

## ANCIENT ART OF ALCOHOLIC FERMENTATION, ITS IMPORTANCE AT PRESENT AND FUTURE PROSPECTS - A REVIEW

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Alcohol fermentation technology is an ancient art discovered accidentally and later continued in knowing more of the technology and eventually of its importance in many ways as a beverage, in medicine etc. It becomes a part of human culture an indispensable component of many of the ceremonies, rituals, rites and festivities. The knowledge have been descended through generations among the communities in their respective ways and become a part of their civilization. Finding of the alternative raw materials such as rice, cane, beet, apple, guava, and palm etc. other than grape in making of wine, reduces the possible post-harvest loss. It is becoming a good source of revenue at household, state and national levels. Ethanol production and using as bio-fuel is the only promising solutions at present, until a better and permanent solution is innovated.

**Keyword :** Meitei; Palm wine; Rice wine; Traditional wine; Tropical regions.

### Introduction

Archaeological evidence suggest the earliest wine production in Georgia around 6000BC<sup>1</sup>, by Assyrians during 3500BC<sup>2,3</sup>. Wine, the alcohol beverage, fermented mainly from grapes and fruits<sup>4</sup> were also mentioned in the late 4th century BC writing of Chanakya, the mentor, advisor, prime minister and maker of the great emperor Chandra Gupta Maurya, who condemn the indulgence of "Madhu" (a type of grape wine) by some of the emperors and courtiers of his time<sup>5</sup>. During Vedic period, the fruit wine "Soma", developed accidentally, was regarded as "God" that led one towards eternal peace<sup>6</sup>. Role of yeast in Alcohol fermentation was demonstrated in the mid 19th century by Cagniard-Latour, Schwann and Kutzig<sup>7</sup>. First winery in India was established by Shaw Wallace in Andhra Pradesh from Bangalore Blue and Anab-e-Shahi varieties of grape around 1980's and by 2000 there were only six operating wineries. There are now estimated to 60 operating wineries with up to 30 additional companies registered to produce wine<sup>8</sup>. During off-season, unavailability of grapes and high price suitability of other fruits for wine production was studied<sup>9</sup>. The fruits that are abundant also face fungal contamination, spoilage and over ripening<sup>10</sup>. Hence, these fruits need to be processed as juice

and other products<sup>11</sup>. Therefore, post harvest technology can reduce the post harvest losses and increase diversity of wine<sup>12</sup>.

*Types of wine*-Wine could be classified on different basis viz. raw materials used, colour of the wine, alcohol content and the process of making wine<sup>13</sup>.

i) *Based on the raw materials used such as:*

- High starch based wines (e.g. rich wine, millet wine, barley wine, potato wine, palm wine etc.).
- High sugar based wines (grapes wine, sugarcane wine, beet wine and grape wine mixed with other fruits such as guava, apple, elderberry etc. gives fruit wines etc.)

ii) *Based on colour:*

- The colour of the wine is determined with the presence or absence of the grape skin during fermentation.
- *Red wine:* Prepared from red/black grapes, but its red colour is due to a further process called maceration. (e.g. Cabernet Sauvignon, "King of Red Wine Grapes" from the Bordeaux region of France is the most popular variety of red wine. Other types are Merlot, Zinfandel, Pinot Noir etc.
- *White wine:* White wine can be prepared from the juice/pulp of coloured and very dark grapes without taking the grape's skin during fermentation. (e.g. Chardonnay, one

of the most famous white wine varieties, principally found in the Burgundy region of France where it was first cultivated. Other types are Chenin Blanc (known as a poor man's alternative to Chardonnay in France), Gewürztraminer (Best suiting Asian foods and sausages), Riesling (German white wine) etc.

- *Rose wine*: The colour ranges between pale-orange to dark pink, entirely depending on the grape variety used and the process of wine making. (e.g. White Zinfandel, a rose (blush) wine of California. It is one of the most famous rosé wines and is the third most popular in the United States. White Zinfandel is sweet, soft, and less alcoholic and is the most preferred table wine. Grenache another famous rosé wine from Burgundy, France. Grenache may have hints of raspberries, mint and black cherries and also have tinge of spicy flavours like clove and herbaceous flavours of lavender.

iii) *Based on the alcohol content, use and the process of making wine :*

- *Table wine*: Alcohols that are normally used in the family consumption or in party. It can be mild, medium and hard depending on the percentage of alcoholic content.

- *Sparkling Wine*: Sparkling wines have carbon dioxide in it. This is achieved through fermenting twice, once in an open container and the second time in a sealed container to keep the gas inside the wine. (e.g. Champagne, produced in the Champagne region of France is the highest quality sparkling wine. It can only be made with Chardonnay, Pinot Noir and Pinot Meunier grapes. Asti and Prosecco, (Asti made from the Moscato grape) produced in the Piedmont region of Italy. And, Prosecco, produced in the Veneto, Italy, is made from the Prosecco grapes. Cava (the Spanish sparkling wine produced using Macabeo, Parellada, Xarel-lo and Viura grapes. Recently, Pinot Noir and Chardonnay grapes are being used as well to produce this sparkling wine. Sekt, the Germany based Sekt is produced using a variety of grapes; Riesling, Pinot Blanc, Pinot Gris and Pinot Noir.

- *Fortified Wine*: Fortified wines are those wines to which Brandy has been added to give it a different texture and flavor. Fortified wines have their fermentation process stopped by either the addition of a spirit or the increase in the level of spirit e.g. Sherry, produced in Spain's "Sherry Triangle" consisting of the towns of Sanlúcar de Barrameda, Jerez and Puerto de Santa María. After fermentation of the wine, Brandy is added to it to produce Sherry. Port, produced in the Duoro Valley in Portugal is sweet, red in colour, mostly consumed as a dessert wine and comes in dry and semi-dry forms. Port wine is fortified halfway through fermentation so that all the sugar in the

wine is not converted into alcohol, which leaves behind a soft, sweet and natural flavour. Madeira too is a Portuguese fortified wine produced in the Madeira Islands. Madeira is a versatile wine and is proalsoduced as a dry aperitif or sweet dessert wine. Cheap Madeira is also used for cooking by adding salt and pepper to it. Marsala, Italian household wine, fortified with alcohol to give it the unique flavor and texture for which it is famous. Vermouth, the main ingredients in the cocktail Martini is used in cooking.

- *Desert wine*: These are generally sweet wines having high sugar content, mostly, served with desserts and have no particular variety. Typical dessert wines are the raisin wines and ice wines (made from grapes from coldest regions).

- *Cooking wine*: Cooking wines have a higher quantity of salt in them. Cooking wine of poor quality is undrinkable and may be used for cooking purposes only.

Wine is not only about taste and flavour; it is also about class, elegance and sophistication. Wine is about soul, about love and about life. The alcohol content allows wine for longer self life.

*Association of wine making with human culture*-The first winery in India was established in Andhra Pradesh during 80's. Though, wine industry was not established in the regions of north eastern (NER) India, the practice of wine making have been amalgamated with their culture and tradition. The raw materials are chiefly starch based such as rice, barley and millet etc. Different communities and tribes have their own methods and use different plants and associated with their respective cultures and ceremonies.

Bodos, the largest tribe of Assam offer their traditional rice wine "*Jou bishi*" and chicken to their supreme "*Bathou*" (Lord Shiva) during "*Baishagu*" and blessings<sup>14</sup>.

*Mishings*, the second largest tribes of Assam, India, celebrate their most important festival "*Ali Aye Ligang*" for the successful annual agriculture on the 1<sup>st</sup> Wednesday of *Phagun* (Mid-February) by offering the traditional rice wine "*Apong*" (either *Nagin apong* or *Poro apong*) to ancestors (Sedi Melo, Karsing-Kartag and Donyi-Polo) for the good harvest<sup>15</sup>. They use 16 different plants in the preparation of the yeast starter locally known as "*epop*", and reported to have alcohol percentage of 7.52 -18.52 % v/v<sup>16</sup>.

Other tribes in Assam like Karbi, Ahom and Deori also celebrate their festivals viz. Ronker/Wofung ronker, Me-Dum-Me-Phi and Bihu respectively with their respective rice wines viz. *hor-alank*, *xaj pani/kolo pani* and *sujen* as their indispensable components<sup>17,18</sup>.

Nishis, the largest tribe of Arunachal Pradesh celebrate their most important festival "Nyokum". Their locally-made drink known as *apong* (two types of *apong*: *pone*, made of rice, and *poling* which is made of millet) is used at all social gatherings and important events<sup>19</sup>.

Adis, the second largest tribe celebrate *solung festival* by offering 'apong' (traditional rice wine) and fowl sacrifice to Kine Nane (goddess) for the better harvest<sup>20</sup>. Other tribes like Apatani also celebrate their own social-religious festivals like "Myoko" to welcome the advent of the spring and worship 'Yullo' whom the Apatanis believed 'as the creator of man and animals'. During the festival hunting of a red-monkey is done and only after killing it the ritual 'Biding Pado' is performed. Apong is served along with meat to the hunting party<sup>21</sup>.

Meitei the non-tribal major community of Manipur is famous of producing very high quality wine locally called "Yu" (with different types of yu like sekmai yu, andro yu etc.) and is often used in many ceremonies to offer to guest<sup>22</sup>. Many tribes in Manipur also produce their traditional wine under different names *viz.* Anal tribe drink a form of rice beer, known as "zupar or zuhrin"<sup>23</sup>. *Gaan Ngai, Chaga-ngai* and *Maleng Ngai* : are ritual festival of the Zeliangrong during which "Joungao", the rice beer is offered to a visitor during the festival as a compulsory item<sup>24</sup>.

Phom naga tribe of Nagaland like other tribes such as Ao, Konyak etc. celebrate their most important festival "Monyu" and the other festivals like Moha, Bongvum and Paangmo with rice beer and meat<sup>25</sup>.

The Yakthung or Limbu tribes and clans belong to the *Kirati* nation are indigenous to the hill and mountainous regions of east Nepal, Southern Tibet, Bhutan and Sikkim. During weddings, mourning, gift exchanges, and settlement of conflicts involve consumption of the Limbu traditional beer popularly known as "Tongba"<sup>26</sup>.

Among Mizos of Mizoram, traditional rice beer "Zu" is offered during their important festival called "Chapchar Kut". According to Legend, one morning in spring a Kawlai Chief, ruler of the most famous and populous village "Suaipui", now located within Myanmar were on a hunting expedition with the village braves into the deep animal-infested forests. They were not blessed by 'Chawngleri' (the Guardian Queen of the beasts) or were cursed by Black Hollock and return to their village empty-handed. So as not to disappoint the villagers waiting with great expectation, the worthy young chiefs' initiate and invent the celebration "Chapchar Kut" which is celebrating every spring even today with rice wine and meat as the main ingredients. A particular dance "Chai", was also born

with Chapchar Kut<sup>27</sup>.

The war Khasi of Meghalaya consumes home brewed rice wine variously known as "iad-um"<sup>28</sup>, or "ka kaid"<sup>29</sup>, or "kaid biar and ka kaid um"<sup>30</sup> also brewed wine from millet and certain plants during festivities and ceremonies.

The most important ritual-cum-dance festival of khasi is "pomblang" (meaning goat killing) which is associated with "nongkhrem dance festival" celebrated during the month of April with guards of rice beer (*ka kaid*) pouring by "syiem" (ruler of shillong) in liberation to "U Blei Shillong" (the God of Shillong), "Lei long syiem" (the ancestral mother of syiem clan) and "U suidnia" (the maternal uncle) and seeks blessing for rain, good harvest, and to be free from famine and epidemics<sup>31</sup>.

Among tripuris of Tripura, India, during marriage by negotiation (*hambui tulnu kaimani*), a ritual known as "kaisunga" was performed between the two families at the bride's residence by keeping two pots of rice wine and two earthen oil lamps. Both families then perform "dangdua rituals" (blessings to bride and groom) which is performed thrice before the guardians drinking the rice wine. The bride's father than arrange for a feast<sup>32</sup>.

Shunris, the Bengali Hindu caste whose traditional occupation is the distillation and selling of country wine, were considered low in social hierarchy, because of their occupation. But, in *tantrism*, flourished in Bengal during medieval period alcohol was considered an important ingredient in worship<sup>33</sup>.

*Ruou can* (literally "stem wine" or "tube wine") is a fermented rice wine of mountainous areas of Vietnam like Tây Nguyên or Tây Bắc. *Ruou can* is typically drunk for special occasions such as festivals, weddings, or harvest feasts. It is often drunk by a fire or in a *nhà rông*, or community house. People always dance and play music (in Tây Nguyên, they play gong) after drinking<sup>34</sup>.

*Choujiu*, the ancient variety of *Chinese wine* brewed from *glutinous rice*, and is possibly the original Chinese wine which can be traced back to the *Tang Dynasty*. In ancient times, *choujiu* was referred to as *lao*li or *yujiang*. In the modern day, the city of *Xi'an* is known particularly for its *choujiu*. *Doburoku* is the Japanese equivalent of *choujiu*, and in Korea *gamju* and *makgeolli* are similar<sup>35</sup>. Chinese celebrate "Duanwu Festival" by are eating (and preparing) *zongzi*, drinking realgar wine, and racing dragon boats<sup>36</sup>. *Makgeolli*, the rice wine is used during ancestral rites in Korea<sup>37</sup>.

*Lao-Lao* is a Laotian rice whisky produced in Laos. A less powerful version of *lao-lao*, called *lao-hai*, is especially popular with the Khamu ethnic group in Laos,

and is drunk from large communal earthenware pots (*hai*) through long bamboo straws. A cocktail, "*Pygmy Slow Lorange*", named after the *Pygmy Slow Loris*, a species endemic to Laos is also Popular<sup>38</sup>.

There are number of rice wines brewed traditionally in Asian countries unlike the European Grapes wine and are used in many traditional ceremonies, rites and rituals<sup>39-45</sup> viz.

*Ang Jiu* - Chinese red rice wine, popular among the FooChow Chinese (Malaysia, China)

*Choujiu* - A milky glutinous rice wine popular in *Xi'an*, China

*Huangjiu* - A Chinese fermented rice wine, literally "yellow wine" or "yellow liquor", with colors varying from clear to brown or brownish red.

*Mijiu* - a clear, sweet Chinese rice wine/liqueur made from fermented glutinous rice.

*Brem* - Balinese rice wine

*Cheongju* - Korean rice wine

*Makgeolli* - a milky traditional rice wine indigenous to Korea

*Gamju* - A milky, sweet rice wine from Korea

*Kulapo* - A reddish rice wine with strong odor and alcohol content from the Philippines

*Lihing* - Kadazan rice wine (Sabah, Malaysian Borneo)

*Lao-Lao* - A clear rice wine from Laos

*Beopju* - a variety of cheongju

*Ara* - Bhutanese rice, millet, or maize wine

*Pangasi* - Rice wine from *Mindanao* in the *Philippines*.

*Raksi* - Tibetan and Nepali rice wine

*Ruou can* - Vietnamese rice wine drunk through long, thin bamboo tubes

*Sato* - A rice wine originating in the Isan region of Thailand

*Sonti* - Indian rice wine

*Tapuy* - Clear rice wine from the *Mountain Province* in the *Philippines*

*Tapai* - Kadazandusun rice wine (Sabah, Malaysian Borneo)

*Tuak* - Dayak rice wine (Sarawak, Malaysian Borneo)

*Thi* - Kayan rice wine, served in a clay-pot with a straw to sip (Kayah State, Myanmar).

The sap of various species of palm tree such as the palmyra, and coconut palms are used to prepare alcoholic beverage called Palm wine, kallu, palm toddy, or simply toddy<sup>46</sup>.

In Karnataka and Tamil Nadu, India, palm wine is usually available at *toddy shops* (known as *Kalitha Gadang* in Tulu, *Kallu Dukanam* in Telugu, *Kallu Angadi* in Kannada or "*Liquor Shop*" in English). In the state of Andhra Pradesh (India), toddy is a popular drink in rural

parts. Palm wine plays an important role in many ceremonies in parts of Nigeria such as among the *Igbo* (or *Ibo*) peoples, and elsewhere in central and western Africa. In some parts of the Eastern Nigeria, the *Igbo* Land, Palm wine is called "*Nkwu Elu*" or "*Mmanya Ocha*" (white drink). For instance, in "*Urualla*" and other "*ideator*" towns, It's used for traditional wedding. A young man who's going for the first introduction at his inlaws is required to come with Palm wine. There are specific gallons of palm wine required<sup>47</sup>.

*Market share and laws of wine in India*- The rate of wine consumption in India has grown steadily since 2003. It was expected to touch 2 million cases in 2010. The largest market for wines in India is in Goa, followed by Mumbai. The market share value for various states:

" Andhra Pradesh 1.2 %

" Assam 2.2%

" Delhi 10.7%

" Goa 26.4%

" Karnataka 19.4%

" Maharashtra 25.9%

" Punjab 0.9%

Every Indian state has specifically framed its policies and taxation regime, independent of other states. Wine can be imported by anyone into custom bonded warehouse as license is not mandatory. Some states such as Delhi, Goa, and Rajasthan have restricted the sale of imported wines. No advertisement is allowed to promote liquor consumption<sup>48</sup>. Sales of alcohol are prohibited in Gujarat, Manipur, Mizoram and Nagaland<sup>49</sup>.

*Drunk Driving Law*: The blood alcohol content (BAC) limits are fixed at 0.03%<sup>50</sup> or 35 µl alcohol in 100 ml blood<sup>51</sup>. Any person whose BAC values are detected more than this limit is booked under the first offense. A person may be fined about Rs. 2000 and/or he or she may face a maximum of 6 months imprisonment.

Drinking has always remained a social taboo and therefore no culture of social drinking could ever develop in India. Even Constitution of India puts a proscription for liquors in India by Section 47 of the Directive Principle of State Policy declaring that "the State shall endeavour to bring about prohibition of the consumption - except for medicinal purposes - of intoxicating drinks". India has predominantly remained a non- drinking country<sup>52</sup>. Now, it is high time to revive the notion of social drinking and responsible drinking habit with proper regulatory affairs of the state.

*Markets of Alcohol in India*- There are four broad categories of Alcohol Markets in India:

*Open Markets*: Private sector sales are allowed subject to

a retail license. *Viz.* Maharashtra, West Bengal, Goa, Assam, Meghalaya, Arunachal and Tripura.

**Auction Markets:** Licenses are auctioned to the highest bidder. Uttar Pradesh, Rajasthan, Madhya Pradesh, Bihar, Punjab, Haryana and Chandigarh.

**Government Controlled:** Tamil Nadu, Delhi, Kerala, Andhra Pradesh and Karnataka.

**Prohibition States:** Sales of alcohol are prohibited. Gujarat, Manipur, Mizoram and Nagaland.

Maharashtra accounts for about two-thirds of domestic wine production. Maharashtra, Karnataka and Goa have taken steps to support the domestic wine industry by reducing or eliminating excise duties on wines produced in-state, easing distribution restrictions and providing fiscal incentives to establish wineries and vineyards. These states have also imposed stiff excise taxes on imported wines and wines from other states. In addition, Maharashtra has eased the licensing requirement and regulations for establishing wineries and wine retail outlets and established two wine industrial parks to facilitate investment in the industry<sup>53</sup>.

**Income from wine-**Wine production in India shows an increased rapidly from 3.6 million litres (400,000 cases) in 2003 to an estimated 13.5 million litres (1.5 million cases) during 2010. The rate of growth appears to have slowed following the 2008 Mumbai terror attacks and the global financial situation caused consumers to reduce their spending on non-essential items and as a result some producers faced financial difficulties. Despite a high federal tariff, wine imports grew steadily from \$1.5 million in 2003 to \$16.4 million in 2008 and import drops to 40% to just \$9 million in 2009. Export data compiled from major exporters confirm the drop reflected in Indian import statistics, indicating that exports of wine to India dropped from 4.3 million liters in 2007 to 2.2 million litres in 2009. The wine market is still quite small with an estimated one to two million consumers imbibing 1.3-1.4 million cases annually<sup>54</sup>.

**Future prospect of wine production-**

**Efficient production of Wine :** Efficiency of wine production can be increased by using good, easily available and low cost raw materials like sugarcane, sugar beet in the unavailability of grapes. Both are good source of sugar and are available at different regions and seasons. Sugar are grown plenty in warm/hot climates and hot seasons while beets prefer cold climates and cold seasons. The contrasting physiological nature of these crops can be exploited for the continuous production of wine all the year round (through out the year) irrespective of seasons or off-seasons. Seasonal availability and high cost of

grapes in the tropical regions could be substituted by other alternate fruit sources in tropical countries<sup>55</sup> like Guava<sup>56</sup> to produce superior grade of wine using blending and proper processing techniques with different fruits of medicinal/antioxidant properties will increase the production while saving it from rotting.

**Production of Wine of Health Importance:** Many of the antioxidants *viz.* Lycopene, Resveratrol, Quercetin and Leutin etc shows higher bioavailability after processing as they are mostly insoluble in water but soluble in fat and fat soluble solvents. Moreover, fruits are rich in active antioxidants like vitamin C which are water soluble. Therefore, wine production by blending with beet, pomegranate and watermelon known for their high content of vitamin C and flavonoids will ensure the wine with health significance. The following health significances of such blended wine could be predicted.

*i) Cardioprotectant:* Increasing antioxidants in the wine could protect heart from coronary heart diseases due to the following reasons:-

Antioxidants stimulates higher production of (HDL) cholesterol also known as Good cholesterol.

Antioxidants help to check the production of (LDL) cholesterol also known as Bad cholesterol.

Antioxidants reduces the risk of blood coating within the hearts' blood vessels due to the above reasons heart become stronger and flexibility of the heart's blood vessels increases nullifying the chance of high blood pressure related heart attacks.

*ii) Anticancer:* Resveratrol, the antioxidant present in the pink grapes known for its anticancer activity is also present in beets, pomegranates and watermelon. Therefore, blended wine with these fruits will also help in checking cancer.

*iii) Antiaging:* Free radicals, the unit with the unpaired e<sup>-</sup> generated and released in our body from different reasons, activities and exposure, try to restore the paired and stable condition by attacking the other's stability. Similarly, the other molecule when they become unpaired it will continue the same in a chain reaction. Number of such free radicals like superoxides, hydroxyl radicals and proton radicles etc attacks the cell membrane and cell death occur leading to premature aging and number of other diseases. Wine with high antioxidants can scavenge these free radicals and check the deleterious effects and safe from advanced aging.

*iv) Anti-nervous disorder:* The presence of these antioxidants in wine in high amount would also help in number of nervous disorder like Parkin's diseases, Alzimers etc. However, exactly the defence mechanism

against these diseases needs to be studied.

v) *Skin tonic*: Presence of high content of antioxidants in the wine will help in removing the death epidermal cells and replacement with new cells resulting to quick rejuvenation with healthy and freshness of the skin.

*Production of Ethanol as an alternative eco-friendly future bio-fuel*: Ethanol has been proven as a cheap alternative to reduce vehicular emission and few countries have started adopting the technology to reduce their Green House (GH) emission in order to meet their Koyoto Protocol targets<sup>57</sup>. Though, ethanol for biofuel production can be done from different crops such as corn, the GH emission during the process ranging from fertilizer and agricultural processing, transport of biomass, processing of the fuel and transport and delivery of the biofuel to the consumers the total GH emission from using cane is far lower than that of corn. Sugarcane cultivation require fewer fertilizer in put than corn, during processing of the fuel from cane at least 50% lesser emission occurs compared to fossil fuels like Diesel and Petroleum<sup>58</sup>. United States Department of Agriculture in July of 2002 clarifies the criticism against inefficiency of ethanol as biofuel reported ethanol to have an output: input energy ratio of (1.34:1)<sup>59</sup>. Furthermore, another study found that the energy balance of gasoline is actually negative, giving ethanol a 1.42:1 output energy ratio compared to gasoline<sup>60</sup>.

*Scope of sugarcane based ethanol industries at domestic and national level*: Political instability at the middle east often cause insecurity in the fuel supply and price hike occurs but generation of own ethanol fuel at the regional and national level could promote internal economic growth. Ethanol production from agricultural crops including wheat and sugarcane is also regarded as 'renewable' and sustainable<sup>61</sup>.

*Elevating the economy and encouraging the agriculture of cane and other fruits*: Wine industry in India is grape based which are at the infant stage<sup>62</sup>. Out of a total of 60 wineries in the country 57 are in Maharastra, 2 in Karnataka and 1 in Goa<sup>63</sup>. Therefore, the huge amount of cane production (second in position next to Cuba) and the number of its processing industries seems unparallel and it can be predicted that expansion in the winery could elevate the nation's income. When the winery industries increase it will in turn encourage the agriculture sectors as the poor food crop category will be changed to fuel crop.

#### Discussion

The present study tries to highlight fact that the ancient art of wine making is still becoming more indispensable from the human welfare. With the advancing knowledge

of the fermentation technology, we are realizing more of its importance and application. It helps in entertaining, in the celebration, ceremonies, rituals, rites, traditions and festivities. It helps in conserving of post harvest fruits from decay and rotting and at the same time providing verities of beverages. It helps in developing countries economy. It is used in food, drinks, medicine and in the scientific research. At present, it is claimed as the only immediate solution of the energy crisis in the form of bio-fuel. Therefore, the prohibition laws, treating of drinking wine as taboos should be replaced with the more reasonable and flexible laws to increase in its consumption, production and commercialization.

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