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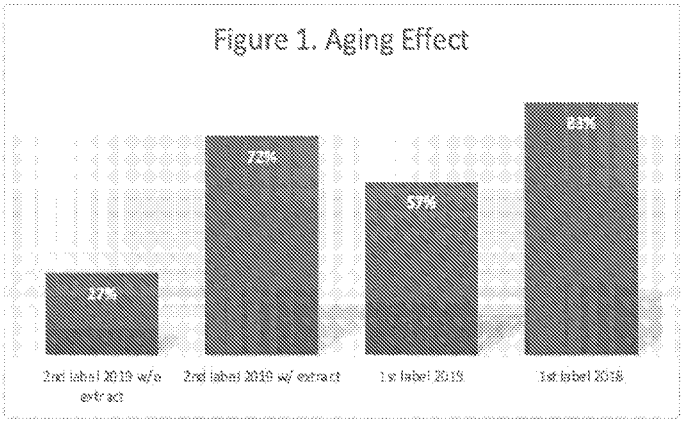

(57) Abstract: Materials and methods for enhancing wine quality are described, A plant extract enhances wine sensory quality.

WO 2024/173918 A1

ENHANCING WINE QUALITY WITH OR WITHOUT AGING

FIELD OF THE INVENTION

[0001] The invention relates to wines, that may or may not be aged, and materials and methods for improving key drivers of wine quality.

BACKGROUND OF THE INVENTION

[0002] Once bottled, many wines undergo, over time, a change of sensory characteristics, a phenomenon commonly known as aging.

[0003] An aged fine wine can offer more complexity and valued attributes, such as, newly developed tertiary aromas, more pleasing mouthfeel, softening of tannin flavoring, longer lingering finish and so on, which are derived or develop after fermentation (2, 4, 5). Many of those beneficial components or characteristics are identified as drivers or characteristics of wine that please consumers (6, 7, 8). Regardless of wine variety, aging can be key to defining or to creating overall quality of fine wines.

[0004] Generally, not all wines are worthy of aging, such as, wines that have insufficient acidity, lower levels of tannins, less structure, lower levels of alcohol and so on, as known in the art. The mechanics of aging are not well understood, and aging wine entails significant storage and time investments, which contribute to increased cost (1, 2). There is not always a guarantee of improvement, because, for example, exposure of a wine to sediment; residual chemicals, such as, detergents; a cork; trapped air; and so on.

[0005] Aging counts among the most fascinating, yet least understood phenomenon essential to oenology (9).

[0006] Due to higher costs, generally, less qualified wines are not aged. With a less qualified wine, structural components, such as, acidity or tannin level, may become overly strong or disappear altogether with aging. Flaws or elements not in balance in a less qualified, young wine, such as, an oak or oaky flavor or alcohol content, can become exaggerated.

[0007] It is estimated 90% of wine is targeted for consumption within a year of bottling, and 99% of wine is targeted for consumption within 5 years of bottling (3).

[0008] Furthermore, some varieties of wine, such as, certain varieties of sauvignon blanc, pinot grigio, rose, gewürztraminer, moscato and so on, may not or do not benefit from aging, regardless of quality.

[0009] Only about 5-10% of wines improve after 1 year in the barrel or bottle, and only about 1% improve after 5-10 years of aging (3).

[0010] Therefore, there is a need in the wine field to dissect and to understand the aging process or to find a way to bypass the aging process to obtain valued attributes, that will boost attractiveness of low to middle quality wines or unaged wines, making those wines more attractive, more desirable, more tasty and so on to consumers therefore avoiding or minimizing unpredictability and costs of aging.

[0011] That goal was achieved by discovering certain plant or botanic extracts that enhance beneficial characteristics of wine, including lower quality or unaged wine.

SUMMARY OF THE INVENTION

[0012] The instant invention is directed to materials and methods that improve quality of wine, such as, young wines, wines not targeted for aging, unaged wines and so on.

[0013] In embodiments, an extract from a botanic or a plant source is added to a wine to enhance properties of that wine. An extract of interest is an enhancer of interest. An extract of interest is an additive of interest. An enhanced wine of interest comprises an enhancer of interest.

[0014] In embodiments, an enhancer of interest adds to an untreated wine, attributes of an aged wine, such as, tertiary aromas, more pleasing mouthfeel, more pleasing taste sensations, lingering mouthfeel, improved aftertaste characteristics and so on. Tertiary aromatic aromas and tastes include the aroma of dried flowers, dried fruits, earthy or earthiness, mineral or mineralness, leather, tobacco and farmyard or grassiness. More pleasing taste sensations include tempered acidity, tempered bitterness and umami. Mouthfeel sensations include tempered astringency and being more mouthwatering. Aftertaste characteristics include a blended or smooth finish, a balanced finish and longer lingering finish.

[0015] In embodiments, a plant originated extract or enhancer of interest can be added prior to bottling.

[0016] In embodiments, a plant originated extract or enhancer of interest can be added after bottling, for example, by a consumer.

[0017] In embodiments, from about .005 ml to about 1.0 ml of extract is added to 175 ml of wine. In embodiments, from about 0.01 ml to about 0.9 ml of extract is added to 175 ml of wine; from about 0.02 ml to about 0.8 ml; from about 0.03 ml to about 0.7 ml; from about 0.04 ml to about 0.6 ml; from about 0.05 ml to about 0.5 ml; from about 0.06 ml to about 0.4 ml; from about 0.07 ml to about 0.35 ml; from about 0.08 ml to about 0.3 ml from. about 0.085 ml to about 0.3 ml; from about 0.09 ml to about 0.29 ml; from about 0.095 ml to about 0.28 ml; from about 0.10 ml to about 0.27 ml; from about 0.125 ml to about 0.265 ml; from about 0.13 ml to about 0.26 ml; from about 0.14 ml to about 0.25 ml; from about 0.15 ml to about 0.2 ml; from about 0.16 ml to about 0.19 ml; from about 0.165 ml to about 0.185 ml; from about 0.1675 ml to about 0.1825 ml; from about 0.17 ml to about 0.18 ml; from about 0.17 ml to about 0.175 ml; about 0.17 ml and so on of extract are added to 175 ml of wine.

[0018] In embodiments, an extract is from a plant of the genus, Vita (or Vitis), Camellia, Matricaria or Rubus.

[0019] In embodiments, an extract is from a Vitis vineria, a Camellia sinensis, a Matricaria chamomilla or a Rubus occidentalis.

[0020] In embodiments, a plant, or part thereof, is fermented prior to obtaining an extract, for example, fermented up to about 3 weeks or more.

[0021] In embodiments, a plant, or part thereof, is compressed.

[0022] In embodiments, a plant, or part thereof, is aged, for example, aged up to 30 years or more.

[0023] In embodiments, a plant is a tea, or part thereof.

[0024] In embodiments, a plant is a black tea, or part thereof.

[0025] In embodiments, a plant is a tea fermented, for example, up to about 3 weeks or more.

[0026] In embodiments, a plant is a black tea fermented, for example, up to about 3 weeks or more.

[0027] In embodiments, a plant is a tea compressed and fermented.

[0028] In embodiments, a plant is a tea compressed, fermented and aged.

[0029] In embodiments, a plant is a black tea compressed and fermented.

[0030] In embodiments, a plant is a black tea compressed, fermented and aged.

[0031] In embodiments, a plant is a tea aged for at least about one year.

[0032] In embodiments, a tea is aged for up to 30 years or more.

[0033] In embodiments, a black tea is aged, for example, up to 30 years or more.

[0034] In embodiments, a plant is a tea from India or China.

[0035] In embodiments, a plant is a tea wet fermented or wet piled.

[0036] In embodiments, a plant is a Pu'erh (also spelled, Pu'er) tea.

[0037] In embodiments, an extract of interest comprises a water extract of a Pu'er tea.

[0038] In embodiments, an extract of interest comprises a water extract of a wet fermented Pu'er tea.

[0039] In embodiments, a fixed amount of plant material is used to obtain an extract of interest.

[0040] In embodiments, a fixed amount of solvent is used to obtain an extract of interest.

[0041] In embodiments, a solvent is a water.

[0042] In embodiments, a solvent is one generally regarded as safe (GRAS).

[0043] In embodiments, a fixed amount of plant material is added to a fixed amount of solvent, at a ratio of, for example, in terms of weight to volume (w/v) of about 1:1, about 1:2. about 1:3, about 1:4, about 1:5, about 1:6, about 1:7, about 1:8, about 1:9, about 1:10 or higher (or larger, that at, a ratio containing a greater amount of solvent relative to amount or weight of plant material).

[0044] In embodiments, extraction occurs at a temperature higher than room temperature (RT). For example, extraction can occur at at least about 55° C, at least about 60° C, at least about 65° C, at least about 70° C, at least about 75° C, at least about 80° C, at least about 85° C, at least about 90° C, at least about 95° C, or at a higher temperature.

[0045] In embodiments, extraction occurs for at least about 2 minutes, at least about 3 minutes, at least about 4 minutes, at least about 5 minutes, at least about 7.5 min, at least about 10 min, at least about 12.5 min, at least about 15 minutes, or longer.

[0046] In embodiments, a fixed amount of plant material is combined with a fixed amount of solvent to obtain an extract of interest. Hence, a fixed amount of plant material is suspended in a fixed amount of solvent. If needed, a plant material is pulverized, ground, macerated, crushed, pounded, separated, dispersed and so on, prior to solvent exposure to enhance exposed surface area of a plant material to a solvent.

[0047] If needed, a plant material is dispersed in a solvent in a first, preparing, exposure step. If needed, a plant material is hydrated in a solvent in a first exposure step. A first exposure step also may clean a plant material of interest, although an extract can be purified as taught herein. An optional first, exposing step, if implemented, can occur at a lower temperature, for example, room temperature (RT); or using a solvent at a lower temperature, such as, RT, lower than about 20° C, lower than about 15° C, lower than about 10° C, lower than about 05° C or at a lower temperature. Such an exposing step can remove dirt, unwanted plant parts, insects and so on.

[0048] In an extracting step, which may be a second step if a preparing step is practiced, plant material is exposed, steeped, brewed, soaked, boiled, incubated, extracted and so on in, with or to a fixed volume of solvent, for at least about 5 minutes or more. An extracting solvent can be at an elevated temperature, for example, from about 50° C to about 80° C, from about 60° C to about 85° C, from about 70° C to about 90° C, from about 75° C to about 95° C, from about 80° C to about 96° C, from about 85° C to about 97° C, from about 90° C to about 98° C, from about 95° C to about 99° C, or at a higher temperature. Generally, an elevated temperature can be maintained during extraction. For example, a hot plate, a heating mantle, a soxhlet extractor and the like can be used. In embodiments, a heated solvent is allowed to cool without extraneous heating during extraction. Following extraction, liquid is separated from solid material, for example, by filtration, to yield a liquid extract of interest.

[0049] In embodiments, an extract is purified. For example, a purification step can remove particulates, can decolor or can remove colored materials, can remove unwanted flavors, and so on, practicing known materials and methods. For example, chromatographic techniques can be used, with, for example, selected solid phase materials, such as, an ion exchange resin, an XAD resin (DuPont Resins, Wilmington, DE) and so on. Some volatile compounds can impact flavor perception, which can be in a negative way, for example, adding amounts or levels of certain flavors and aromas, such as, fruity, musty, woody and so on. Exposure of an extract to a controlled purification step can remove unwanted flavors from an extract of interest.

[0050] In embodiments, extract purification is by filtration.

[0051] In embodiments, extract filtration is by microfiltration, diafiltration, ultrafiltration or nanofiltration.

[0052] In embodiments, extract purification is by evaporation, distillation or chromatographic separation.

[0053] In embodiments, a plant is a grape plant, or part thereof.

[0054] In embodiments, an extract is made from grape leaves.

[0055] In embodiments, an extract is made from grape leaves that are compressed.

[0056] In embodiments, an extract is made from grape leaves fermented, for example, for up to about 3 weeks or longer.

[0057] In embodiments, an extract is made from grape leaves aged, for example, for up to about 3 years or longer.

[0058] In embodiments, an extract is made from grape leaves compressed and fermented.

[0059] In embodiments, an extract is made from grape leaves compressed, fermented and aged.

[0060] In embodiments, a solvent comprises water, ethanol, acetic acid, isopropyl acetate, heptane, acetone, isobutyl acetate, 1-butanol methyl acetate, 2-butanol, 3-methyl-1-butanol, butyl acetate, methylethyl ketone, tert-butylmethyl ether, 2-methyl-1-propanol, dimethyl sulfoxide, pentane, 1-pentanol, ethyl acetate, 1-propanol, ethyl ether, 2-propanol, ethyl formate, propyl acetate, formic acid, triethylamine, mixtures thereof or combinations thereof.

[0061] In embodiments, a solvent is a water, which may warmed, for example, up to about 90° C, up to about 95° C or higher in temperature. Amount of water used can be a fixed amount based on weight of plant material, so, for example, a fixed amount of grape leaf material is suspended in a fixed amount of water, which may be at an elevated temperature, for a certain time to produce an extract of interest.

[0062] In embodiments, extraction can comprise steeping, soaking, incubating, extracting and so on a plant material in any of a variety of solvents, or, alternatively, can employ a device or devices, or a method reported in the literature.

[0063] In embodiments, two or more extraction techniques can be combined, which techniques can be practiced simultaneously, consecutively and so on.

[0064] In embodiments, extraction comprises a conventional, taught or known solvent extraction; ultrasound assisted extraction (UAE); microwave assisted extraction (MAE); high hydrostatic pressure (HHPE); supercritical fluid extraction (SFE); and so on (Xia et al. 2006; Nkhili et al. 2009; Friedman et al. 2005; Jun 2009; Jun et al. 2010; Chang et al. 2000; Park et al. 2007; Ding et al. 2006; Jun et al. 2009; and Xu et al. 2012).

[0065] In embodiments, an extract of interest comprises a flavonoid.

[0066] In embodiments, an extract of interest comprises a catechin.

[0067] In embodiments, an extract of interest comprises a puerin.

[0068] In embodiments, an extract of interest comprises quinic acid, theogallin or isomers thereof, gallic acid-4-O-glucoside, gallic acid, gallocatechin, theophylline or isomers thereof, chlorogenic acid, puerin A or isomers thereof, 6-carboxyl-(-)-gallocatechin or isomers thereof, epigallocatechin, catechin, theasinensin B, 3-O-caleoylquinic acid or isomers thereof, 1,6-di-O-galloyl-β-D-glucopyranose or isomers thereof, procyanidin B1 or isomers thereof, epicatechin-(4b-8)-epigallocatechin-3-O-gallate or isomers thereof, procyanidin B2, puerin VII, 8-carboxyl-(+)-catechin or isomers thereof, epicatechin, epigallocatechin gallate, puerin V, puerin VIII, epicatechin-(4b-8)-epicatechin 3-gallate, gallocatechin gallate, 1,4,6-tri-O-galloyl-β-D-glucopyranose or isomers thereof, α-spinasterol or isomers thereof, kaempferol-3-O-rutinoside or isomers thereof, puerin VI, myricetin-3-O-β-D-galactopyranoside, puerin I, puerin II, apigenin-6-C-α-L-arabinopyranosyl-8-C-β-D-glucopyranoside, epicatechin gallate, puerin III, ellagic acid, rutin and isomers thereof,

catechin gallate, puerin IV, quercetin-3-O-glucoside, quercetin-4'-O-α-L-rhamnopyranosyl-3-O-α-L-rhamnopyranosyl-(1/6)-β-D-glucopyranoside or isomers thereof, luteolin-7-O-glucoside, epiafzelechin-3-O-gallate, kaempferol-3-O-glucoside, quercetin, kaempferol and other flavonoids, or combinations thereof.

[0069] In embodiments, an extract of interest comprises puerin IV, puerin III, 8-carboxyl-(+)-catechin or isomers thereof, puerin II, puerin A or isomers thereof, 6-carboxyl-(-)-gallocatechin or isomers thereof, puerin V, puerin VIII, α-spinasterol or isomers thereof, kaempferol-3-O-[α-L-rhamnopyranosyl-(1/3)-α-L-rhamnopyranosyl-(1/6)-β-D-glucopyraannoside], epigallocatechin or combinations thereof.

[0070] In embodiments, an extract of interest comprises an ethyl substituted pyrrolidinone substituted flavan-3-ol.

[0071] In embodiments, an extract of interest comprises a puerin, such as, puerin IV, puerin III, puerin II or combinations thereof.

BRIEF DESCRIPTION OF THE FIGURE

[0072] The following description of the figure and the respective drawing are a non-limiting example that depicts embodiments of the instant invention.

[0073] Figure 1. A wine enhancer of interest produced improvement of flavor; mouthfeel; and other properties of better wines often found after aging, in wines not aged, for example, at least a cabernet sauvignon, a chardonnay, a pinot noir, a petit noir, a gamay, a viognier, a barbera, a corvina, an aglianico, a cannonau, a montepulciano, a nerello mascalese, a nero d'avola, a primitivo, a nebbiolo, a sagrantino, a carménère, a grenache, a malbec, a merlot, a pinotage, a sangiovese, a shiraz/syrah, a tempranillo and so on wine, for example. Six drops of enhancer (or extract, about 0.17 ml) were added to 175 ml of such a wine. The bar graph shows wine aging properties in selected control and experimental samples. For assessing magnitude of tertiary aroma creation or development, or that of other desirable or attractive properties, or attributes of better wines, such as, aged wines, 15 wine attributes were assessed as characteristics or attributes of bottle aging. As known, "w/," means with, or including an enhancer of interest. As known, "w/o," means without, or not including an enhancer of interest. Any improvement was compared to a negative control, the same wine without treatment with the enhancer, that is, without

enhancer added to the wine, for example, see the leftmost bar in the figure. Blinded test wine samples carrying coded labels, and an assessment scheme for quantifying each wine and metric or parameter measured, were used to prevent bias. First label is assessed as a better wine, second label is assessed as a wine of lesser quality.

[0074] An enhanced second label wine containing an extract of interest was improved in flavor, and was comparable in quality to first label wines not containing an enhancer of interest.

DETAILED DESCRIPTION OF THE INVENTION

[0075] Features and advantages of the instant invention may be understood more readily, by those of ordinary skill in the art, from and by reading the instant disclosure and the following detailed description. It is to be appreciated certain features of the invention, which are described above and below, in the context, at times, of separate embodiments, also encompass features, aspects, embodiments and so on in combination in a single embodiment. Conversely, various features of the invention that are, for brevity, described in the context of a single embodiment, encompass those features, aspects, components, descriptions and the like separately or may be provided in any combination or sub-combination, a well as other species within a genus.

[0076] Unless defined otherwise, technical and scientific terms used herein have the same meaning as understood by one of ordinary skill in the arts to and in which the instant application belongs.

[0077] All patents, applications, published applications, scientific publications, journal articles, any published communication and other publications referred to herein are incorporated by reference in entirety to disclose and to describe aspects of the methods and/or materials taught herein.

[0078] If a definition set forth herein is contrary to or otherwise inconsistent with a definition set forth in a patent, application or other publication herein incorporated by reference, the definition set forth in the instant application prevails over a definition incorporated herein by reference.

[0079] Methods and materials similar to or equivalent of those described herein can be used in practice of embodiments in or of the instant application.

[0080] Those skilled in the arts will recognize that species of microbes, reagents, chemicals, conditions and the like listed or illustrated herein are not exhaustive, and that additional species within or about scope of those defined terms or related to a defined species also may be used in practice of the instant invention.

[0081] Except as otherwise noted, methods and techniques of the present embodiments generally are performed according to conventional methods known in the art and as described in various general and more specific references, some of which are cited and discussed throughout the present specification, for example, Loudon, "Organic Chemistry," 4th Edition, New York, Oxford University Press, 2002; Smith & March, "March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure," 5th Edition, Wiley-Interscience, 2001; and so on.

[0082] Practice of the instant invention employs, unless otherwise indicated, conventional methods of chemistry, microbiology, biochemistry, food chemistry, cell biology, botany, plant science, food science, oenology and so on.

[0083] Terms used herein generally are known in the arts, for example, as described in Leuenberger et al., eds., Helv Chim Acta, Basel, CH (1995). Terms used herein include grammatic forms and variants thereof.

[0084] Nomenclature used herein to name compounds can be obtained, for example, using the commercially available, ChemBioDraw Ultra software (Cambridgesoft/Perkin Elmer), version 12.0.

[0085] It is known a compound can have a number of different but equivalent names based on the way and/or order in which components or substituents are included or recited in a descriptive name.

[0086] A formula depicted herein is intended to represent a compound of that structural formula, no matter how named, as well as variants, variations or forms thereof. For example, a formula given herein is intended to include a racemic form, one or more enantiomeric, diastereomeric or geometric isomers, tautomeric forms, or a mixture thereof, unless the content herein teaches otherwise. Moreover, a formula given herein generally is intended to refer also to a solvate, such as, a hydrate, a polymorph of such a compound, or a mixture thereof. A formula herein also is intended to refer to amorphous and/or crystalline physical forms of a compound. A compound described herein may be analytically pure, or may be a mixture in which a

compound comprises at least about 50%, at least about 70%, at least about 80%, at least about 90%, at least about 95%, or at least about 98% by weight of the mixture.

[0087] As used herein, the phrase, "having the formula," or, "having the structure," is not intended to be limiting. For example, a compound of interest can be a base compound, a salt thereof, an isomer thereof and so on.

[0088] References in the singular also may include the plural (for example, "a," and, "an" may refer to one, or one or more), unless the context states otherwise.

[0089] Use of numeric values in ranges specified herein, unless expressly indicated otherwise, are stated as approximations as though minimum and maximum values of stated ranges both may be preceded by the word, "about." In that manner, slight variations above and below the stated limits of a range can be tolerated to achieve substantially the same results as for values within ranges in practice of the instant invention. Disclosure of ranges is intended as continuous with and within that disclosed range including every value (including those of the same degree of accuracy of the two range limit values) between the minimum and maximum values and including the cited minimum and maximum values. Hence, the range, 1-3, includes, 1, 2 and 3; and the range, 1.4-1.7, includes 1.4, 1.5, 1.6 and 1.7, along with other values between 1 and 3, and between 1.4 and 1.7, respectively.

[0090] The term, "about," to describe a value, amount or variable means greater or lesser than that value, amount or variable (includes all values within a range, such as, those to the same degree of accuracy of that value) by 1/10 of that stated value, but is not intended to limit any value or range of values. For instance, a concentration value of about 30% means a concentration between 27% and 33%, or 27%, 28%, 29%, 30%, 31%, 32% and 33%, and other values between 27% and 33%. Each value or range of values preceded by, "about," is intended to encompass an embodiment of a stated absolute value and a range of values thereabout.

[0091] "Base compound," "base structure," "reference compound," grammatic forms thereof and so on are equivalent terms and used synonymously herein and refer to an original compound or structure from which a modified form is made. Hence, a base compound can be one that is unmodified or does not contain a modification or a functional group. A base compound can be modified and engineered to include one or more additional modifications, substitutions and so on. Thus, "a derivative thereof," is

that base compound made to contain a new functional group or a new substituent. A base compound can be a molecular entity from which an atom, group and so on is removed to form a derivative. Therefore, a halogenated base compound can be treated to remove the halogen group to yield a dehalogenated derivative thereof. A salt can be a modified form of or a derivative of a base compound.

[0092] "Subject," is an organism or entity (as relating to a life form) that ingests, drinks or is exposed to an enhanced wine of interest. Synonyms include, "recipient," "individual," "consumer," "host," "organism," "person," and so on.

[0093] As used herein, "palatable," means a composition, such as, a beverage, has an agreeable, acceptable or pleasant taste on consumption, such as, agreeable or desirable mouthfeel sensation; desirable or agreeable chemical feeling factor; agreeable or desirable flavor and tactile sensations; and so on. For example, "palatable," can include elements of, for example, bitterness and astringency that are in balance with the rest of a composition, that is, in balance with, for example, sweetness and sourness. Bitterness, astringency and aftertaste are properties, as a person of skill in the art can appreciate, that can be associated with a wine.

[0094] A hedonic scale, for example, as used in the food science art, can be used to assess palatability of food or beverage compositions. A hedonic scale that has been used, for example, is a 9-point scale in which a person rates preference for food or beverage, ranging from, "extremely dislike," (with a value of 0) to, "extremely like," (with a value of 9) with the midpoint of 5 being neither like nor dislike. Thus, a composition can be, "palatable," if a person rates a composition as at least 5 and above. Such assays and testings can be blind studies to establish or to ensure objectivity, that is, an assessor is unaware of what sample is being tested. Assays for quantifying sensory metrics are known, for example, see, Adinsi et al. (2015) Food Sci Nutr, 3:1-9; Mehta et al., Foods, 2021, 10(2)330; and so on.

[0095] In the food industry, empiric studies yielded industry accepted parameters for assessing, for example, food and beverage quality; food and beverage attraction; food and beverage flavor and flavor parameters; food and beverage palatability; food and beverage hedonic sensations; and so on. Objectivity can be obtained by using blinded techniques and procedures. Thus, there are wine industry accepted parameters or metrics for assessing wine quality and attractiveness. Each

parameter or metric can be graded or rated on a numeric scale, as known in the art. Thus, using such parameters, quality of a wine can be assessed to determine whether a wine can benefit from an extract of interest, and whether a wine comprising an extract of interest has benefitted from an extract of interest.

[0096] "Enhance," and grammatic forms thereof as used herein refer to adding, supplementing, increasing, substituting for less desirable, replacing of less desirable, intensifying, magnifying, amplifying, strengthening, augmenting, boosting, upgrading, raising, rising, improving and so on desirable or palatable features, desirable or palatable properties, flavor parameters, hedonic sensations and so on of a consumable item, such as, improving, making better, intensifying, increasing, amplifying, supplementing and so on an untreated wine, that is, a wine that does not include an extract of interest, such that a wine comprising an extract of interest mimics, resembles, is perceived as a wine of higher quality by a consumer.

[0097] The term, "shelf-stable," refers to a stored product, for example, under ambient temperature and humidity conditions, that does not spoil or become unsafe for consumption throughout a specified timeframe. Maintaining package integrity during storage, shipping, display and so on following preparing and packaging a wine can enhance product stability, product shelf stability, product fidelity and so on.

[0098] The phrase, "water soluble composition," is intended to mean the same as, "water dispersible composition," which also may be referred to as a, "water soluble/dispersible composition." As a person of skill in the art can appreciate, compositions can contain some ingredients that are or can be water soluble and some that are or can be dispersible in water.

[0099] "Administrable," "edible," "drinkable," and grammatic forms thereof, indicate an enhanced wine of interest can be imbibed by a subject.

[00100] The term, "approximately," refers to a quantity, level, value or amount that can vary by as much as about 30%, as much as about 20%, as much as about 10% of a reference or stated quantity, level, value or amount.

[00101] It will be understood that compounds may contain one or more chiral centers, and those compounds may exist in and may be isolated as pure enantiomeric or diastereomeric forms or as a racemic mixture. The instant application

therefore includes any possible enantiomers, diastereomers, racemates and so on, in pure form or in mixtures thereof, and salts thereof, of a compound of interest.

[00102] Isolated optical isomers may be purified from racemic mixtures by known chiral separation techniques, such as, but not limited to, normal and reverse phase chromatography; crystallization; and so on. For example, a racemic mixture of a compound of the application, or a chiral intermediate thereof, can be isolated or can be separated, for example, using a chiral salt or passed through a chromatographic device, such as, a Chiralcell OD column (Daicel Chemical Technologies, West Chester, PA) operated as recommended by the manufacturer.

[00103] In embodiments, compounds of the application may be racemic. In embodiments, compounds of the application may be enriched in one enantiomer. For example, a compound of the application may have greater than about 30% enantiomeric excess (ee), about 40% ee, about 50% ee, greater than about 60% ee, about 70% ee, greater than about 80% ee, greater than about 84% ee, about 88% ee, greater than about 90% ee, about 92% ee, about 94% ee, about 96% ee or greater ee.

[00104] The terms, "polyphenol," "polyflavonol," "flavonoid," "bioflavonoid," "polyphenolic compound," "flavanol," "isoflavonoid," "neoflavonoid," "flavonol," "flavanone," "flavan," "anthocyanadine," "flavone," and, "anthoxanthin," are used synonymously and interchangeably herein.

[00105] Those terms relate generally to a plant compound containing plural phenol groups and can comprise a 15 carbon skeleton or backbone. A compound of interest can contain a heterocyclic ring. Hence, a compound of interest can be abbreviated as a C_6-C_3-C_6 compound. A catechin is an example of a flavonoid. Flavonoids generally are fluorescent, are yellow in color, provide plant color, such as, floral pigmentation, and are involved in other plant functions.

[00106] The term, "non-polymer catechin," as used herein is a generic term which collectively encompasses a group of catechins, gallocatechins, catechingallates, gallocatechingallates, epicatechins, epigallocatechins, epicatechingallates and epigallocatechingallates. The first four species collectively can be called, "gallate body," and are ester-type catechins that can have high levels of bitterness. The last four species collectively can comprise a, "non-gallate body."

[00107] From the standpoint of taste, such as, bitterness or sourness, content of gallic acid, in terms of the ratio of gallic acid to non-polymer catechins, can be lower, such as, not greater than about 0.3, about 0.1 or smaller, about 0.07 or smaller (or lower), can be as low as 0.

[00108] "Extract," and grammatic forms thereof as used herein refer to separation, isolation, washing and so on of a compound from a matrix, a mixture and so on to yield a partitioned, separated, purified, isolated and so on preparation of that compound. Extraction is a standard procedure in, for example, chemistry and is known in the art. Extract, and grammatic forms thereof, as used herein is as known in the art. Extraction can be obtained, as known in the art, using, for example, a membrane, a particular solvent, a selective solid phase, partitioning conditions and so on.

[00109] The present invention relates to a botanic (or a plant) extract that when added to wine in a barrel, bottle, glass and so on, transforms or creates sensory characteristics normally found in higher quality or aged wines to be present or to be at higher levels in wines of initial lower quality. Quality preference drivers, such as, greater complexity, for example, in aroma, improved mouthfeel and greater longevity in the mouth and so on are found in lower quality or unaged wines comprising an enhancer of interest; the lower quality or unaged wine thereby acquiring or possessing characteristics of an aged wine or a wine of higher quality.

[00110] A botanic extract of interest can be obtained from a number of botanic or plant species including, but not limited to, Vitis vineria, Camellia sinensis, Matricaria chamomilla and a Rubus species. A plant is one containing a flavonoid or a polyflavonol. A plant may contain multiple species of flavonoid. A plant may be one with a high level or amount of one or more flavonoid. Suitable plant sources include citrus fruit, onion, berries, banana, Gingko biloba, buckwheat, sea buckthorn, cocoa, peanut and so on.

[00111] Other plants with high levels of flavonoids, such as, catechins, can be used to obtain an extract or enhancer of interest, such as, broad beans, grapes, such as, black grapes, apricots, strawberries, apples, parsley, blueberries, blackberries, cherries, pears, raspberries, teas, guava and so on.

[00112] It may be beneficial to have plant, plant portion or plant part accumulate flavonoid, such as, flavonols, catechins, phenolic acids (gallic acid) and so on. For example, grapes react to stress of ozone treatment by increasing concentration of flavonoid, US Pat No 11,332,703. Extracts can be made from such sources.

[00113] Extracts also can be made from plant products, such as, one containing catechins, such as, the Polyphenon line of products (Mitsui Norin Co., Ltd. Minato-ku, JP), various products of Ito En, Ltd., Shibuya, Tokyo, JP or the Sunphenon line of products (Taiyo Kagaku Co., Ltd., Minneapolis, MN).

[00114] A wine enhancer of interest provides benefits of aging (found in aged wines) in younger, unaged and/or lower quality wines by adding key drivers of higher quality wines obtained by aging to lower quality or unaged wines. A wine enhancer of interest substitutes for or mimics aging in many red, rose and white wine types or varieties that are of lower quantity, are unaged and so on producing appealing or desirable wines without aging.

[00115] A wine enhancer of interest can, when added to a lower quality or unaged wine, cause or have the treated wine mimic an aged wine, acquiring features, characteristics and properties of an aged wine, in a wine of beginning lower quality or a wine that is not aged. Hence, a wine enhancer of interest can create or enhance a lingering finish or flavor after drinking of an enhanced wine of interest comprising a lower quality or unaged wine and a wine enhancer of interest, thereby mimicking a higher quality wine. An enhancer of interest can enhance flavor, mouthfeel and other taste sensations in and of an enhanced lower quality wine or an enhanced non-aged wine to mimic a high quality or a successfully aged wine.

[00116] For example, a wine enhancer of interest can benefit, for example, a cabernet franc, a cabernet sauvignon, a carménère, a chardonnay, a grenache, a malbec, a corvina, a rondinella, a muscat, a nero d'avola, a riesling, a malvasia, a sauterne, a kerner, a rose, a merlot, a nebbiolo, a pinotage, a pinot grigio/pinot gris, a pinot noir, a sauvignon blanc, a sémillon, a sangiovese, a shiraz/syrah, a tempranillo, a viognier, a zinfandel, an aglianico, a tannat, a monastrell, a motaro, a xinomavro and so on.

[00117] It is known some wine varieties do not benefit from aging, such as, a sauvignon blanc, a gamay and so on. However, a wine enhancer of interest can be used to boost quality or semblance of quality of those wine varieties.

[00118] In embodiments, in one experiment, an experimental second label, lower quality wine mixed with a wine enhancer of interest had improved wine quality by 45% as compared to that same second label wine without enhancer, that untreated wine showed only 27% aging attributes versus the treated wine containing an extract of interest that showed 72% aging attributes. In addition, the enhancer enabled the treated second label wine to exceed quality of the winery first label wine (better perceived quality) of the same year by 15%. The cost difference between the second label and the first label wines was $50, that is, the untreated first label wine cost $50 more than the untreated second label wine of the same year. Furthermore, the experimental wine comprising an extract of interest showed a comparable aging effect of a first label, untreated wine of the prior year with an 83% aging effect. The cost difference between the untreated second label wine and the untreated first label wine of the prior year was $70.

[00119] Liquid extracts of interest can be obtained from a plant or from plant parts, such as, leaves, stems, flowers, roots, tubers, seeds, fruit, buds, drupes and so on. Plants or plant parts can be dried, pulverized, compressed, fermented, dried, powdered and so on prior to extraction.

[00120] In embodiments, a plant is a tea. For example, extracts can be obtained from tea leaves of the genus Camellia, for example, C. sinensis, C. japonica, C. assamica, the Yabukita cultivar or variety of C. sinensis, hybrids thereof and so on. Prepared tea leaves which can be used in the instant invention include green teas, such as, sencha (middle-grade green tea), bancha (coarse green tea), gyokuro (shaded green tea), tencha (powdered tea); kamairicha (roasted tea), semi-fermented teas represented by oolong tea; fermented teas, such as, a brown or red tea; and so on. Darker teas, such as, black teas, can occur by encouraging oxidation, or minimizing or delaying oxidation until heating the tea, for example, pan frying, to cease oxidation.

[00121] In embodiments, a plant is a fermented tea. Hence, a tea is picked, leaves dried (which can occur by pan frying, which heat also would cease oxidation), rolled and sun dried, as known in the art and as practiced with many teas

soon after picking leaves from a plant. The dried leaves then can be compressed into cakes, or other forms, for aging. Such aged teas are known as raw teas and can yield a lighter colored beverage.

[00122] Raw tea can be aged for many years, for example up to 50 years or more. Beverages obtained from raw teas can have a greater display and range of flavors. Raw teas can be a green to darker green in color.

[00123] In embodiments, a plant is tea that is wet fermented or wet piled, or treated by wet piling. Wet fermentation comprises dried tea leaves that are moistened and stacked into piles of leaves to form an environment conducive to hastening fermentation of tea by bacteria and yeast.

[00124] Wet fermentation or wet piling enhances, facilitates and encourages microbial and fungal growth and metabolism, for example, of Aspergillus niger, Blastobotrys adeninivorans and so on, in the wet tea piles. Microbial and fungal action acts on the tea leaves simulating or hastening fermentation of the tea and simulates or hastens the reactions that occur during normal tea fermentation and aging.

[00125] Hence, the dried leaves are layered into piles, mats or stacks, which then are moistened or dampened with water and the piles covered with a cloth, such as, a linen sheet, to produce a warm and moist environment, which enables and accelerates fermentation. Then, after storage and aging of the moistened stacks of tea, the piles are deconstructed, the tea leaves are spread and allowed to dry. The dried tea then is compressed into cakes for further aging. Such teas are known as ripe teas and yield a darker colored beverage.

[00126] Ripe tea leaves are darker in color, for example, brown, chestnut, reddish-brown and so on. Beverage obtained by steeping ripe tea can be darker in color, for example, reddish in color, and possesses unique flavors.

[00127] The wet piling method reduces overall natural fermentation and aging time practiced prior to development of the wet piling method. Fermentation and aging time can be reduced by years.

[00128] Ripe tea can be aged for fewer years than a raw tea, for example, up to about 20 years or more, if not fewer than 20 years.

[00129] Hence, a wet fermented tea can be mixed with, for example, a water, which may be at an elevated temperature, for a certain period of time to obtain a water extract of interest.

[00130] A number of extraction methods are described in the literature. As known in the art, extraction is a separation process to remove a compound or substance from a matrix.

[00131] For example, Chandini et al., 2011 (Int J Food Sci Technol 46(4)879–886) teach extracting polyphenols from black tea using water at a 50:1 v/w ratio of water to tea and incubating for 40 minutes.

[00132] Chuong & Lee, 2011 (Food Sci Biotechnol 20(2)327–333) teach extracting catechins from green tea using a two hour, room temperature extraction with a 2% phosphoric acid, 40% ethanol solution.

[00133] Ding et al. (2006) teach extraction of epicatechins by solid phase extraction (SPE) using an acrylamide gel.

[00134] Feruzzi & Green, 2006 (Food Chem 99(3)484–491) teach catechin extraction from a milk tea beverage using 40 mg/ml of pepsin.

[00135] Horzic et al., 2012 (Bioprocess Technol 5(7)2858–2870) teach extraction of polyphenols from yellow tea using an ultrasound probe in a 75% aqueous ethanol bath.

[00136] Jun et al. (2009) teach removal of total polyphenols using a 50% (v/v) ethanol solution at a 20:1 (v/w) liquid:solid ratio under 500 mpa hydrostatic pressure for 1 minute (HHPE).

[00137] Jun et al. (2010) teach catechin extraction from green tea using the above hydrostatic methodology but at a lower pressure of 400 mpa for 15 minutes.

[00138] Labbe et al., 2008 (Food Chem 111(1)139–143) and Bazinet et al., 2007 (Sep Purif Tech 56:5-56) teach a two step water extraction method of green tea where the first extraction is for 30 min at 30° C and the second is at 75° C for 40 minutes.

[00139] Li et al., 2010 (J Sep Sci 33(8)1079–1084) teach extraction of catechins from Longjing tea by brewing tea in water for 10 minutes at 50° C.

[00140] Liang et al., 2007 (J Sci Food Agric 87(9)1748-1752) teach catechin extraction by repeating a two step process three times, with the first step being soaking tea in water for 10 minutes and then brewing at 80° C.

[00141] Nwuha, 2000 (J Sci Food Agric 87(9)1748-1752) and Pan et al., 2008 (Chem Eng Process 42(2)129–133) teach extracting polyphenols from tea at a 1:15 gm/ml ratio of tea to water using 400W of microwave irradiation for 1 minute.

[00142] Perva-Urunalic et al., 2006 (Food Chem 96:597–605) teach extracting catechin from tea using 4 minute microwave irradiation of a 50% ethanol solution.

[00143] Rusak et al., 2008 (Food Chem 110(4)852–858) teach catechin extraction from black and white tea using up to a 100:1 ratio of solvent to tea either at 95° C for 5-10 minutes or at 60-80° C for 20 minutes.

[00144] It also is possible to use tea leaves subjected to treatment in contact with carbon dioxide in supercritical state to obtain an extract.

[00145] US Pat No 5,198,259 teaches the steps of: (a) extracting tea leaves with water having a temperature between 15° C and 50° C and separating the first extract from the tea leaves; (b) extracting tea leaves which have previously been extracted with water between 15° C and 50° C for a second time, with water having a temperature of more than 50° C and separating the second extract from the tea leaves; (c) concentrating said first extract to obtain a first concentrate; (d) concentrating said second extract to obtain a second concentrate; and (e) combining said first and second concentrates, wherein said first extract is concentrated by reverse osmosis at a temperature between 20° C and 50° C and said second extract is concentrated between 50° and 100° C.

[00146] US Pat No 7,238,376 teaches black tea powder (100 g) was soaked in hot water (1000 ml) for 10 minutes. After filtration, the filtrates were extracted with 300 ml of chloroform three times for decaffeination. The aqueous phase was collected and extracted twice with 300 ml of ethyl acetate. The combined ethyl acetate phases were washed with a 2.5% sodium bicarbonate solution (300 ml) followed by distilled water (500 ml).

[00147] However, those teachings relate generally to purifying particular flavonols and polyphenols, essentially to prepare a pure compound preparation and

then to characterize those particular species of compounds. There is no teaching or suggestion of using same as a wine enhancer. On the other hand, the instant wine enhancer extract of interest is not focused on preparation of any one compound.

[00148] As a method for making an extract, stirring extraction or drip extraction can be used. An organic acid or an organic acid salt, such as, sodium ascorbate, may be added to water for extraction.

[00149] It also is possible to make combined use of boiling deaeration or an extraction method that is conducted while bubbling an inert gas, such as, nitrogen gas, to eliminate dissolved oxygen, that is, under a non-oxidizing atmosphere.

[00150] In the case of tea, to control percentage of gallate body in a purified tea extract, or percentage of gallates can be reduced, by subjecting an extract to a hydrolysis treatment. As the hydrolysis treatment, alkali hydrolysis, hydrolysis by enzymatic treatment or the like can be used. For stability of non-polymer catechins, hydrolysis by enzymatic treatment can be used.

[00151] As a method for hydrolytically treating a tea extract by an enzyme, hydrolysis treatment by an enzyme having tannase activity can be used. The expression, "having tannase activity," means the ability to degrade a tannin. No particular limitation is imposed on origin, but tannase can be obtained by culturing a tannase-producing fungus of the Aspergillus, Penicillium, Rhizopus or Mucor genera in a manner known in the art. Tannase can be used as an unpurified product or as a purified product. As a specific commercial enzyme product having tannase activity, tannase (Kikkoman Biochemica Co. Tokyo, JP) or the like may be used. When treated with an enzyme having tannase activity, ester bonds in gallate bodies in non-polymer catechins are hydrolyzed and results in reduction of the percentage of non-polymer catechins.

[00152] As solvents for use in the extraction, ester solvents, acid solvents, ketone solvents, ether solvents, alcohol solvents, halogenated solvents and so on can be used. For example, ethyl acetate, diethyl ether, methyl ethyl ketone, butanol, chloroform, dichloromethane and the like can be used.

[00153] Combining ethyl acetate and dichloromethane to extract flavonoid scan be practiced, US Pat No 9,414,613.

[00154] Other solvents can be used to form the extract. For example, 500 kg of green tea powder prepared by pulverizing dried green tea leaves was extracted at 70° C after adding 10,000 L of 70% (v/v) ethanol. The extract was concentrated to 1/5 of initial volume and then filtered.

[00155] Again, those teachings relate generally to purifying particular flavonols and polyphenols, essentially to prepare pure compounds and to characterize same. There is no teaching or suggestion of using same as a wine enhancer. On the other hand, the instant wine enhancer extract of interest is not focused on preparation of any one compound.

[00156] In embodiments, a water is used as extraction solvent. A water can be purified. A water can be one suitable for drinking. A water can be filtered, chromatographed, deionized, demineralized, purified, distilled and so on.

[00157] In embodiments, a solvent used is at an elevated temperature, that is, higher than room temperature (RT).

[00158] In embodiments, an elevated temperature can be from about 90° C to about 99° C, can be from about 50° C to about 99° C, can be from about 55° C to about 99° C, can be from about 60° C to about 99° C, can be from about 65° C to about 99° C, can be from about 70° C to about 99° C, can be from about 75° C to about 99° C, can be from about 80° C to about 99° C, can be from about 85° C to about 99° C, can be from about 95° C to about 99° C and so on.

[00159] In embodiments, a plant or part thereof is exposed to a solvent for about 30 minutes or less, about 20 minutes or less, about 15 minutes or less, about 10 minutes or less, about 5 minutes or less, about 4 minutes or less, about 3 minutes or less, about 2 minutes or less or for a shorter period. In embodiments, exposure can be for a time longer than the periods disclosed hereinabove, such as, about 35 minutes or more, about 40 minutes or more, about 45 minutes or more, about 50 minutes or more, about 55 minutes or more, about 60 minutes or more, about 65 minutes or more, about 70 minutes or more, or for longer periods.

[00160] In embodiments, ratio of volume of solvent to weight of plant material (v:w or v/w) in an extraction is in a range of from about 1:1 to about 9:1, from about 2:1 to about 8:1, from about 3:1 to about 7:1, from about 4:1 to about 6:1, about

5:1. Other ratios can be practiced, such as 10:1 or greater (such as, 11:1, 12:1 and so on with larger amounts of solvent).

[00161] Thus, for example, 20 grams of plant material (separated, if needed) are placed in a vessel and rinsed at room temperature (RT) or at a colder temperature, with water to hydrate the plant material, if necessary, and to rinse the plant material, if necessary, removing any extraneous material. The optional rinse water is discarded and then 100 ml of 95° C water are introduced into the vessel. Heat can be maintained using known devices or the hot water is allowed to cool during the extraction. The plant material is steeped, brewed, incubated and so on in the hot water, with optional stirring, for about 5 minutes. The fluid is separated from the solid material yielding a liquid extract of interest.

[00162] To remove particles remaining in an extract, centrifugation, filtration and so on can be practiced. Hence, an extract can be passed through a filter, a membrane and so on, and the filtrate collected as an enhancer of interest.

[00163] An extract can be dried or concentrated. Examples of the forms of an extract of interest include liquid, slurry, thickened liquid or syrup, semi-solid, solid and so on.

[00164] The phrase, "a concentrate of an extract," and grammatic forms thereof as used herein means a concentrated form of an extract obtained from a plant with a solvent, for example, water or an aqueous solution of an organic solvent and so on. A portion of solvent is removed, for example, by evaporation, filtration and so on, from the original extract obtained from treating plant material thereby increasing concentration of solutes, compounds, non-solvent items, flavonoids and so on in the resulting concentrated extract. Viscosity of a concentrated extract may be increased. A concentrate of an extract may be a semi-solid or a solid.

[00165] Desiccation or concentration can enhance shelf stability. Drying or concentration can occur by means known in the art, for example, evaporation, filtration, air drying, spray drying, centrifugation, lyophilization, freeze drying, boiling, exposure to reduced pressure and so on. A solid or concentrate can be rehydrated prior to use.

[00166] A purified extract according to the present invention can be obtained by removing gallic acid, free amino acids, sucrose and glucose from an extract, practicing methods known in the art.

[00167] Amount of extract added to a wine can range from about .005 ml to about 1.0 ml per 175 ml of wine, from about .01 to about 0.9, from about .02 to about 0.8 ml, from about .03 to about 0.7, from about .04 to about 0.6, from about .05 to about 0.55 ml, from about .06 ml to about 0.5 ml, from about .07 to about 0.45, from about .08 to about 0.4, from about .08 to about 0.35 ml, from about 0.08 ml to about 0.3 ml, from about .08 ml to about 0.25 ml, from about 0.08 ml to about 0.20 ml extract per 175 ml of wine, from about .09 ml to about 0.24 ml, from about .10 ml to about 0.23 ml, from about .11 ml to about 0.22 ml, from about .12 ml to about 0.21 ml, from about .13 ml to about 0.20 ml, from about .14 ml to about 0.19 ml, from about .15 ml to about 0.18 ml, from about .16 ml to about 0.17 ml, about 0.17 ml of extract per 175 ml of wine and so on. Those ratios are adapted or adjusted for larger volumes of wine so relative ratios or relative amounts are maintained. (In embodiments, an extract is one made using a 5:1 v:w ratio of water to wet piled tea steeped at 95° C for 5 minutes.)

[00168] Droppers, pipettes, dispensers and the like can deliver drops of variable size of an enhancer of interest. Hence, number of drops delivered can vary depending on volume of a drop. For example, with a dropper of interest, six drops delivers about 0.17 ml of extract.

[00169] In embodiments, other liquid dispensing devices can be used to deliver a requisite amount of an extract of interest to a volume of wine, such as, a volumetric flask, a measuring cup, a graduated cylinder, a syringe, a pipette and so on, as known in the art.

[00170] In a formula or ratio of interest, a requisite amount of extract (about 0.17 ml) is delivered to about 175 ml of wine. In the US and elsewhere, many bottles or vessels can carry about 750 ml of wine. Thus, the amount of extract based on the above ratio of about 0.17 ml to about 175 ml is adjusted for that larger volume of wine. Accordingly, using a dropper of interest, 26 drops of extract (about 25.7 drops delivering about .73 ml) are added to a 750 ml bottle of wine.

[00171] Amount of extract added can be a design choice, a consumer may favor more of or more expressive sensory metrics. Hence, one consumer may use more extract per glass or cup of wine than does another consumer. Amount of extract used can vary with wine variety, again, as a design choice. In embodiments, darker a wine, a greater amount of enhancer can be used. Hence, a glass of white or rose wine may be enhanced sufficiently with 1-6 drops (for example, using a dropper wherein 6 drops delivers about 0.17 ml) of an enhancer of interest, while a glass of red wine may command 5-8 drops, or more, of enhancer, although fewer or more drops can be used as a design choice. (In embodiments, an extract is one made using a 5:1 v:w ratio of water to wet piled tea steeped at 95° C for 5 minutes.)

[00172] An extract of interest can be stored. An extract of interest can be stored in any known vessel, such as, a bag, a bottle, a tube, a jug, a pouch, a vial, and so on, constructed, for example, from a plastic, a glass, a metal and so on, and combinations thereof. The vessel may be one that does not or minimally transmits light, such as, one that is opaque, is lined with a metallic foil, is lined with a material that blocks certain wavelengths of light, such as, UV light, is colored and so on. An extract can be stored at room temperature (RT), reduced temperature, such as, 4° C, 0° C or lower, and so on.

[00173] An extract of interest enhances palatability of a wine where aging no longer is needed to attain a desirable wine. An extract from a plant comprising a flavonol or a flavonoid is obtained and added to a wine to create or to enhance desirable properties and characteristics found normally in higher quality wines or aged wines.

[00174] The instant invention is defined further and is exemplified in the following non-limiting Example. It should be understood that the Example, while indicating embodiments of the invention, is given by way of illustration only.

EXAMPLE

[00175] Fifteen aged wine attributes were selected to demonstrate wine aging effects of an enhancer of interest, including, seven tertiary aromatic characteristics (for example, dried flower, dried fruits, earthy, mineral, leather, tobacco and farmyard), three taste sensations (for example, acid, bitterness and umami), two

mouthfeel sensations (for example, astringency and mouth-watering) and three aftertaste characteristics (for example, blended/smooth, well-balanced and longer lingering finish).

[00176] Those attributes can be produced by bottle aging, especially, the seven tertiary aromatic characteristics that do not exist in grapes or in juice before or during fermentation, those seven features are formed only after fermentation. The rest of the eight sensory attributes also are known as fine wine attributes that usually are obtained from aging.

[00177] Four wines were evaluated separately to determine if any of the attributes of aged wines of interest was present.

[00178] A black tea was used to produce the extract. Pu-erh tea was sourced from Yunnan province. The tea was oxidized, roasted and sun-dried. Fermentation was microbial. The tea leaves were steamed for compression into cakes. The leaves were layered into piles 25-30 inches high. The leaves and piles were sprayed with water and then the piles were covered with a cloth to enhance humidity and warmth, and to hasten color change and flavor development in the leaves. Following fermentation, the leaves were used to form cakes, which were aged.

[00179] A 1:5 (w:v) ratio (about 20 g of tea and about 100 ml of water) of wet piled Pu-erh tea and about 95° C. water were mixed and incubated for about five minutes on a hot plate. Solid material was removed by filtration to produce an extract of interest.

[00180] Extract (about 0.17 ml) was added to about 175 ml of wine.

[00181] A first label cabernet sauvignon produced in 2019 without treatment served as a first positive control. Cost of that wine was $70. A first label cabernet sauvignon produced in the previous year (2018), cost, $90, served as a second positive control. A second label cabernet sauvignon produced in 2019 (Napa, CA), cost $20, served as the negative control. The second label wine was treated with a plant extract of interest.

[00182] As noted in the bar graph of Fig.1, desired characteristics of wine were obtained with an extract of interest. The first bar relating to the second label wine without an extract of interest (negative control) possessed 27% of desired attributes as compared to the second bar representing the same wine with an extract of

interest (72%). The treated second label wine was comparable to an untreated first label wine of the same year, third bar (57%), and to an untreated first label wine of the previous year (fourth bar, 83%).

References

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[00202] All references cited herein are incorporated herein by reference in entirety.

[00203] It will be appreciated that various changes and modifications can be made to the teachings herein without departing from the spirit and scope of the disclosure. From the above discussion and the Example, one skilled in the art can ascertain the essential characteristics of the invention, and without departing from the spirit and scope thereof, can make various changes and modifications of the invention to adapt to various uses and conditions.

We claim:

1. A wine additive extracted from a plant, wherein said additive comprises a flavonoid, and wherein said additive combined with an unaged wine comprises an attribute of an aged wine.

2. The additive of claim 1, which is a liquid.

3. The additive of claim 1, comprising a water.

4. The additive of claim 1, wherein said plant comprises a tea.

5. The additive of claim 1, wherein said plant comprises a fermented tea.

6. The additive of claim 1, wherein said plant comprises an aged tea.

7. The additive of claim 1, wherein said plant comprises a wet fermented tea.

8. The additive of claim 1, wherein said plant comprises a tea from China.

9. The additive of claim 1, wherein said plant comprises a tea from India.

10. The additive of claim 1, which is concentrated.

11 A wine comprising an additive extracted from a plant, wherein said additive comprises a flavonoid, and wherein said wine comprising said additive comprises an attribute of an aged wine.

12. The wine of claim 11, wherein said wine is not aged.

13. The wine of claim 11, wherein said wine comprises a white wine.

14. The wine of claim 11, wherein said wine comprises a red wine.

15. The wine of claim 11, wherein said wine comprises s a rose.

16. A wet fermented tea water extract.

17. A method of making an unaged wine taste like an aged wine comprising adding to said unaged wine, an additive, extracted from a plant, comprising a flavonoid, wherein said unaged wine comprising said additive comprises an attribute of an aged wine.

18. The method of claim 17, wherein said plant comprises a tea.

19. The method of claim 17, wherein said plant comprises an aged tea.

20. The method of claim 17, wherein said plant comprises a wet fermented tea.

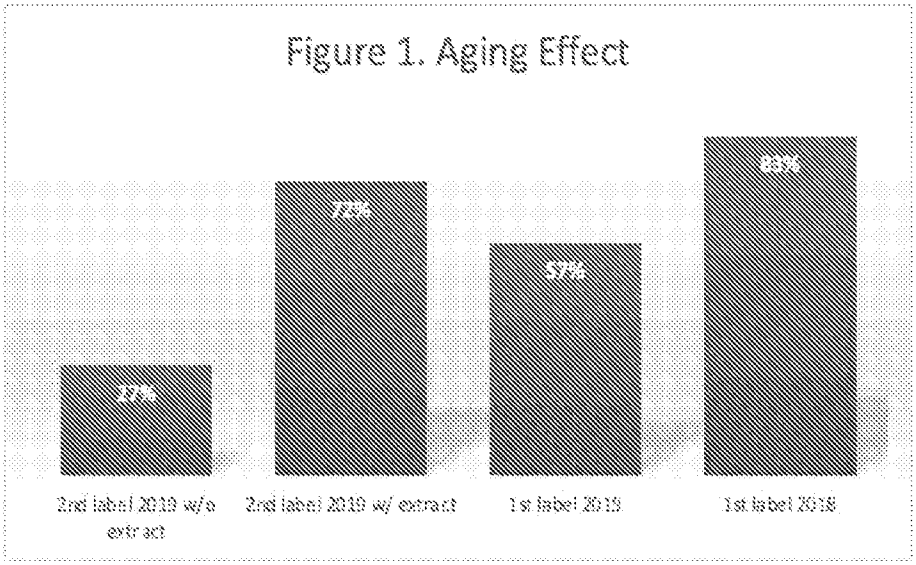
Figure 1. Aging Effect
37%
73%
57%
83%
2nd label 2019 w/o extract
2nd label 2019 w/ extract
1st label 2019
1st label 2018

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2024/016387

A. CLASSIFICATION OF SUBJECT MATTER

IPC: ***C12G 1/02*** (2024.01); ***C12G 3/055*** (2024.01); ***C12G 3/07*** (2024.01); ***C12G 3/08*** (2024.01); ***C12H 1/14*** (2024.01)

CPC: ***C12H 1/14; C12G 1/02; C12G 3/055; C12G 3/07; C12G 3/08; C12H 1/006***

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

See Search History Document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

See Search History Document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History Document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	US 2018/0119075 A1 (INSTITUT NATIONAL D'ETUDES SUPERIEURES AGRONOMIQUES DE MONTPELLIER (MONTPELLIER SUPAGRO) et al.) 03 May 2018 (03.05.2018)	
X	entire document	1, 4, 11, 12, 17, 18
Y	entire document	2, 3, 5-10, 13-15, 19, 20
	US 2019/0284223 A1 (AMOREPACIFIC CORPORATION) 19 September 2019 (19.09.2019)	
X	entire document	16
Y	entire document	2, 3, 5-7, 19, 20
	US 2010/0247501 A1 (IKEDA) 30 September 2010 (30.09.2010)	
Y	entire document	8-10
	US 2018/0208883 A1 (WINERX LLC) 26 July 2018 (26.07.2018)	
Y	entire document	13-15

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 May 2024 (20.05.2024)	**12 June 2024 (12.06.2024)**

Name and mailing address of the ISA/US	Authorized officer
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