

Science investigatory project (chemistry) flashcard



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Science Investigatory Project: Comparison of the Rate of Fermentation of Manger Indict, Anon Muscat, and Citronella's microware Juices Presented to:

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Optical Comparison of the Rate of Fermentation of Magnifier indict, Anon

Marietta, and This study aims to find out which among the Juices of Magnifier indict, Anon Marietta, and Citronella's microware fruits ferment fastest.

Three treatments were made: 200 ml. F Magnifier indict fruit Juice fermented with 20 yeast cells; 200 ml.

Of Anon Marietta fruit Juice fermented with 20 yeast cells; and 200 ml. Of Citronella's microware fruit Juice fermented with 20 yeast cells. The start date of fermentation was recorded as well as the original specific gravity of each treatments. The end of fermentation of each treatment were watched for by the researchers. To verify a treatment ended fermentation, apparent attenuation was computed, computing prior to that the final gravity of each treatment.

The result showed that the treated Citronella's microware fruit Juice fermented fastest.

Next was the treated Anon Marietta fruit Juice. The last to complete fermentation was the treated Magnifier indict. This study is economically beneficial to the province, since it is abundant with the fruits used. It would also encourage small and medium enterprises to venture into liquor-making,

even via home-based production. The researchers recommend a similar research on other fruits such as cashew, kiwifruit and bananas.

Also recommended is the use of variables such as temperature, pressure and amount of ferments added. L. Introduction A. Fermentation Fermentation, also called anaerobic glycoside, is “ an enigmatically controlled anaerobic breakdown of an energy-rich compound (as a carbohydrate to Carbon dioxide and alcohol or to an organic acid),” according to the 1 TIT edition of the Merriam-Webster Collegiate Dictionary. Recorded first in 1601 , the word “ fermentation” came from the root word “ ferment”, a Middle English word derived from the Latin word for yeast, ferment.

To most people, yeast comes to mind whenever fermentation is brought about as a topic for discussion, since the presence of yeast is widely known to cause the In the process of producing beer, yeast enables the fermentation of sugars glucose ND sucrose and their conversion into ethyl alcohol, otherwise and more popularly known as ethanol, grain alcohol or drinking alcohol. This is one of two most popular types of microbial fermentation, ethanol fermentation, which is chiefly used in making alcoholic beverages, industrial biochemical's, cosmetics and pharmaceuticals.

Lactic acid fermentation of milk, vegetables, cereals, meats and fish is another kind of microbial fermentation (ibid.).

Fermented products have many advantages over raw materials from which they came from. Fermented products are more digestible; has improved flavor, texture, appearance and aroma; are enriched with synthesized

vitamins; have lesser carbohydrates; cooks quickly, stays longer; and stocks up normal intestinal microfilms (Shirtless, et al. , 2007). B.

Ciders Among the thousands of fermentation products are ciders, which are “... Expressed juice of fruit[-s] (as apples) used as a beverage or for making other products (as applejack)” (Merriam-Webster).

Ciders come from a wide variety of fruits (Cider, Wisped)-from apples to grapes, cherries to cranberries, and even bananas. The island province of Samaras abounds with vegetation, I. E. , fruits and gettable, with mangoes, coconuts and bananas topping the list (2007 National Statistical Coordinating Board figures).

Ciders can be made from most, if not all, of Samaras fruits.

It is the researchers’ task to determine the rate of fermentation of these ciders. II. Objectives of the Study 1.

To find out the rate of fermentation of Juices from bountiful Samaras produce such as mango, claimants, suburban, coconut, banana, and cashew; and 2.

To help find potential industry for Samaras folks, from the production of these fermented ciders and their by-products. III. Significance of the Study

This study on the rate of fermentation of ciders from various Samaras produce is primarily aimed to benefit local folks by finding new frontiers for the booming food IV.

Limitation of the Study This study is limited to the fermentation of mango, claimants, suburban, coconut, banana, and cashew Juices, and restricted to qualitative observations of their rate of fermentation and color.

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V. Review of Related Literature The history of fermentation predates the history of man, since the process is natural to fruits and, practically, to all vegetation. Modern manipulation of the process is but a display of man's superior intellectual ability. In antiquity, though, man's use of fermentation is more of a product of accident rather than aimed curiosity.

It is believed that man's serendipitous foray into fermentation was made after meat observing that certain elements in salting food made the food more palatable than plain, salted food (Wang et al. , 1979).

For those who use crude processes of fermentation, it is more of a mystic art than a science. In fact, not until the 19th Century, was the mechanism of fermentation intelligently applied (Choc]knack, 2008; Shirtless, et al. , 2007). Records show that man had been utilizing this process to his benefit in as early s the Caucasian era, about 6, 000-8, 000 years ago in Shoulders, present-day Georgia.

Artifacts such as 7, 000-year old Jars containing wine residue in Hajji Frizz Tepee in the Gross Mountains, the largest mountain range spanning present-day Iran and Iraq (Wine History, Beerier.

Com) are now on display at the University of Pennsylvania. Accounts of the existence of fermented beverages in Babylon circa 5000 BC, in ancient Egypt circa 3150 BC, pre-Hispanic Mexico circa 2000 BC, and Sudan circa 1500 BC are numerous (Choc]knack, 2008). Learned use of fermentation can be attributed to the German physiologist

Theodore Schuman who in 1840 developed the cell theory and found that fermentation is the result of living things. This was influential to French chemist and microbiologist Louis Pasteur who determined in 1854 that fermentation is caused by yeast.

Pasteur assumed that a special element or force called “ferments” gives yeasts the ability to ferment (Dubos, 1951). Though Pasteur believed that ferments is dormant outside a living cell, he endeavored to extract ferments but to no avail. In 1897, German chemist Eduardo Boucher proved that the enzymes in yeast cells, which he called “zymases” causes fermentation, not the yeast itself.

He received the Arthur Harden and Hans Euler-Echelon won the Nobel Prize in Chemistry for detailing the exact mechanism of fermentation caused by enzymes (Monopolize. Org) Since Pasture’s discovery of the fermenting ability of yeast, mankind has all the more benefited from fermentation products. The essence of fermentation has shifted, though, from for preservation, since we now utilize much better preservation methods, into food and beverage production (Choc]knack, 2008).

VI. Methodology A. Materials 250 ml. Fresh mango Juice claimants Juice suburban Juice hydrometer 250 ml. Fresh cork stopper/lid cover 250 ml. Fresh three PC’s.

De-lid glass ferment 100 small-sized yeast cells (Chromosomes aggressive)

B. Fermentation Process 1 . Do this in the early morning to allow ample time for the experiment. 2. Pour each of the prepared fruit Juice (250 ml. Each of fresh mango, claimants, and suburban) in a separate glass ferment.

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3. Measure with the hydrometer the specific gravity of each Juice. Mark this as original gravity (O. G.).

Specific gravity is measured by floating the hydrometer in a sample of liquid. The hydrometer must float freely. Read and take note of the point where the surface of the Juice being observed lines up with the graduation on the hydrometer. Pitch 20 yeast cells on each ferment. 5.

Close the ferment with a cork stopper/lid cover to utilize closed fermentation.

6. Note the exact time each fermenting setup was closed. 7. Let off.

Have team members take turns every hour in observing the fermenting setups. 8. Fermentation is complete once no more bubbles are produced in the air-locked ferment, since carbon dioxide (CO) production is ended at the end of fermentation. It should be noted that this is not foolproof. If there is still some fizzing and foaming, it is not done yet.

Foam.

This doesn't mean fermentation has just halted and is re-starting. It's only that here's CO in the setup itself (as in most brewed setups such as beer) and it was only disturbed by shaking it. 9. To guarantee that fermentation has ended, measure with the hydrometer the specific gravity of the fermenting setup. Mark this as the final or finishing gravity (E.

G.). Compute for apparent attenuation. Mark this as A.

A. Apparent attenuation is the difference between the specific gravities before and after fermentation divided by the specific gravity before fermentation, and multiplied by 100.

To illustrate: $((0. G.$

- E. G.) / 0. 6.) x 100 = A. A.

Usual apparent attenuation of a complete fermentation is 70-75 percent. 10.

If apparent attenuation of percent is not capped, repeats steps 1 to 9. 11.

Tabulate data. VI. Results and Discussions A. Chart on Rate of Fermentation

of Magnifier indict, Anon Marietta, and Fruit Juice Date Fermentation Started

Original Gravity (at 31 Final Gravity Apparent Attenuation (in Percent) Date

Fermentation Ended Number of Days of Fermentation Magnifier indict Jan. 4,

2013 1. 040 0.

333 73. 50 Jan. 27, 2013 13 days Anon Marietta 0. 338 71 .

77 Jan. 24, 2013 10 days Citronella's microware 1. 092 0. 395 74. 26 Jan.

18, 2013 days B. Discussions Juices of Magnifier indict, Anon Marietta, and

Citronella's microware employed fermentation at different dates. Magnifier

indict completed fermentation last at 13 days, while Anon Marietta at 10

days, and Citronella's microware, the fastest, at only 3 days.

The researchers deemed this difference in fermentation rate a result of the

apparent amount of fructose, which are broken down by the yeast cells, in

the fruits where the Juices came from as can easily be induced from the

sweetness of the fruits. It was, thus, determined that more fermented

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product can be made from the juice of Citronella's microware in less amount of time, than from the Juices of Magnifier indict and Anon Marietta. VI'.

Implications The researchers have found fruits viable for fermentation and, hence, for making liquor such as wine.

With the development of the fermentation of fruit Juices for the latter purpose, so will the growth of income opportunities for the people of this island province. The manufacture of fruit Juice-fermented beverage can easily be operated even in small homes. Using these fruits might also provide for a substitute for beer, gin and other alcoholic beverages, which come from less healthful raw materials.

Backyard fruit growing would be also encouraged, which not only would provide accessory raw materials but would also somehow help lessen the effect of air pollution and global warming.