i> (most pathogenic strain) and some other pathogenic bacteria like <i>Bacillus spizizenii</i> and <i>Pseudomonas aeruginosa</i> detected by disc diffusion method, Broth micro dilution method.	Yakob et al. [63]
	Aloe vera based herbal wine not only possess the antibacterial activities but also support and maintain the persistence of lactobacilli in the wine fed animal gut	Trivedi et al. [49]
Anti-oxidant activity	Phenolic compounds in wine prepared from amla possess antioxidant activity	Gayon and Glories [61]
	Bioactive compounds present in herbs of herbal wine have antioxidant activity which is effective in free radical scavenging activity that leads to anti-ageing as free radicals are responsible for cell ageing and death.	Sharma et al. [64]; Trivedi et al. [59]
	Herbal wine prepared from different herbs like ginger, amla, tulsi, peppermint, lemongrass and starchy compounds like cassava starch, purple sweet potato also possess antioxidant activity	Amornpitak et al. [53]; Rana and Singh [48]; Yakob et al. [63]; Panda et al. [50]
Anti-cancerous	Herbal wine prepared from alma, tulsi, ginger, aloe vera is effective against cancer and has been likely to reduce cancer chances.	Seo et al. [66]; Panda et al. [50]
Source of vitamins	Wine yeasts like <i>Brettanomyces</i> , <i>Sachharomyces cerevicae var. Ellipsoidus</i> , <i>Brewer's yeast</i> , <i>Pineapaple yeast</i> are good source of all B complex vitamins; fat soluble and water soluble vitamins.	Reed, [67]
Medicinal and therapeutic properties	Polyphenols present in herbal wine has beneficial effects against human diseases like cardiovascular diseases, cancer, diabetes, etc.	Seo et al. [66]; Panda et al. [50]
	Holy basil herbal wine have therapeutic properties like anti-cancerous, against common ailments like cough, cold and sore throat infections. It is good option for pure fermented herbal beverage. This herbal wine is effective against inflammation, neurological disorders and diseased lungs.	Kaur and Kaur [12]
	Wine prepared from purple sweet potato possess therapeutic properties against common ailments like cold, cough, chronic dysentery Increasing the functionality of liver	Panda et al. [50]
	Herbal wine prepared by using tulsi, ginger, lemongrass and peppermint has positive effect on body in treating diseases like diarrhoea, migraine, diabetes. Wine was gastro-protectant, good for cardiac activity and to treat nervous inflammation.	Shiradhonkar et al. [41]; Stewart, John et al. [56]; Craig [57]; Prakash and Gupta, [58]
	Moderate consumption of wine leads to protective action against Alzheimer's disease	Seo et al. [66]
Treating the various body disorders and disfunctionality at DNA and chromosomal level	Herbal holy basil wine has protection against radiation induced chromosomal disorders by two water soluble flavonoids orientin and vicenin of <i>ocimum</i>	Uma Devi et al. [60]
	Protective role of aloe vera wine against oxidative stress induced by salmonella infection on animal murine model This oxidative stress was measured by hepatic superoxide dismutase activity and reduced glutathione levels.	Trivedi et al. [59]

Table 3: Health benefits of herbal wine

for daily consumption. Plants contain a diverse array of metabolically active chemicals, including secondary compounds or allelochemicals (e.g., alkaloids, glycosides, phenolics, and steroids) that are beneficial to human and human health. Many metabolically active secondary compounds from plants are capable of inducing varied and profound phenotypic and genotypic changes among consumers. Sometimes, these secondary compounds in plants promote human health and survival. Human metabolic biology is intimately connected to biochemical medicine [68]. These plants parts or herbs when administered in body act round the clock from being blood purifiers, anti-microbial in nature

to enhancing cardiovascular health and maintaining the body weight. Herbal interactions with human cells and enzymes works dynamically reaching up to the minute electron and thus providing benefits to human; acting as functional foods giving health benefits beyond normal.

Conclusion

In past generations the consumers and customers who would not like consumption of wine were often meant to be uncultured. But globalization, industrialization and the accompanying rapid worldwide

access to knowledge about different types of wines, herbs and their flavours along with the respective health benefits of each herbal component added in wine, has resulted in a more knowledgeable and empowered consumer with more sophisticated understanding of product value. Although during the last decade; biotechnology has genetically mutated yeast strains that effectively and exponentially work on the substrates to yield alcohol. While food technology has developed new procedures and process to alter the already existing methodologies of wine making so as to make new product that is equally showed and accepted by customers. Now the whole production and acceptance of the wine is totally dependent on its consumer. In twenty-first century, thorough appreciation of product behaviour and consumer choice is the utmost requirement by the wineries. Herbal wine possesses all the health benefits that confer the health benefits on host beyond the normal nutrition. Health conscious consumers are always seeking the food that is not only nutritional but also confer remarkable and distinctive health benefits. Wine contains physiologically-active components that may enhance health. It should be stressed, however, that herbal wine is not a magic bullet or universal panacea for poor health alteration. It is an invasion in consumer body to alter the poor health with betterment. Herbal wine and herbal formulations provide resplendent health benefits to consumer. They act one way or another as functional foods also. They have unique properties that only give health benefits to consumer. In a nutshell, these herbal wines are novel way to step in the herbal era of wineries.

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