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(57) Title: NON-ALCOHOLIC WINE BEVERAGE


(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(30) Priority Data:

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61/079,484 10 July 2008 (10.07.2008) US

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(54) Title: NON-ALCOHOLIC WINE BEVERAGE

(57) Abstract: A carbonated beverage prepared from dealcoholized wine base and having from about 150 mg to about 700 mgs of polyphenols per six to eight ounce serving.
BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates generally to beverages, and more particularly to alcohol-free carbonated wine beverages.

Related Art

[0002] The consumption of non-alcoholic red wine is increasing worldwide, particularly in the United States, Europe and Asia. Consumers are demanding healthier and functional beverages for daily consumption. Red wine has intrinsic health benefits associated with polyphenol antioxidant grape compounds, and has been shown to improve heart health. However, there are consumption limitations on the drinking of wine, due to its alcohol content, when compared to traditional soft drinks. Even with the health benefits associated with moderate consumption of red wine and the wealth of research on the subject, many cardiologists don’t suggest drinking larger amounts of red wine given the effects and risks associated with alcohol.

[0003] There is a need for a beverage that can offer the benefits of red wine without the disadvantages associated with the consumption of alcohol.

BRIEF SUMMARY OF THE INVENTION

[0004] The invention is an innovative, lightly carbonated and tunnel pasteurized beverage utilizing an alcohol-free wine base that has the same or more polyphenols per 6 to 8 oz serving than a glass of red wine. The invention provides the health benefits and taste of red wine without the alcohol in a refreshing and functional, lightly carbonated soft drink.

[0005] The invention provides the novel use of dealcoholized wine grape extractives obtained after prolonged fermentation. The invention can utilize red wine grape extractives, for example from a Cabernet, white wine extractives, for example from a Sauvignon Blanc, or mixtures thereof. In order to protect the wine base that has been stripped of a majority of alcohol from, for example, growth of Mycoderma Vini (vinegar bacteria and yeast) and loss of fruit flavor, a nitrogen "ullage" or oxidative rinse can be utilized to replace any air or dissolved oxygen that remains in the finished dealcoholized wine base. Process technology available
from, for example, INMATEC (Herrsching, Germany) can be used for dosing with nitrogen. (See "Refinement and Quality Preservation of Foodstuffs and Luxury Foods From Juice to Energy- and Wellness Foods" by Maximiian Meindi, IMATEC, Herrschling, Germany, drink TECHNOLOGY + MARKETING - June 2007.) The quantity of inert depends on the variety of grapes used in the fermentation and production of the wine. Generally, nitrogen is added in a quantity that is about 2.5 - 5 times the emptiness volume of the container. For example, a 10,000 liter tank filled to 80% has a 2,000 liter emptiness volume and would require minimum 2.5 X 2,000 liters, or about 5,000 liters nitrogen.

[0006] In some embodiments, the wine base contains a high concentration of polyphenol compounds, for example, red wine base can include high concentrations of polyphenols. If necessary, spray dried red wine flavonoids or polyphenols can be added, for example as a red wine concentrate powder, to increase the polyphenol or flavonoid content to a level corresponding to greater than 150 mg in a single serving. In other embodiments, green tea extractives or tea solids can be added as a source of polyphenol extractives. Antioxidant synergy can be obtained through the combination of high polyphenol containing juice concentrates of pomegranate and cherry; natural berry fruit flavors components, and natural wine essence. The formulation can utilize natural flavor modifiers and taste receptor astringency blockers, which modulate the undesirable taste defects of the high concentration of polyphenol compounds. The product can be processed with light carbonation and tunnel pasteurization requires only small amounts of added preservatives.

[0007] Further objectives and advantages, as well as the structure and function of preferred embodiments will become apparent from a consideration of the description and examples.

DETAILED DESCRIPTION OF THE INVENTION

[0008] Embodiments of the invention are discussed in detail below. In describing embodiments, specific terminology is employed for the sake of clarity. However, the invention is not intended to be limited to the specific terminology so selected. While specific exemplary embodiments are discussed, it should be understood that this is done for illustration purposes only. A person skilled in the relevant art will recognize that other components and configurations can be used without parting from the spirit and scope of the invention. AU
references cited herein are incorporated by reference as if each had been individually incorporated.

[0009] The terms "flavonoid" and "polyphenol" are used interchangeably herein. These terms are intended to refer to naturally occurring chemical substances found in plants, including grapes and other fruits, particularly in the skins, and are characterized by the presence of more than one phenol groups per molecule. Polyphenols include, for example, tannins, and phenylpropanoids such as lignins and flavonoids. Such compounds are alternatively referred to as polyphenol antioxidants, and have been shown to be important in combating oxidative stress that can contribute to the causation of some neurodegenerative and cardiovascular diseases. The health benefits of polyphenol antioxidants has been the subject of a growing body of health research in recent years. There is strong experimental evidence of their ability to affect the body's reaction to allergens, viruses, and carcinogens. They have shown anti-allergic, anti-inflammatory, anti-microbial and anti-cancer activity.

[0010] The present invention is a unique ready to drink beverage product. Shelf life is increased by using tunnel pasteurization and, if necessary, a small amount of preservatives to ensure the wine flavors and wine concentrate maintain their flavor integrity. Velcorin® (from LANEXX, Pittsburgh, PA) can also be added as a processing aid. The use of Velcorin® may eliminate the need for added preservatives to the finished beverage. Other suitable preservation methods can also be used. Typically, wine has alcohol to act as a natural preservative, together with added sulfites. In order to achieve a shelf stable system, products embodying the present invention can utilize an innovative solution to address the microbiological stability issues in using wine extractives in a beverage without alcohol which may be fortified with red wine polyphenols or other wine extracts.

[0011] A product according to an exemplary embodiment of the present invention can be prepared from a dealcoholized red wine base. The red wine base is a red wine grape extractive, typically obtained from prolonged fermentation. The wine base can be prepared from, for example, Cabernet Sauvignon, Merlot, Pinot Noir, Claret, Sangiovese or other red wine varietals. Advantageously, the wine base is of a type that provides relatively high concentrations of polyphenol compounds. The wine base is dealcoholized, for example by the use of a Spinning Cone Column or other techniques, to contain not more than about 0.5% alcohol. In some embodiments, the wine base can contain red wine polyphenols in a sufficient quantity to
provide over 100 mg of polyphenols, for example about 100 to 1000 mg of polyphenols or about
100-800 mg of polyphenols, per 8 oz. serving of the finished product. In some embodiments,
the wine base can contain wine polyphenols in a sufficient quantity to provide over 150 mg, for
example about 150 to 1000 mg of polyphenols or about 150-700 mg of polyphenols or about
150-500 mg of polyphenols, per 8 oz. serving of the finished product. If the desired amount of
polyphenols can not be reached by use of the wine base alone, the polyphenol content can be
increased by adding a secondary source of polyphenols. The secondary source of polyphenols
can be, for example, spray dried red wine polyphenols such as a red wine concentrate powder,
solid or liquid concentrates from other fruits containing polyphenols, tea extracts or other
sources of polyphenols. Other extractives of high polyphenol juices include, for example
pomegranate, blueberry, raspberry, blackberry, cranberry, mangosteen, acai and red grape juice
concentrate.

[0012] In another exemplary embodiment, a product can be prepared from a
dealcoholized white wine base, for example a Sauvignon Blanc. Additives that increase the
polyphenol content or enhance the flavor can be used. For example, in some embodiments, a
secondary source of polyphenols, for example tea extracts, can be added to increase the
polyphenol concentration to levels recited above. Additives can include, for example, grape
juices or juice concentrates, apple juices or juice concentrates and tea extracts, for example
green tea extracts.

[0013] The combination of the wine base and, if necessary, added concentrate can
provide a sufficient quantity of polyphenols to provide health benefits equivalent to one to two
6 to 8 oz serving of red wine. The wine base can comprise from about 25% to about 75% of the
finished product, taking into account water added in the product. More particularly, the
dealcoholized wine base can comprise from about 35% to about 65 %, about 45% to about 55%
or about 50% of the finished product. The amount of wine concentrate powder, tea extract or
other source of additional polyphenols can be, for example, up to about 5%, up to about 2%, up
to about 1%, or up to about 0.5% of the finished product.

[0014] Additional antioxidant benefits can be added by the use of high polyphenol
containing juice concentrates. For example, pomegranate juice concentrate and/or cherry juice
concentrates, such as sour cherry or sweet cherry juice concentrates, can also be added. Other
juice concentrates include white grape juice concentrates and apple juice concentrates, for
example Granny Smith apple juice concentrate. Such juice concentrates can be added for flavor enhancement as well as, in addition to, or instead of, being added to increase antioxidant content. One or more juice concentrates can be added, with each comprising an amount of up to about 13% of the finished product, up to about 10% of the finished product, or up to about 5% of the finished product. In some embodiments, juice concentrates can be added such that the total amount of juice concentrate is up to about 10% of the finished product, up to about 5% of the finished product, from about 2% to about 5% or from about 2% to about 3% of the finished product.

[0015] The Brix range of the juice concentrates used will depend on the particular concentrate and the quantity used. Typical Brix ranges can be from about 40°Bx to about 80°Bx. Examples of specific concentrates and Brix ranges include sour cherry juice concentrate with a brix range of about 40-68°Bx, dark sweet cherry juice concentrate with a brix range of about 40-68°Bx, pomegranate juice concentrate with a Brix range of about 40-66°Bx, white grape juice concentrate with a Brix range of about 60-75°Bx, and apple juice concentrate with a Brix range of about 65-80°Bx. These juice concentrates and Brix ranges are provided only by way of example and are not intended to limit the composition to any particular, specific product. Additionally, other components can be used to enhance the polyphenol content, such as green tea extracts, for example.

[0016] Additional antioxidants that can act as a "cocktail" delivery system, can also be added to the composition. These antioxidants can be natural or synthetic compounds. Non-limiting examples of antioxidants include COQ10, vitamin E and derivatives thereof, de-fatted Acai, and berry extract blends, including blends that contain Acai. Other sources of antioxidants include green teas, black teas, grape, cranberry, black currant, elderberry, strawberry, bilberry, mangosteen, and raspberry. These sources can be added as, for example, liquid or solid fruit, juices, juice concentrates and extracts and or their concentrated polyphenol compounds.

[0017] A blend of sodium benzoate and potassium sorbate can be used in order to avoid oxidation of the wine and to insure the stability of the finished beverage over its shelf life, i.e. manufacture, distribution, and store and consumer shelf time. The amount of sodium benzoate and potassium sorbate can be less than about 0.05% or about 0.025% of the final product to about 500 PPM each. Alternatively or in addition, benzoic acid or other salts thereof and/or
sorbic acid and other salts thereof can be added as preservatives. Another preservation technique would be the use of Velcorin®, added as a processing aid. The use of Velcorin may eliminate the need for added preservatives to the finished beverage.

[0018] Typically, wine contains alcohol to act as a natural preservative, and frequently has added sulfites. In order to achieve a shelf stable system, the present invention can utilize an innovative solution to address the microbiological stability issues in using wine extractives in a beverage without alcohol. The product can be carbonated to about 1.5 to about 4.0 volumes or about 2.5 to about 3.0 volumes. Exemplary embodiments can be carbonated with about 2.8 volumes CO₂. The product can also be tunnel pasteurized to help preserve the quality and extend shelf life. In an exemplary embodiment, the product is tunnel pasteurized at about 160°F (about 71°C) for about 10 minutes, although other times and temperatures can be used as is known in the art and as necessary to achieve sufficient preservative effect. In addition, a nitrogen flush can be added prior to capping the finished drink to eliminate any remaining oxygen in the container head space. These processes prevent further fermentation of the wine base and make the product shelf stable. The carbonation and/or nitrogen flush can help create an "anaerobic" environment which minimizes oxidative degradation. In addition, carbonation has the benefit of providing a unique taste sensation that mimics alcohol's drying effect.

[0019] Flavor modifiers and taste receptor astringency blockers can be added to modulate the undesirable taste effects that might result from the high content of polyphenol compounds. Examples include B-Blocker™ and/or Zatiate™, which are available from Blue Pacific Flavors of Industry, CA. B-Blocker™ utilizes GRAS approved ingredients that can successfully block one or more of the 25 bitter taste receptors of the tongue. Zatiate™ utilizes GRAS approved ingredients with other natural flavors as a mouth watering agent to modify astringency from complex acids and or polyphenol juice extractives. Other suitable flavor modifiers and taste receptor astringency blockers can be added and their specific identities and use will be known to persons skilled in the art. Flavor modifiers and taste receptor astringency blockers of this type can each be added in amounts of up to about 0.10%, for example from about 0.05% to about 0.10% of the finished product, or the total amount of flavor modifiers and taste receptor astringency blocker can comprise up to about 0.10%, or example from about 0.05% to about 0.10% of the finished product. The addition of flavor modifiers and astringency
blockers enhances drinkability by providing "gulf ability" and satiation even at the high levels of polyphenol fortification present in the beverage.

[0020] The beverage can be unsweetened or can be sweetened with, for example, from 0 to about 10% sugar. Other natural or synthetic sweeteners can be added to achieve a similar taste. Examples of sweeteners include erythritol, sucralose, acesulfame potassium, aspartame, crystalline fructose, and agave nectar.

[0021] As will be known to persons skilled in the art, additional ingredients can be added to achieve the desired flavor, "mouthfeel," and shelf life stability. For example additional natural and artificial flavors and flavor blends can be added. Tartaric acid or its salts can also be added. Components such as citric acid and malic acid can be added for flavor modification and shelf-life stability. Citric and malic acid or their salts can be added in individual or combined amounts of up to about 0.1%, up to about 0.05%, or up to about 0.025%. Water is typically added to the composition in a range of from about 25% to about 75% of the finished product, in particular from about 30% to about 50% or about 40% of the finished product. In some embodiments, the finished beverage can have a final Brix value of about 10-15°Bx, for example, 11-12.5°Bx or about 11.9°Bx. In other embodiments, the finished beverage can have a final Brix value of about 5-10°Bx, for example, 6.5-8.5°Bx or about 7.9°Bx. The pH can be from about 2.5 to about 4.5, about 3.0 to about 4.0, or about 3.25 to about 3.50. The specific gravity of the finished composition can be from about 1.00 to about 1.10 or about 1.02 to about 1.05.

Furthermore, although various components described herein are used for particular purposes, the ingredients and uses are exemplary and components may serve one or more functions and alternative ingredients that serve a desired function but are not specifically mentioned in this specification may be substituted.

[0022] In an exemplary embodiment of manufacturing a beverage according to the invention, the ingredients, including water, are combined. The composition in chilled and then carbonated to the desired CO₂ volumes, using methods known in the art. The product is then bottled into the appropriate package and tunnel pasteurized at 160°F for about 10 minutes.
EXAMPLE 1

An exemplary Cabernet Soda composition according to the invention was prepared in a 100 gallon quantity by combining:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity (lbs.)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Q.S. to 100 Gal. (Approx.)</td>
<td>348.45</td>
<td>40.14</td>
</tr>
<tr>
<td>Wine Dealcoholized Cabernet</td>
<td>434.07</td>
<td>50.00</td>
</tr>
<tr>
<td>Potassium Benzoate</td>
<td>0.22</td>
<td>0.03</td>
</tr>
<tr>
<td>Potassium Sorbate</td>
<td>0.22</td>
<td>0.03</td>
</tr>
<tr>
<td>Sugar</td>
<td>52.09</td>
<td>6.00</td>
</tr>
<tr>
<td>Sour Cherry Juice Conc.</td>
<td>7.14</td>
<td>0.82</td>
</tr>
<tr>
<td>Dark Sweet Cherry Juice Conc.</td>
<td>10.22</td>
<td>1.18</td>
</tr>
<tr>
<td>Pomegranate Juice Conc.</td>
<td>8.55</td>
<td>0.98</td>
</tr>
<tr>
<td>Citric Acid</td>
<td>0.33</td>
<td>0.04</td>
</tr>
<tr>
<td>Malic Acid</td>
<td>0.33</td>
<td>0.04</td>
</tr>
<tr>
<td>Red Wine Concentrate Powder</td>
<td>2.08</td>
<td>0.24</td>
</tr>
<tr>
<td>Fruit Flavor Pack Nat With Other Natural Flavors</td>
<td>2.71</td>
<td>0.31</td>
</tr>
<tr>
<td>Mouthfeel Solution</td>
<td>0.87</td>
<td>0.10</td>
</tr>
<tr>
<td>B-Blocker™ Nat Flavor Modifier</td>
<td>0.43</td>
<td>0.05</td>
</tr>
<tr>
<td>Zatiate™ Natural</td>
<td>0.43</td>
<td>0.05</td>
</tr>
</tbody>
</table>

The ingredients were batched and chilled, followed by carbonating to about 2.8 volumes CO₂. The product was bottled and pasteurized at 160°F for about 10 minutes. The finished drink of this formulation contained about 12% juice and had a Brix value of 11.92°Bx ± 0.5; a pH of about 3.47± 0.1 and a specific gravity of about 1.0403 ± 0.01.

EXAMPLE 2

An exemplary Sauvignon Blanc composition according to the invention was prepared in a 100 gallon quantity by combining:
The finished drink of this formulation contained about 12% juice and had a Brix value of 7.86 ± 0.5; a pH of about 3.27 ± 0.1 and a specific gravity of about 1.0288 ± 0.01.

The embodiments illustrated and discussed in this specification are intended only to teach those skilled in the art the best way known to the inventors to make and use the invention. Nothing in this specification should be considered as limiting the scope of the present invention. All examples presented are representative and non-limiting. The above-described embodiments of the invention may be modified or varied, without departing from the invention, as appreciated by those skilled in the art in light of the above teachings. It is therefore to be understood that, within the scope of the claims and their equivalents, the invention may be practiced otherwise than as specifically described.
WHAT IS CLAIMED IS:

1. A non-alcoholic wine beverage comprising greater than about 150 mg polyphenols per 8 oz. serving.

2. The beverage of claim 1 comprising from about 150 mg to about 700 mg polyphenols per 8 oz. serving.

3. The beverage of claim 1, comprising a dealcoholized wine base and carbonation.

4. The beverage of claim 3, further comprising a secondary source of polyphenols.

5. The beverage of claim 4, wherein the secondary source of polyphenols is selected from the group consisting of red wine concentrate, white wine concentrate and tea extract.

6. The beverage of claim 3, further comprising at least one component selected from the group consisting of concentrate of pomegranate, concentrate of cherry, flavor modifiers, taste receptor astringency blockers, spray dried red wine polyphenols, green tea extract, white grape juice concentrate and granny smith or other apple juice concentrate.

7. The beverage of claim 2, further comprising at least one component selected from the group consisting of natural berry fruit flavors components, natural wine essence, and fruit juice.

8. The beverage of claim 1, comprising dealcoholized wine base, one or more juice concentrates, and a secondary polyphenol source selected from the group consisting of red wine concentrate, white wine concentrate and tea extract.

9. The beverage of claim 1 comprising:

   from about 45% to about 55% dealcoholized red wine extract;
from about 2% to about 5% of juice concentrate selected from the group consisting of sour cherry juice concentrate, sweet cherry juice concentrate, pomegranate juice concentrate, and combinations thereof;
up to about 0.5% red wine concentrate powder; and
water.

10. The beverage of claim 9, further comprising
up to about 0.05% potassium benzoate;
up to about 0.05% potassium sorbate;
up to about 0.05% citric acid; and
up to about 0.05% malic acid.

11. The beverage of claim 1 comprising:
from about 45% to about 55% dealcoholized white wine extract;
from about 2% to about 5% of juice concentrate selected from the group consisting of white grape Juice Concentrate, apple Juice Concentrate and combinations thereof;
up to about 0.5% green tea extract; and
water.

12. The beverage of claim 11, further comprising
up to about 0.05% potassium benzoate;
up to about 0.05% potassium sorbate;
up to about 0.05% citric acid; and
up to about 0.05% malic acid.

13. A process for a preparing non-alcoholic wine beverage comprising
(a) mixing as a liquid dealcoholized wine base and one or more components selected from the group consisting of concentrate of pomegranate, concentrate of cherry, flavor modifiers, taste receptor astringency blockers, spray dried red wine polyphenols, green tea extract, white grape juice concentrate and granny smith or other apple juice concentrate, wherein the combination is sufficient to provide greater than about 150 mg polyphenols per 8 oz. serving; and
(b) carbonating the liquid mixture.

14. The method of claim 13, wherein carbonating comprises carbonation at about 2.8 volumes of CO₂.

15. The method of claim 13, further comprising tunnel pasteurizing the liquid mixture.

16. The method of claim 15, wherein tunnel pasteurizing comprises pasteurizing at about 160°F for about 10 minutes.
**INTERNATIONAL SEARCH REPORT**

International application No
PCT/US 08/10457

**A CLASSIFICATION OF SUBJECT MATTER**

IPC(8) - A23L 2/02; C12H 3/00 (2008.04)

USPC - 426/14, 330.5

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)
426/1 4, 330 5

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
426/599, 77, 51

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
DialogPro (Engineer.rng), USPTO, PubWEST, and Google Scholar
Search Terms Used Beverage, wine, non-alcoholic, polyphenol, carbonate, acid, pasteurize, tunnel, tannin, acid, fruit-wine

**C DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 2006/0039972 A1 (Aldratt et al.) 23 February 2006 (23 02 2006) para [0024], para [0030], para [0031], para [0032], para [0035], para [0039], para [0061], and para [0067]</td>
<td>1-8, 13, 9-12, 14-16</td>
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<td>Y</td>
<td>US 2008/0170730 A1 (Rodney) 2 September 2004 (02 09 2004) para [0042], para [0044], para [0045], and para [0051]</td>
<td>14-16</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C

* Special categories of cited documents
  * "A" document defining the general state of the art which -- not considered to be of particular relevance
  * "E" earlier application or patent but published on or after the international filing date
  * "L" document which may throw doubts on pPriority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  * "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 pPriority 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
20 November 2008 (20 11 2008)

Date of mailing of the international search report
29 DEC 2008

Name and mailing address of the ISA/US
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Facsimile No 571-273-3201

Authorised officer
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PCT Holpdock 571-272-4380
PCT OSP 571-272-7774

Form PCT/ISA/2 10 (second sheet) (April 2007)