



Original Research Paper

STRENGTHENING OF THE FRUIT WINE INDUSTRY IN KALINGA

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II. Rationale

The emergence of Small and Medium Enterprises (SMEs) in the province of Kalinga is greatly characterized by the processing of products that are already preset in the Kalinga communities such as wine processing from the available supply of fruits within the locality. The wine processors are given support by the Local Government Units and the Department of Trade and Industry by coordinating trade fairs where they can display and sell their products. These activities encourages the wine processors to really go into the business. Although wine producers in the province of Kalinga concentrate on the production of bugnay wine they also process other fruit wines using fruits in season such as pineapple, lemon and wild cherries.

III. Objectives

This study aimed to:

1. Analyze consumer preferences in light of prevailing production management practices of local wine processors;
2. Determine the problems encountered by the fruit wine processors in order to meet such consumer expectations on quality level requisites; and,
3. Propose strategies on identified areas of product attributes, location of plant facilities, process and capacity management and total quality management.

IV. Review of Related Literature

Wine was first made 8,000 years ago. Learning about the history of wine making is helpful and at least interesting when considering this rewarding hobby. Most people have the opinion that you can only get fine wines by buying it from well known wineries, however this is not so, you can learn *how to make homemade wine* by learning the basic fundamentals of winemaking used thousands of years ago.

Many of the great homemade wines (called “country wines”) are the best wines in the country. These wines use many great ingredients like grapes, elderberries, blackberries, apples, peaches, and many other wonderful cultivated fruits that you may be able to find in any of the many winemaking books available online and in stores. How to grow grapes is a science of its own. You may even find recipes for vegetables and flowers and some other interesting ingredients.

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Fruit wines have traditionally been popular with home winemakers and in areas with cool climates such as North America and Scandinavia; in Africa, India, and the Philippines, wine is made from bananas. Most fruits and berries have the potential to produce wine. Few foods other than grapes have the balanced quantities of sugar, acid, tannin, nutritive salts for yeast feeding and water to naturally produce a stable, drinkable wine, so most country wines are adjusted in one or more respects at fermentation.

Producers and Consumer Preferences

The good old pineapple has just had a makeover at Hosabale, a remote village in Shimoga district, where it could soon be used to make wine on a commercial scale.

Manjunath Hegade (46), a pineapple grower, is knocking on the doors of the state excise department to get a licence to produce wine from pineapple. If he succeeds, Hosabale will have India's first pineapple winery.

Experiments with wine

Experimenting at his makeshift brewery located on a sprawling 18-acre plot, Manjunath has successfully brewed a couple of barrels of pineapple wine in the last two years.

Ecstatic over the results, Manjunath has sent a proposal along with the wine samples to the technical committee of the excise department, responsible for permitting liquor production from a new substance. "It is something new and being done for the first time in the country. We are analysing the samples in our laboratory before giving our nod for the actual production," Excise Minister M P Renukacharya told Bangalore Mirror.

Desperate measure

For Manjunath, who has been growing pineapples for the last five years as an intercrop between rubber trees, the wine-making was an act of desperation. "I had no idea about making wine out of pineapple. But the sudden fall in prices left me with no option but to explore new ideas. Forget about the price, there were no takers for the fruit and I had to literally throw them away," he said.

Even at normal times, the fruit gains little market space between September-November but after that period, it is no match for seasonal fruit, he said. A casual browsing on the internet revealed bits and pieces of information about pineapple wine in Latin America and countries like Spain and Portugal. "After pooling in all the available information, I decided that wine could be a ray of hope for the pineapple grower," Manjunath explained.

The tasty healer

Pineapple has medicinal properties and is commonly used in the Malnad area as a cure for various ailments. While tanning areca and tobacco, the major crops in this area, farmers develop mucous fibrosis which can eventually lead to cancer. But this can be prevented with pineapple.

"Also, pineapple wine has bromelain enzyme which can act as an anti-cancer drug. This apart, it is also good for those suffering from asthma and bronchitis," said Manjunath.

Minister Renukacharya added that pineapple wine could cut excessive cholesterol, reducing instances of heart attack in the long run.

Pineapple is rich in nutrition with health care function. We use fresh pineapples as materials. The pineapple juice was extracted by adding pectinase after being squeezed and treated. It fermented under the condition of sugar(17%),active dry yeast(10%) for 7 days at 33°C. The alcohol content of pineapple wine was 7%-8%,acidity was 0.4%-0.5%,and total sugar was 5%-6%.We can get the pineapple wine, which is rich in nutrition, and of outstanding flavor.

Wine yeast, bread yeast, beer yeast and grape wine yeast were used respectively in the experimental production of pineapple wine with pineapple as raw materials and the experimental results were contrasted. The results indicated that wine yeast achieved the highest alcohol content(8.8%,v/v)in fermentation, immobilized yeast led to quicker fermentation than free yeast ,and the initial sugar content, temperature and p H value played an important role in immobilized yeast fermentation. Through orthogonal tests, the optimal technical conditions for immobilized yeast fermentation were as follows: temperature at20°C,initial sugar content as20%,and p H value as5

Production Management Practices

Fruits can be transformed into wine through a process called fermentation. All it takes is heating to bring about the chemical reaction plus other ingredients.

Choice of Fruit Varieties

Grape is not the only fruit which we can make good-quality wine. Native fruits such as cashew (kasoy), duhat, pineapple, guava, banana and bignay can be

also processed into good wine. Other less familiar, yet excellent sources of wine are lipote, balubat and katuria.

The lipote resembles the duhat, except for its round shape and black skin. Its white flesh become sweet when ripe and it also known as duhat matsing.

Another native fruit, the balubat, is like siniguelas, green when unripe and reddish-orange when mature. It has white flesh with seeds like that of prunes and taste very sour even when ripe.

The katurai is similar to the tiessa, green when unripe and yellow when ripe. Its flesh is yellow and sour with seeds like those of nangka. It is also have plenty of latex, a sticky juice.

Preparation

The fruits should be sweet enough; otherwise, add cane sugar to the ingredients. Make sure the fruits are ripe and free from bruises and diseases.

Wash the fruit very well and peel if necessary. Crush or mash to extract the juice. Use a fruit press or crush by hand and then strain the juice through a strong piece of cheesecloth.

Add water twice the amount of the extracted juice, then add sugar if necessary.

Pasteurization

Pasteurize the juice using the double boiler. This may consist of a kettle that can be placed within a much bigger kettle containing water. Prepare cheesecloth or any filter cloth, a spoon and a container for the pasteurized juice. Clean and sterilize all these boiling water before using.

Filter the juice into the small boiler and place inside the bigger boiler. Put water in the bigger one up to the level of the juice. Heat the set-up at 63°C for 30 minutes, or at 72°C for 15 seconds. Gently stir while heating.

Afterwards, cool the juice immediately by exposing the container to cold running water. Stir the juice continuously, until sufficient cool. Add a pinch of baker's yeast or commercial yeast preparation which is commonly sold in the grocery stores.

Aging the Wine

In a glass or enameled container, place the mixture and then cover with piece of cloth. after about 48 hours, transfer to a wooden barrel (preferably oak) or a demijohn (garapon). Plug holes with cotton and keep the barrel or container undisturbed in a dark quiet place for about three months.

After this period, heat the wine in a steam bath to a temperature of 50° to 60°C. Do this by exposing the container to steam. Add well-beaten eggwhite, about five cubic centimeters (cc) of eggwhite for every one liter of wine, stir and then cool.

Filter the mixture and throw out the residue. Afterwards, heat the wine at 80°C for 20 minutes.

Make sure that the aged wine looks clear before putting in clean, sterilized bottles. Use a siphon to transfer the wine.

Pineapple wine is made from the juice of pineapple. Fermentation of the pineapple juice takes place in temperature controlled vats and is stopped at near dryness. The result is a soft, dry and fruity wine with an unmistakable pineapple bouquet. It is made in Hawaii by the Tedeschi Vineyards called 'Maui Blanc' located in Ulupalakua, Maui-Hawai'i, on the slopes of Haleakala. Several varieties of pineapple wine are also made in Okinawa, Japan, from local produce. Its alcohol content is 11.5% by volume.

The Basic Fundamental Stages

In the effort to learn *how to make homemade wine* you will need to know the basic fundamental stages of making wine, such as flavor extraction, fermentation, bottling and aging. Besides learning these concepts you will also need to understand the types of equipment you need for making wine at home, and the ingredients needed to make the wine you make at home, great.

Stage One: Flavor Extraction

Some wines can be made from pure undiluted juice from the grape and may have little to no sugar added to them. But many times homemade wines may use fruits that has stronger flavors and may need to be diluted with water so that it will have a more agreeable concentration. In this process the juice (or flavor) is extracted and the liquid that is obtained is watered down or diluted, this is called the "must". Sugar may be dissolved in the must and the yeast will need to be added so that the fermentation process can begin. You will have to decide if you will use real fruit or juice concentrate. If you choose to purchase juice concentrate you will avoid all the squeezing.

Stage Two: Fermentation

When you are learning how to make wine from home, one of the most important concepts you must learn regarding the making of wine is the fermentation process. Fermentation is a natural occurrence that happens through the use of yeasts as well as fungi, bacteria and moulds. However, for the wine making concern, fermentation usually refers to the use of yeast and its action on the sugar that is dissolved in your must.

In wine fermentation, the yeast uses the sugar as food, it consumes the sugar that you have added to the must and then it produces alcohol. The actual fermentation process involves to stages, the first stage is the aerobic stage in which the yeast builds up a colony and the second stage is the production of alcohol in the much. Many times the first stage occurs in your primary fermentation bucket which

contains the must and the pulp of the ingredients. This is the first step in the extraction of the juice or flavor, so you may notice that the extraction and the fermentation work together. After waiting the allotted time as directed by your recipe, you will need to strain the liquid (raking) and then pour the liquid into your demijohn or a vessel with a fermentation lock to block the air out. While the yeast is using the remaining oxygen you may see some bubbling, this will stop when the oxygen is gone and a slower fermentation will occur. When the yeast has completed its work the yeast will drop to the bottom of your vessel and you will notice that your wine will start to clear. You will want to rake it again at this point (siphoning) and put it into a clean jar to age. The siphoning and cleaning process is known as wine clarification.

Bottling and Aging

Another important aspect of learning how to make wine at home is bottling and aging wine, this is the easiest part of the process but it is very important that it is done properly. When your fermentation process is done and you have allowed it to age some, it will be time to bottle your wine, and allow it to continue to age. A lot of times new wines will not taste good when you first finish the fermentation process, so you will want to store it for a while just to allow the flavor to mellow and to allow all of the ingredients to continue interacting with each other so that they will produce a wonderful bouquet and flavor you would usually find in the finer wines.

IV. Research Methodology

Location and Time of the Study

The study was conducted in the province of Kalinga (*particularly in the city of Tabuk*) from January to November 2011.

Respondents

The respondents of the study comprises of 102 who were chosen using purposive sampling. The respondents of the study as reflected on the table comprises of 9 or 8.82% wine processors and 93 or 91.18% wine consumers. They have been randomly selected from the community, offices and schools. See table below.

Respondents	Frequency	Percent
Processors	9	8.82
Consumers	93	91.18
Total	102	100.0

Table 1

Profile of Wine Consumers

Particulars	Frequency	Percentage
Classification of Consumers		
Professional/Employee	55	59.14
Housewife	17	18.28
Young People	21	22.58
Total	93	100
Age		
24 and 31 below years old		33.33
25 – 35 37 years old		39.78
36 – 45 14 years old		15.05
46 and 11 above years old		11.83
Total	93	100
Gender		
Female	68	73.12
Male	25	26.88
Total	93	100
Marital Status		
Single	34	36.56
Married	58	62.37
Separated	0	0
Widowed	1	1.07
Total	93	100
Religion		
Roman Catholic	71	76.34
Protestant	10	10.75
Others	12	12.90
Total	93	100
Educational Background		
Elementary	4	4.30
High School	11	11.83
Vocational	3	3.23
College	75	80.64
Total	93	100
Reason for Buying the Fruit Wine		
Attractive packaging	10	10.75
Health benefits	39	41.94
Cheap alternative to Imported wines	14	15.05
Others	30	32.26
Total	93	100

Table 2 Profile of Wine Processors

Gender		
Male	5	55.56
Female	4	44.44
Total	9	100
Marital Status		
Single	1	11.11
Married	6	66.67
Separated	0	0
Widowed	2	22.22
Total	9	100
Religion		
Roman Catholic	3	33.33
Protestant	0	0
Others	6	66.67
Total	9	100
Educational Background		
Elementary	0	0
High School	3	33.33
College	5	55.56
Vocational	1	11.11
Total	9	100
Occupation		
Wine processor	4	44.44
Businessman/woman	1	11.11
Teacher/Employee	4	44.44
Total	9	100
Number of Years in Fruit Wine Processing		
1 – 5	4	44.44
6 – 10	4	44.44
11 – 15	1	11.11
Total	9	100
Reasons for Engaging in Wine Processing		
Appears to be profitable	4	44.44
Inherited form of business	2	22.22
Due to availability of raw materials	3	33.33
Others	0	0
Total	9	100
Trainings/Seminars Attended Related to Wine Making		
Fermentation	0	0
Fruit Wine Production	0	0
Basic Wine	0	0
Wine Packaging	0	0
Wine Yeast Making	0	0
Processing of Wine	9	100

Table 3 Profile of Wine-allied Micro, Small and Medium Enterprises (MSMEs)

Nature of Business	Frequency	Percentage
Processor	9	100
Re – packer	0	
Retailer	0	
Wholesaler	0	
Combination	0	
Total	9	100
Form of Business Organization & Partnership		
Sole	9	100
Proprietorship		
Partnership	0	
Corporation	0	
Cooperatives	0	
Total	9	100
Years in Operation		
0 – 5	4	44.44
6 – 10	4	44.44
11 – 15	1	11.11
16 and above	0	0
Total	9	100
Market Area Coverage		
Town – wide	6	66.67
Province – wide	3	33.33
Region – wide	0	0
Foreign	0	0
Market Others		
Others	0	0
Total	9	100
Type of Buyers/Costumers		
Wholesalers	0	0
Contract	0	0
Buyers		
Retailers	0	0
Walk in	9	100
Buyers Others		
Others	0	0
Total	9	100

Data Collection*Survey Questionnaire-checklist*

The study devised two sets of questionnaires. These were designed for wine consumers and wine processors (*see appendix 1*).

The questionnaire for wine consumers was specifically intended to obtain data relevant to their profile and their perceived preference expectations vis-à-vis measures of quality.

For wine processors, it was designed to solicit information regarding their profile and venture, production management practices, process flow, facilities and equipment and their process capacity management.

Focused Group Discussions (FGD) and Interviews

Focused Group Discussion and informal interviews were used to obtain firsthand insights from wine enthusiasts and consumers on matters concerning their preferences. It was also instrumental in understanding the problems and dilemmas facing the wine processors.

V. Research Findings

A. Consumers Preferences

Table 4 Consumer preferences as to the degree of quality expectations along the identified indicators

Indicator s o f Q u a l i t y	From	$\longleftrightarrow$ scale 5 4 3 2 1					To
		5	4	3	2	1	
Taste	Dry	9	1	2	2	2	Sweet(
Color	Yellow	2	1	2	9	1	Colorl
Scent/Ar o m a	Fruity	2	1	2	1	1	No
Clarity	Very	2	2	3	1	1	Murky

Alcohol	15 %	1	1	1	1	1	Less
L	8						
e		3	1	1	1	6	
v							
e							
l							

The table shows that respondents preferred towards a sweeter taste. This is perhaps for the reason that most of the local fruit wine consumers were women. Midway between yellowish and colorless is also preferred on the color. The scent or the aroma was seen to be fruity. This is also perhaps for the reason that many of the respondents are singles and have ages 24 and below. A clear one is preferred rather than murky and a higher alcohol level was preferred.

Packaging design preferences

Packaging	Frequency	Percent
Plain	15	16.1
With ethnic design	47	50.5
Elegant	25	26.9
Do not mind at all	3	3.2
Combination of 2 and 3	3	3.2
Total	93	100.0

As can be seen, half of the respondents prefer that the packaging will be with ethnic design. The elegant packaging came in next with 26.9%. 16.1% also preferred to be plain while 3.2% respectively do not mind at all and a combination of ethnic design and elegance.

Label information preference

Labeling	Frequency	Percent
With information	83	89.2
Do not mind at all	10	10.8
Total	93	100.0

It is clearly see from the table that the wine consumers wanted that the product should be labeled with information. This is indicated by the 83 or 89.2% respondents.

There were 10 or 10.8% who do not mind at all the labeling.

Cost preference on wine

Selling Price	Frequency	Percent
P70	37	39.8
P100	34	36.6
P120	22	23.7
Total	93	100.0

As to the selling price, the consumers preferred the lower price of P70. This is indicated by 39.8% of the respondents. 36.6% of the respondents claimed it should be sold at P100 while 23.7% wanted it at P120.

Based on the Focused Group Discussions with the respondents, the prevalent fruit wine they are producing is still the Bugnay wine since there are many bugnay fruits available in the locality when it is in season. In fact some farm owners have already ventured into large scale plantations of the bugnay trees such as the Ryan's Farm in Tabuk, Kalinga.

B. Production Management Practices

1. Location and plant facilities

Wine Processing Plant Layout

The study found out that none of the fruit wine processors have detailed engineering blueprint of their plant layout.

Criteria for Evaluation of Processing Plant

In the evaluation of processing plant location, most of the processors did not comply with BFAD/DOH specifications. This is for the reason that most of them are using their own kitchen for the processing, fermentation and racking activities.

2. Process Flow

Raw Materials

The main ingredient of course for this venture is pineapple. This is being processed using yeast (local and imported). The type of

water being used is boiled with sugar as the additive.

In choosing the fruit, the criteria being considered are the following:

1. Fully ripe, skin intact
2. Clean
3. Grown organically

The stages in wine making, the following is observed:

1. Procurement of fruits
2. Preparation of materials
3. Crushing of fruits
4. Boiling of fruits
5. Straining/Cooling
6. Adding of sugar and yeast
7. Fermentation for 2 to 3 weeks
8. Filtering with cheese cloth
9. Bottling in sterilized bottles
10. Pasteurization

In the process, the fruits were washed with water before crushing or pressing. No SO₂ was used to prevent spoilage. After the bottling and fermentation for 2 to 3 weeks using aging bottles, the product is being aged for 3 to 4 months before marketing.

Packaging

The information placed in the wine label consisted of the brand name, brand mark, manufacturer, contents and nutritional value. The expiry date and the bar codes were not included.

B. Facilities and Equipment

Most of the wine processors used their own kitchen to process wine. However some have facilities to process just like in schools where processing is introduced to students. But actually many don't have the facilities.

The processors use laddles and blenders in the crushing and pressing, while sterilized bottles and jars were used for fermentation. Bottles are being for racking and cheese cloth and strainers were used for filtering.

Water and soap are used for cleaning and sanitizing with the aid of a brush. Long neck bottles are used and plastic containers are utilized for aging. The labeling of bottles use sticker papers with computer prints and designs. The sealing equipment use bottle sealer and hair dryer.

C. Process and Capacity Management

In the quality control, it is only on the evaluation of colors where they base the quality. Some establish quality on the raw materials used while others claim it is on the process. The inspection procedure is done during processing.

Of the nine (9) fruit wine processors interviewed only three (3) are actually processing pineapple fruit wine. This could be attributed to the fact that pineapple is not a primary produce in the province of Kalinga, aside from the fact that it is seasonal. When pineapple fruits are in season, the fruits being sold in Kalinga come from Nueva Vizcaya and other nearby provinces. Only a part of the pineapple fruit produce is being supplied by the local farmers in the province.

It can be noted that most of the wine producers produce bugnay wine because of its availability in the community. Bugnay trees abound even on backyards of households thereby there is no problem on its supply when it is in season. Some farmers in Kalinga have even venture to large scale plantations of bugnay trees, thereby assuring a steady supply of bugnay fruits as long as it is their fruiting season.

The following are problems encountered in local fruit wine processing:

1. The raw material is a seasonal fruit. There is no sustainability with the production. Lack of supplies and materials, financial constraints would also bar the processor in ingredient preparation.

For fruit processors who are into pineapple wine production, this is really a concern considering that their supply would depend on sellers that bring in their products from Isabela, Cagayan and Nueva Vizcaya. For the fruits processors who are into bugnay wine making they have to process their wines while the Bugnay trees in Kalinga are still loaded with their ripened fruits. Generally the price per liter (or caltex in the lingua franca), of fresh ripened fruits of bugnay when it is in season in Kalinga is P15.00.

2. On fermentation, it is the weather that would affect fermentation and aging. Not all the

processors could afford to put up a space in that process.

Based on the interviews with the fruit wine processors in the province of Kalinga, they process their wines in their own kitchens or they have set up working spaces with their household for their wine processing activities ; hence they cannot yet come up with a temperature controlled room to ferment their wines.

3. Lack of laboratory facilities is also seen as a problem especially on measuring PH level, alcohol level, and sugar level. Lack of equipment on racking was also seen.

According to the fruits wine processors, although they have wine recipes to follow, they cannot determine the PH level, alcohol level, and sugar level because they do not have the equipment to use and they do not have the money to subject their wine produce to laboratory tests by the BFAD or DOST.

On the lack of racking equipment, space is the utmost consideration since the processors are working in their own houses; there is a possibility that during the racking stage the wine containers may not really be left alone . There is a possibility of the containers being transferred in location when the space is needed.

4. Sediments were identified to be not well filtered, thus the need for a filtering equipment.

According to the fruits wine processors, they use the cheese cloth to filter their wine. They are constrained by their financial resources to buy a good filtering equipment. Another respondent said that sediments appear in the wine if the racking process is not maximized because of the high demand for the fruit wine they would have to sell it a few months after its processing.

5. Processors do not have also personalized bottles. The bottling consisted of different types of packaging the product. Likewise, no barrels are available for the aging process.

Again the financial constraints on the part of the fruit wine processors would bug them at the

bottling stage, the respondents claimed that they use recycled bottles from the emptied commercial wine bottles which they buy from commercial stores and outlets.

The local fruits wine producers explained that if they will order personalized bottles from Sa Miguel Corporation it would entail a large sum because they have to order by the thousands.

6. On marketing, there is a strong competition with established wineries. The promotion of the product is more expensive as compared to the return of investment.

The respondents claimed that although the local fruit wine is slowly gaining popularity, the established brand names are still more popular among buyers in the locality . They also claimed that they cannot afford advertisements to mass media at the moment. It is a relief according to them that the Local Government Unit and the DTI are helping them make their products known by encouraging them to display and sell in trade fairs during festivals in the town, province and in the region.

V. Conclusions and Recommendations

Conclusions

On the analysis on consumer preferences in light of prevailing production management practices of local wine processors; it was found out that:

- a. The wine consumers preferred a sweeter taste. Midway between yellowish and colorless is also preferred on the color. The scent or the aroma was seen to be fruity. A clear wine is preferred rather than murky and a higher alcohol level was preferred.
- b. Half of the respondents prefer that the packaging will be with ethnic design. The other half of the respondents were spread out in the choices of elegant packaging at 26.9%, plain at 16.1% and a nil 3.2% said they go for a combination of ethnic design and elegance and some said they do not mind at all.
- c. Majority of the wine consumers wanted that the product should be labeled with

information. This is indicated by the 83 or 89.2% respondents.

d. As to the selling price, the consumers preferred the lower price of P70. This is indicated by 39.8% of the respondents, while 36.6% of the respondents claimed it should be sold at P100 . The 23.7% of the respondents wanted it at P120.

2. The fruit wine producers in Kalinga have identified six (6) problems encountered as fruit wine processors in order to meet such consumer expectations on quality level requisites; and they are:

- a) The raw material is a seasonal fruit. There is no sustainability with the production. Lack of supplies and materials, financial constraints would also bar the processor in ingredient preparation.
- b) On fermentation, it is the weather that would affect fermentation and aging. Not all the processors could afford to put up a space in that process.
- c) Lack of laboratory facilities is also seen as a problem especially on measuring PH level, alcohol level, and sugar level. Lack of equipment on racking was also seen.
- d) Sediments were identified to be not well filtered, thus the need for a filtering equipment.
- e) Processors do not have also personalized bottles. The bottling consisted of different types of packaging the product. Likewise, no barrels are available for the aging process.
- f) On marketing, there is a strong competition with established wineries. The promotion of the product is more expensive as compared to the return of investment.

3. Propose strategies on identified areas of product attributes, location of plant facilities, process and capacity management and total quality management.

- a) Not enough space for processing
- b) Lack of laboratory facilities is also seen as a problem especially on measuring PH level,

- alcohol level, and sugar level. Lack of equipment on racking was also seen.
- c) Absence of filtering equipment
 - d) Processors do not have also personalized bottles. The bottling consisted of different types of packaging the product. Likewise, no barrels are available for the aging process.

Recommendations

1. The problem on sustainability could be addressed if the supply of pineapple will be sufficient for the processors.
2. Financial assistance should be provided by the local government to the processors.
3. Laboratory facilities should be made available to the processors in the locality; even on a communal level through the women groups such as the KALIPI or through the cooperatives.
4. The consumers should patronize the fruit wine product of the community.
5. The DTI, DOST and the Local Government Units should come up with a way to help the local fruit wine producers subject their products to BFAD analysis.
6. Further studies should be conducted on the sustainability of the fruit wine industry in the province.

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