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Production and Analysis of Wine from Agriculture Wastes: Pineapple (Ananas Comosus) Peels, To Act for Sustainable Ecosystem

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ABSTRACT
Wine production from pineapple waste (*Ananasa comosus*) was carried out by controlled fermentation for five days. Fermentation of these wastes was done in groups. group 1 and 2 (test and control group for pineapple wastes.). Bitter leaves macerated was added to group 1 and 2 to obtain substrate leaves, ratio of 400:0.02:50 (gram per litter). The mixture was boiled after 18hrs at 100^0c for 30mins and the filtrate obtained was inocculated with 1.0ml of x 10^9cfu/ml saccharomyces cerevisiae, elliposides and left at room temperature (28 ±1.0^0C) for 5 days. During the fermentation period, the pH, specific gravity, temperature, percentage of alcohol content were monitored. Wine produced from substrate treated with bitter leaves had higher alcoholic content (0.68%) than the untreated control (0.038 – 0.26%). The microbial analysis of bacterial/fungi production in the fermentation was also done on the production.

INTRODUCTION

Waste (also known as rubbish, trash refuse, and garbage, junk) is unwanted or useless materials. Litter is waste which has been disposed improperly. Waste include all items that people no longer have any use, for which they either intend to get rid of or have already discarded. There are different types of waste: Municipal, industrial, Hazardous, construction, mining, Biodegradable, packaging and Agricultural wastes.

Agriculture waste is any substance or object from premises used for Agricultural or horticulture, which the holder discards or required to discard. Utilization of pineapple and banana peel for production of wine can serve as one of the vital ingredient in accelerating the rate of realization of the millennium development goal (MDGs) for the basis of the much desired Sustainability of development. Many definitions have been given to wine: Wine is defined as the product of normal alcoholic fermentation of juice of sound ripe grapes followed by the usual cellular or storage treatment. Wine are healthful beverages that has been seen as a natural remedy for man's illness from early day and are said to aid recovery during convalescent period.

Fermentation of food for presentation, enhancement and nutritive values, improvement of flavor and preparation of beverages has been practiced, since pre- historic times by people of nearly early civilization. Processes are usually done by species of the yeast sacchyaromyces, where by the sugars. In the fruit juice are converted into alcohol and organic acid, that later react to form aldehydes, asters and other chemical component. Nowadays large plantation of banana and pineapple are established in Nigeria. These banana and pineapple are being used by industry and homes. A considerate part of these fruits are wasted during these processes.

Pineapple (*Ananas comosus*) is the common name for a tropical plant and its edible fruit which are coalesced berries. Pineapple is the only brome-land fruit in widespread cultivation. It can be grown as an ornamental, especially from the leafy tops.

Pineapple is eaten fresh or canned or juiced also high is vitamin c and essential mineral such as manganese. Its protein – digesting enzyme, bromeliad may help digestion after high protein meal.

Treatment of substrates for wine production pumpkin leaves Infusion increase alcoholic content of wine produced after fermentation from 0.035 to 0.57% and 0.21% to 0.57% for banana and pineapple waste mine, respectively. Therefore this material may provide good adjuncts for wine and alcohol production.

MATERIALS AND METHOD

pineapple (*Ananas comosus*) fruit were purchase from a local market at ule Nigeria with the bitter leaf (Vernonia baldwini). Culture of *Saccharamyces cere visiae* yeast was obtained from the brewer at Uli.

The production of wine involves four stages: Extraction, preservation, actuation of the juice using yeast, and fermentation. The juice was collected from banana and pineapple peel respectively. About 400g of the fruits was washed and peeled; the peels were macerated using sterile mortar and pestle. 50ml of distilled water was added to the macerates. Sodium metabisulphite was used to sterilize the container which is used to collect the pineapple juice.

The juice was now divided into two portions; one portion served as the control experiment and yeast was

added. Before the activation of the yeast in the other portion. The two portions of the juice were boiled for some minute to boil off the sodium metabisulphite used as preservations. Thereafter, 17.00g of yeast (brewer's yeast) was added as inoculums for the fermentation after cooling the must 25°C.

The whole mixture was poured into the fermentation bottle and the bottle tightly closed with an outlet for CO_2 directed into a beaker of water to encourage anaerobic fermentation i.e. fermentation without oxygen. The fermentation was carried out at room temperature. The alcoholic content analysis, pH, Specific gravity, temperature, total acidity, fixed acidity and volatile acidity were also carried out. The microbial isolates of bacteria and pineapple peel was also carried out using nutrient agar, Mac conkey agar and potato dextrose agar (oxide). *Saccharamyces cerevisis* yeast was obtained from the brewers at Uli.

RESULTS AND DISCUSSION

Table 1: Microbial Isolates of bacteria count

SAMPLE	Dilution	No.7 Bacteria per gram of sample	Total count per gram of sample	Bacteria count Average count
Pineapple Only	10^{-2} 10^{-3} 10^{-4}	6 6 3 3 - -	0.6×10^3 0.6×10^3 0.3×10^4 0.3×10^4	0.6×10^3 0.3×10^4
Pineapple + Bitter leaf	10^{-2} 10^{-3} 10^{-4}	2 2 0 1 - -	0.2×10^3 0.2×10^3 0 0.1×10^4	0.2×10^3 0.6×10^4

Table 1 showed the total microbial count of total bacteria in the Must during fermentation. The pineapple only had a lower bacterial count compared to the pineapple/bitter leaf must(0.3×10^4 as against 0.6×10^4 for pineapple-bitter leaf). This must be related to the higher production of wine in pineapple-bitter leaf aided fermentation.

Table 2: Microbial Isolates of fungal counts of banana and pineapple peel

SAMPLE	Dilution	No.fungal per gram of sample	Total count per gram of sample	Average count
Pineapple Only	10^{-2} 10^{-3}	5 6 2 3	0.5×10^3 0.6×10^3 0.2×10^4 0.3×10^4	5.5×10^3 3.5×10^4
Pineapple + Bitter leaf	10^{-2} 10^{-3}	3 3 1 2	0.3×10^3 0.3×10^3 0.1×10^4 0.2×10^4	0.3×10^3 1.5×10^4

Table 2 showed the total fungal counts for both Pineapple and Pineapple-bitter leaf fermentation. This Table showed that pineapple-bitter leaf must had lower quantity of fungal count. This meant that bitter leaf reduced the quantity of stray fungi that took part in fermentation and this led to production of higher quantity of wine.

Table 3: Incidence of bacterial/fungal isolate for the sample

SAMPLE	*Bacillus Sp*	*Staph. auras*	*Staph albus*	*Lacto bacillus Sp*
Pineapple only Bitter leaf	+	-	-	-
Pineapple + Bitterleaf	+	-	-	-

N/B: + = present
- = Absence

Table 3 depicted the bacteria/fungi isolates from the fermentation. The result confirmed that the major isolate in the fermentation is *Bacillus Species*.

Table 4: Change in the fermentation parameter of pineapple waste wine

Parameter	Group	
	1 with bitter leaf	2 controlled
pH	4.82	5.32
Specific gravity	1.00	1.002
Percentage of alcohol	0.68	0.26
Temperature (°C)	26	26

Wine are successfully developed using the waste of pineapple fruits. The effects of bitter leaves infusion

increased alcohol content of wine produced after fermentation from 0.26 to 0.68% pineapple waste wine (tables 4). There was change in pH from 4.82 to 5.32 for pineapple waste wine; the specific gravity of the pineapple is from 1.00 to 1.002. The major microorganisms isolated from the fermentation were *Bacillus Species*

The research was carried out in small scale. Wine was prepared from pineapple waste using bitter leaves adjunct as facility at or wine with better characteristics.

During fermentation there were no temperature changes in the fermentation group. The change the pH showed wider venation which might be due to microbial activities which lead to more acid production. There was slight change of specific gravity during fermentation, which did not show any significant difference between the control and the ameliorated fermentation both.

Wine preparation from pineapple peel was considered a bioconversion method that can facilitate easy removal of these wastes from the environment. These production of wine from pineapple peel may provide alternatives to the already established wine production raw material such as grapes. Similar application of wastes in wine production has led to the use of Banana waste in ethanol production.

CONCLUSION

The result obtained in this production of wine with utilization of pineapple peel waste which is currently viewed as a waste is very useful. Treatment of substance for wine production with bitter leave infusion increased alcoholic content of wine produced after fermentation from 0.28 to 0.68 for pineapple peel. Therefore this material may provide good adjuncts for wine and alcohol production.

This can also reduce liters or waste in the environment which causes health problem in our country and provide job opportunities, reduce seasonal losses of the fruits.

REFERENCE

1. Hornweg, D. and Thomas, L., (199). Working paper series Nril. Urban Development sector unit pp.5 Retrieved 2011/08/15
2. European Directive, (2006). Waste from hsork, WFO Pub.
3. HORN, .J. (1989), Chemistry of wine making. Food technology, 48, 42-53.
4. Jay, J.M. (1996), Modern food microbiology. (5th edition) Chapman and Hall, New York. p.212.
5. Sofos, J.M. (1993), current microbiology consideration in food preservation. Int . J. food Microbial, 19,87-108.
6. Watanabe and Shimazu (1980). Effect of yeast on botrytised wine making. J. ferment technol . 58 (3) 227-235.
7. Morton, J (2006), Banana from fruit of warm Climates. Hort Purdue. Edu. Retrieved 2011.
8. Isihia, C. and Ibeh I.N (2010). Microbiology and production of wine with pumpkin leave.
9. Etuk, A (1997), the microbiology and production of wine from over –ripe banana (Musa Accumnata). M.Sc. Thesis, university of Benin City Nigeria. p.17