MERIT RESEARCH JOURNALS
www.meritresearchjournals.org

Merit Research Journal of Agricultural Science and Soil Sciences (ISSN: 2350-2274) Vol. 5(8) pp. 142-146, August, 2017
Available online http://meritresearchjournals.org/asss/index.htm

Review

The place of palm wine in the alcohol and wine industry

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Abstract

Palm wine is an alcoholic beverage produced from the sap of palm trees like oil palm, coconut palm, Date palm etc. Like every other wine, beer and spirit, palm wine undergoes fermentation to produce a desired level of alcohol content due to the presence of yeast which occurs naturally in it. It is imperative to note that all wines, beers and alcohols undergo varying degrees of fermentation via the aid of yeast to produce different tastes, colors, nutritional qualities and brands. Palm wine stands unique in the wine industry in the sense that it can also be distilled into gin after it has undergone a longer period of fermentation to increase its alcohol content. Palm wine has many more qualities and health benefits than ordinary wines, beers and gins. It also holds high socio-cultural and economic values in places where it is produced especially in Africa. Despite the social, economic and spiritual importance attached to the palm wine, the economy of the locals producing this revered wine is low due to constraints such as low shelf life of the product, unhygienic means of storage and the contamination of the wine by addition of roots and other plant parts which alter the taste and color of the wine. This has resulted in lack of exportation of the wine with no record of its contribution to the national GDP. With the huge market for wines and alcohol both locally and internationally, the Nigerian palm wine has a great prospect of earning foreign revenue for the country if the wine can be kept fresh and at a controlled alcohol content of below 5% for wine and 40- 60% for gin. To enhance the economic potentials of palm wine producers, this paper seeks to highlight the unique properties of palm wine vis-à-vis other wines, beers and gins.

Key Words: Palm wine, Fermentation, Alcohol, Contamination, Exportation, Revenue

INTRODUCTION

The term "wine" was originally used for fermented brew made from grapes. Presently, it is used for similar drinks made from tree saps or fruit juices and a distinction is made by using the name of the fruit or tree to qualify the wine. Wines are alcoholic beverages made from the fermentation of fruits such as grape, apple, cherries, tree saps and plums, for example, apple wine, elderberry wine, palm wine, barley wine, e.t.c. However, the grape fruit is the preferred raw ingredient in wine making process. The process of producing wine is called wine making which involves the crushing of fruits to release its juice, which is then fermented with the help of yeast and bottled to be drunk. Wines are not usually carbonated. But wines with added carbon dioxide are sometimes made, and they are called sparkling wines. Wines are one of the oldest alcoholic beverages in human history. The three basic types of wine are red wine, white wine and rose wine. Wines are the second most popular drink worldwide after gin and liquors.

Palm wine though is not made from crushed fruits; it

is called a wine because it is a sap or juice produced from palm tree such as the palmyra, date palms, coconut palms, Raphia palms, oil palms, e.t.c. It naturally contains yeast, which ferments it to give it a sour taste. When freshly tapped, the alcohol content is below 5%, which is ideal for all conventional wines (with alcohol content below 15%) (FAO, 2012). However, if not promptly and properly preserved, its alcoholic content continues to rise due to the presence of yeast in it. Thus, while yeast is introduced to fruits juices to ferment them in ordinary wine making; yeast naturally exists in palm wine and so fermentation starts immediately after tapping and continues until the effect of the yeast is arrested to stop the fermentation process otherwise the gin thus produced turns into venigar (Obahiagbon and Oviasogie, 2007). From the fore going therefore, palm wine from whatever source (palm tree) is also a wine in its own right because it is similar in production to any other wine and has more or less similar properties to other wines in terms of benefits to consumers. Due to its near-global popularity, palm wine is known by such variety of names as “Matango,” “Fitchuk,” and “Mbu” in Cameroon, “Doka” in Ghana, “Toddy” in India, “Emu” in Nigeria, “Lambanog” in the Phillipines, and “Panam culloo” in China (Noll, 2008). Palm wine and local gin (ogogoro or kaikai) are traditional alcoholic beverage consumed by more than 10 million people in Africa, South India, Myanmar and Mexico and in lower frequencies in Asia, South America, and the middle East (Ukhum, Okolie and Oyerinde, 2005; Adakaren, 2014). Many factors including the species of the tree, the season of the year, time of day at harvest, and type of soil, impact the alcohol content of the wine (Mbuagbaw and Noorduyn, 2012). In fact, these factors play a key role in the characteristics of the final product as rudimentary storage through addition of plant parts and production facilities do little to preserve the product and more often than not alter the taste of the wine (Obahiagbon and Oviasogie, 2007). One major factor limiting the exportation of palm wine especially in Africa where it is produced in abundance is the low shelf life of the wine. As such, millions of earnings in foreign exchange are lost due to spoilage impairing the economy of the locals producing this revered wine.

Beer is the third most popular drink after spirits and wines. It is an alcoholic beverage made with hops, grains, yeast and water. The process of making beer is known as brewing. Firstly, barley or any other cereal used is heated, dried and cracked. It is then mashed (a process whereby the barley is steeped in hot water for an hour to release the sugars, and then drained of the water so that all that is left are the grains and the sugars). This material is called wort. The wort is boiled for an hour with hops and any other spices and ingredients and then added to a chamber with yeast to be fermented. The beer is then bottled with carbon dioxide (carbonated).

Spirits also known as hard liquors are distilled alcoholic beverages made by distilling fermented mash or fermented palm wine. Mash made out of grains or other substances, is put into a heated container, known as a still and heated. The alcohol evaporates first into a chamber or container where it gets cooled to drops of alcohol. Spirits include whiskey, gin, vodka and brandy. Spirits have alcohol contents of 20% and above depending on the level of fermentation allowed.

From the aforementioned, all wines including palm wine, beers and alcohols undergo varying degrees of fermentation to produce different tastes, colours, and nutritional qualities. Egwim, Amanabo, Yahaya and Bello (2013), while citing Steinkraus (1995), highlighted the several functions of fermented foods to include; enhancement of diet through development of flavour, aroma, and texture in food substrates, preservation and shelf-life extension through lactic acid, alcohol, acetic acid and alkaline fermentation, enhancement of food quality with protein, essential amino acids, essential fatty acids and vitamins, improving digestibility and nutrient availability, detoxification of anti-nutrient through food fermentation processes, and a decrease in cooking time and fuel requirement. The longer the fermentation processes of the palm wine however, the stronger and more sour or acidic the taste turns out to be. For instance, the longer the days of palm wine fermentation, the likelihood of it becoming vinegar rather than stronger wine. Hence to control the level of fermentation in fresh palm wine, it becomes necessary to keep it fresh and at a controlled alcoholic content of below 5%, the fermentation process can be stopped by such means of preservation, such as, heat treatment or pasteurization (45°C) or by freezing (0°C or below) and perhaps by canning.

From Table 1 above, the main difference between wines and spirits are in the production process, the ingredients that go into making both and the percentage of alcohol each contain. Hence, wines are made by fermenting tree saps or juice of fruits in the presence of yeast. While spirits are made by distilling fermented palm wine or grain mash.

Nutritional Qualities of Wines, Beers and Spirits

The calories in wines, beers and spirits differ depending on one factor: ABV. Since alcohol is the primary source of calories in wines, beers and spirits, there cannot be a standard number of calories in them. However, the lesser the alcohol content in a serving of a drink, the more minerals and antioxidants present in it (Egwim, Amanabo, Yahaya and Bello, 2013). This estimate does not include flavoured wines which have higher sugar content. Other nutrients found in wines and beers (due to their lower ABV percentage) include (Table 2)

Table 1. Comparison Chart for Convectional wines, Fresh Palm Wine, Beers, Spirits and Local Gin

Conventional wine	Palm wine	Beer	Conventional spirits	Local gin (palm wine base)
Made from fermented fruits juice	got from palm tree saps	brewed from fermented hops and grain mash	Made by distilling fermented grain mash	Made by distilling fermented palm wine
introduction of yeast to initiate fermentation of fruit juice	Naturally contains yeast that triggers the process of fermentation.	Yeast introduced to start process of grain mash fermentation	Introduction of yeast to start the fermentation process of grain mash	Yeast is naturally present in the palm wine
Low alcohol content of below 9-12% ABV	Low alcohol content of below 3-5% ABV	Alcohol content of 5-9% ABV	Alcohol content of up to 40% ABV and above	Alcohol content of 40-60% ABV
Sometimes carbonated	Not carbonated	carbonated	Not carbonated	Not carbonated

Table 2. Nutrient Content of Wines and Beers

Conventional wine	Palm wine	Beer
Fluoride	Simple sugar	Fluoride
Manganese	Magnesium	Manganese
Potassium	Potassium	Potassium
Iron	Iron	Iron
Vitamin B_6	Vitamin B_1	Vitamin B_6
Vitamin B_2	Vitamin B_2	Vitamin B_2
Phosphorus	Vitamin B_3	Phosphorus
Chlorine	Vitamin B_6	Chlorine
	Vitamin C	
	Zinc	
	Yeast	
	Bacteria	
	Protein	
	Carbohydrate	
	Amino acid	

Source: Bachai (2013); Wilson (2015)
Note: There is no column for spirits, whiskey and gins because of their zero nutrient content with little or no calorie content due to their high level of alcohol (ABV).

Functions of nutrients found in wines and beers

- Fluoride - prevents tooth decay when used topically
- Manganese - Antioxidant beneficial to brain, liver and nervous system
- Potassium - Helps keep the heart beating
- Iron - Delivers oxygen to the body
- Vitamin B_6 - Helps access energy in the body
- Vitamin B_2 - Antioxidant that aids in oxygen delivery in the body
- Phosphorus -Strengthens bones, regulates hormones, and aids in digestion
- Chlorine - Helps in memory and liver function

Nutritional Qualities of Palm Wine

Inform Africa (2015) listed following nutrients as those found in palm wine

- Simple sugar – for quick supply of energy
- Protein- Promotes tissue growth and repair
- Carbohydrate-Energizes and keeps the body warm
- Amino acid- builds and repairs body cells and tissues
- Vitamin C-Prevents scurvy and fights diseases
- Yeast –Promotes good eyesight
- Bacteria –Helps in digestion
- Potassium - Helps keep the heart beating
- Zinc- It is required for hundreds of enzymes that control functions as diverse as hearing, taste and smell, health of the skin, hair, nails, and connective tissue, sexual function, digestion, immune response, blood sugar regulation, vision and more. It is also involved in protein synthesis, a vital function, where it is required for several key enzymes in RNA and DNA synthesis.
- Magnesium- is required for thousands of critical

enzymes in the body
- Iron- Delivers oxygen to the body
- Vitamin B1,B2 B3 and B6- Energy booster to the body

Health Benefits of Drinking Wine, Beer and Liquor

Wines, beers and gin/liquors have some added health benefits to drinkers when taken in the recommended doses or drinks per serving per day (Lingberg and Ezra, 2008).

Benefits of Drinking Wine

Currently, wine is second most drunk alcoholic beverage drink. Over the years, its popularity has continued to grow. Information from Inform Africa (2015) and Lingberg and Ezra (2008) disclosed results of researches conducted to show the health benefits of wine especially palm wine to include:

- Boosts lifespan of drinker – A 2000 Danish study found that wine drinkers had significant lower mortality from both coronary heart disease and cancer than did non wine drinkers. In fact, the study suggested that wine drinkers reduced their risk of death by one third compared to non drinkers. People who drank beer and other alcohol had about a 10% decrease in their mortality rate compared to non drinkers.
- Promotes good cholesterol – Red wine is the super hero here. Wines are specially credited with increasing 'good' HDL cholesterol levels and cleaning the body of LDL or 'bad' cholesterol.
- Wine drinkers have lower cancer rates- This may be because of the resveratrol substance found on the skin of grapes. This substance has been proven to slow the formation and growth of cancer, though researchers say more studies are needed to confirm this claim. Resveratrol is only found in red wine and not in white wine or palm wine since white wine is fermented without the skin.
- Wine drinkers eat better – A more recent study (2006) from Denmark found that wine drinkers make healthier food choices (fruits, vegetables, olives, soda pop and sausages) than beer and spirit drinkers.
- Researchers also informed that wine drinkers tend to be better educated and wealthier than beer and liquor drinkers, which also results in better health.

Benefits of Drinking Beer

Research conducted among Chinese adults in January, 2017 showed that a moderate daily bear intake helps provide the body with the following benefits:

- Beer keeps the kidneys healthy - A Finnish study singled out beer among other alcoholic beverages to be better for the kidneys by reducing the risk of developing kidney stones by 40%.
- Beer is good for better digestion - Beer, and especially dark beer, contains up to one gram of soluble fiber in each 30 cl glass – unlike wine, which does not contain any fiber at all. Fiber plays an important role in intestinal transit.
- Beer helps to lower cholesterol - The fiber in beer can also help reduce high levels of LDL cholesterol, i.e. the "bad" type of cholesterol.
- Beer can increase vitamin B levels - Beer contains several B vitamins (B1, B2, B6 and B12). A Dutch study found that beer drinkers had 30 percent higher levels of vitamin B6 than their non-drinking counterparts, and levels that were twice as high as those of wine drinkers. Beer is also a generous source of vitamin B12, an anti-anaemic factor not found in many foods.
- Beer promotes stronger bones - A 2009 study concluded that the elevated levels of silicon in beer can contribute to higher bone density.
- Beer as a cure for insomnia - Lactoflavin and nicotinic acid, which are both present in beer, can promote sleep.
- Beer reduces the risk of a heart attack - Beer drinkers have a 40 to 60 percent reduced risk of suffering a heart attack compared with non-beer drinkers.
- Beer helps prevent blood clots - The ingredients in beer help prevent blood clots from forming.
- Beer boosts memory - According to studies, beer drinkers are less likely to suffer from Alzheimer's disease and dementia than non-beer drinkers.
- Beer helps combat stress - Researchers at the University of Montreal found that two glasses of beer a day can reduce work-related stress or anxiety.
- Beer as a cold remedy - Drinking warm beer is an excellent cold remedy. When barley is warmed up it improves blood circulation and helps one breathe when he feels congested. It also provides relief for joint pain and boosts immunity. To prepare it, heat a bottle of beer in a double boiler and then add four small teaspoons of honey.
- Beer makes skin more beautiful - Good news for women! Certain vitamins in beer can regenerate the skin and have a positive impact on pigmentation. Your skin becomes smoother and suppler.

Benefits or Drinking Spirits/Liquor

Alcohol is not exactly considered a healthy lifestyle choice; more often than not, it's associated with empty calories and bad decisions. But that doesn't mean there aren't a few benefits to drinking in moderation. In fact, gin including local gin (made from palm wine) is liquor with a wealth of potential benefits to offer. The very common health benefits of drinking spirit in the recommended moderation are:

- Warms up the body - It helps to fight cold.

- It is a social lubricant – It lubricates social interactions and making awkward situations a little less anxiety-inducing. It makes one fit in at parties and temporarily boost confidence.
- Helps to get over malaria infection – The tonic inside gins contain quinine, an alkaloid that also has anti-inflammatory and analgesic properties that can be administered to a fever patient before proper medication can be administered.
- Spirits/Gin soothe sore throat – When there is not much of a voice or a sore throat, gargling some gin combined with a spoonful of warm water can help ease pain by numbing the throat. As with the mouth wash, make sure not to swallow the dose. You want to feel better not get smashed by accident.
- Reduce heart disease – spirits are good boosters of 'good' HDL cholesterol levels. HDL helps clean the body by removing LDL or 'bad' cholesterol.
- Spirits helps one to be more creative – A study found that people who drank and ate during a problem solving test performed better than their sober counterparts.
- Become Genius – Gin/whiskey helps to keep the brain sharp by helping the neurons in the brain resist wear and tear that can lead to Alzheimer and dementia later in life.
- Freshen breath – A shot of spirits/Gin help cure the case of bad breath by killing bad odor bacteria. However, care must be taken to spit it out after use and do not use any liquor with high sugar content, as they can eat away at all that healthy enamel.

CONCLUSION

Palm wine may not rank amongst the three most popular drinks when it comes to alcohol beverages, but it is consumed by millions of people in West Africa, Asia, South America, the Middle East and North Africa. Palm wine provides more or less the benefits of wine and the local gin made from it gives all the benefits of spirits except that the fresh palm wine has other additional health benefits than other wines (as listed above) and that is what gives it the edge above other wines in the market. Besides other nutrients contents of Palm wine, it is also high in amino acids, potassium, magnesium, zinc, and iron (Mbuagbaw and Noorduyn, 2012). Pam wine is also found to increase the health benefits of drinkers by; Improving their vision because it contains the antioxidant Vitamin C (ascorbic acid) and Vitamin B1 (thiamine) which are also found in other fruits and vegetables that helps in improving vision, reduces depression, reduces fatigue, prevents nausea, lowers blood pressure, prevents cancer because it contains vitamin B2, also known as riboflavin which is an antioxidant that helps in the fight against some cancer causing agents called free radicals, tackles the symptoms of malaria, promotes skin, nail and hair health because of the iron and vitamin B complex found in it. Iron is very essential for the development, growth and functioning of some cells in the body. This property of palm wine makes it helpful in promoting wound healing. Research has showed that drinking moderate amounts of palm wine has been associated with a reduced risk of developing cardiovascular diseases such as heart failure. However, just like other wines, beer and spirits, drinking palm wine in excess also has adverse effects like destroying the liver. There are also word – of - mouth reports that palm wine helps in increasing sperm in men and breast milk production in women as well as help with male erection (Inform Africa, 2015).

It is therefore very important to conduct more research into the effective preservation and packaging (presentation) of palm wine in other to exploit the full potential of this revered drink. This will also bring this special resource to lime light and encourage investments in the industry as the economy of the producers will increase, so also will the GDP of the producing countries be boosted besides other direct and indirect linkages that would be associated with the expansion of market for this product.

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