

The Difference Paper Of Ph (Hydrogen Potential) Indicator Between Medium: Sugarcane Juice¹⁾, Borassus Flabellifer Water²⁾ And Cow Milk³⁾ With Knob And Ultrasonic [A Review]

Syamsul Arifin

Abstract: Bacteria can live in a lot of liquid medium like as beverage: Sugarcane juice, Borassus flabellifer water and Cow milk. The sign of medium have bacteria is medium can be sour and wrinkle, so that medium can be to decomposing, that at long time and no fresh again. We know bacteria (*Pseudomonas aeruginosa*) can be colony splintering or inactive, with technique knob and 48 kHz ultrasonic in PZ (Syamsul arifin, 2013), and in this experiment to replaying technique using beverage: Sugarcane juice, Borassus flabellifer or cow milk, with strip paper of pH indicator, specification 48 kHz ultrasonic frequency, 1 VPP intensity from function generator, transmitted with 12 knob (small ball), the ultrasonic treatment is applied continuously or periodically about 3 hours and measurement every 30 minute. The result observation have new phenomena in the differences pH value between no (without) ultrasonic, and with ultrasonic in mediums i.e.: The pH value in each liquid medium without ultrasonic are decrease of pH value at long time (> 5 hours or days), but with radiation continue of ultrasonic or periodic of ultrasonic are very attractive pH value. This study shows, each liquid medium has same graphic of pH schema with no ultrasonic there are decrease in the pH value (acid liquid); and pH schema in with periodic of ultrasonic of there are decrease pH value at the moment of 30 minute (with ultrasonic) and increase at 30 minute (after no ultrasonic) and that keep on; but in with continuous ultrasonic the pH schema keep on are with constant line of the pH value in Sugarcane juice and Cow milk, but no in water of Borassus flabellifer, that the null minute has same as pH value at no ultrasonic, at the 30 minute first has decrease, at the 30 minute second has continue value, than at 30 minute third has increase value and at 30 minute forth - soon have constant value of pH as same as at no ultrasonic.

Keyword: ultrasonic, knobs, pH, Sugarcane juice, Borassus flabellifer and Cow milk.

1. INTRODUCTION

Food and beverage our consumption is the nutrient resources for microbiology, calling medium [1], and that's nutrient of live environments bacteria in the beverages: Sugarcane juice (Latin: *Saccharum officinale*), Borassus flabellifer water (English: Sugar Palm, or Latin: *Arenga pinnata* Merr) and Cow milk (Latin: *colostrums*). In there have several bacterial, in culturing nutrient agar (one day) having a lot of colony bacteria or some value of pH. Radiation ultrasonic with knob (small ball) is a new technique with experience of syamsul arifin [2].

This research is updating technique, which ultrasonic exposure in mediums. Model research (in vivo), who'll be developing ultrasonic radiation, explorer with 12 knobs, in 48 kHz, 1 VPP, with mediums (3 ml) in tube: 1. The samples (medium) are beverage of Sugarcane juice, Borassus flabellifer, and Cow milk, brought in Gresik (East Java), 2. The beverage is taking place without pasteurizing and can be to drinking. 3. Bio safety and bio security in physics laboratory. Aim this research will be: 1. Comparing of pH value between without and with ultrasonic, 2. Comparing pH value between radiating in continuous and periodic of ultrasonic wave in PZ.

2. MATERIALS AND METHODS

Sugarcane juice

Sugarcane juice in small trade can made with a roller machine for flatter sugarcane, for producing Sugarcane juice, and can be drinking. The chemical composition in Sugarcane juice is Octacosanol, Saccharin, linoleic acid, palmitic acid, oleic acid, linoleic acid, and arachidonic acid [3], with the microorganism is Lactate Bacteria [4]

Borassus flabellifer,

Borassus flabellifer from palm tree, from hard work the man is climbing and incising that palm tree that has essence Borassus flabellifer. In small trade can be made, and can be drink with adding some water, ice. The chemical composition in Borassus flabellifer is glucose, protein, phosphor, vitamin, with the microorganism in Borassus flabel lifer is *Lactobacillus casei* and *Saccharomyces* sp [5].

Cow milk

Cow milk produced from nipples women cow, and can be drinking immediately. The chemical composition in cow milk

- *Khamidatus Sariroh*, academic student diploma 3 in *Delima Husada Academic of Health Analyze (AAK DH) Gresik* (amr_kita@yahoo.com), and topic of research: *Sugarcane juice, pH value, knob and ultrasonic.*
- *Elfa khoirotul fajriyah*, academic student diploma 3 in *AAK DH Gresik* (elfakhirotulf@yahoo.com), and topic of research: *Borassus flabellifer water, pH value, knob and ultrasonic.*
- *Nur fariha*, academic student diploma 3 in *AAK DH Gresik* and topic of research: *Cow milk, pH value, knob and ultrasonic.*
- *Syamsul arifin*, is build guidance of researcher and lecture in *Laboratory Instrumentation in Poly technique of Health Analyze, Health Department of Republic Indonesia, Surabaya, AAK DH Gresik, and AAK YPM Sidoarjo*, E-mail: s_arifin61@yahoo.com.

is Potassium, Vitamin, mineral, Fat, Iron (Fe), Copper (Cu), Calcium (Ca), Magnesium (Mg) [6], with the microorganism in cow milk is Bacillus cereus, Clostridium perfringens, Escherichia coli, Enterobacter aerogenes, Streptococcus thermophilus, Bacillus coagulans, Bacillus subtilis, Clostridium tyrobutyricum [7].

Ultrasonic

The Ultrasonic deals with acoustic the audio is beyond of frequency limit 20 kHz [8]. Resource of ultrasonic in this research is from the function generator type VOM VFG 3020 DDS, PROTEK, made in South Korea, with 48 kHz, in 1 VPP, in 1 VDC, and then it'll be to connect at the speaker piezoelectric.

The Speaker piezoelectric

Specification of the speaker piezoelectric type 40 T – 16B made in Taiwan is: Center frequency (kHz) = 40.0 + 1.0 kHz, The sound pressure level (0 dB = 0.0002 μ bar) > 119 dB, Band width (kHz) = 4.0 – 112 Db, Beam angle – 6 dB = 55°, Driving voltage (RMS) = 30V, Working temperature = – 30 ~ 80°C. The modifying of speaker is from speaker piezoelectric that newly purchased, and then was destroyed shell so stay condenser piezoelectric (diameter = 1.0 cm, thick condenser = 0.04 cm). And modifying speaker is diameter plastic holder condenser to till = 1.2 Cm [2].

The transmitter knobs

The knob (small ball) in this research is handmade, material 12 knobs is from tin metal, that smooth ball with diameter less than 3 mm and over 2 mm and no paint. The knob has a wire holding from copper (the length of copper wire that holding knobs is 3 cm, diameter = 0.011 cm and black painted), that connected to plat condenser piezoelectric and the condenser connect on function generator. when the speaker using one frequency, transmit to knob by copper holding wire, than 12 knobs will be to radiating ultrasonic on liquid mediums [2].

The tube

Specification of the test tube is a glass, type short tube, diameter of inside about 1.3 cm and depth 9.9 cm The glass tube is containing liquid medium, and the knobs into in liquid medium, but transducer still at upper of liquid, and volume of liquid medium = 3 ml [2].

The method measure of pH

Specification of pH in this experiment is an indicator paper of pH, because can be dipped in small diameter glass and easy, the treatment in research is:

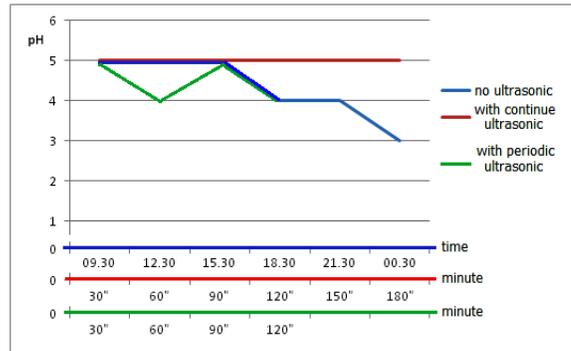
- To observe pH value in that liquid medium without ultrasonic: with sample of Sugarcane juice observed at 09.30 – 00.30, with sample of Borassus flabellifer observed from 1st day – 11th day (every day), and with sample of Cow milk observed from 1st day – 4th day (at times) [4].
- To observe pH value in that each liquid medium with continuous ultrasonic for each 30 minute in 3 hour time [5].
- To observe pH value in each liquid medium with periodic ultrasonic, that's radiating in 30 minute with ultrasonic and then 30 minute without ultrasonic, during 2 hour [7].

3 RESULT

Result per experiment ie:

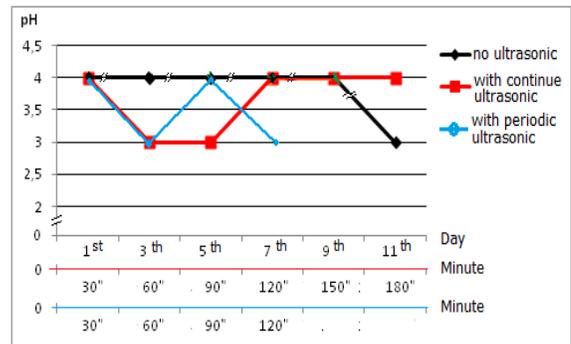
- The Difference of pH value between in without ultrasonic, continuous ultrasonic and in periodic ultrasonic for

Sugarcane juice graphic is:



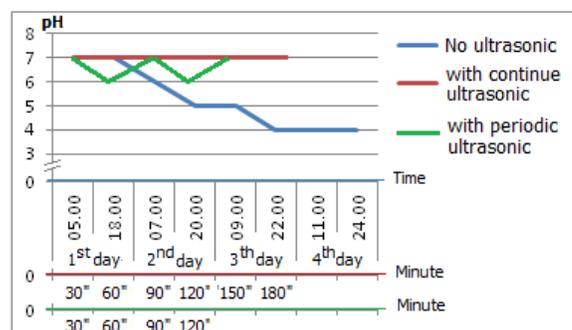
Picture 1, Sugarcane juice in pH graphic: In no ultrasonic is blue line; In continuous ultrasonic is red line and in periodic ultrasonic is green line, Khamidatus sariroh ¹⁾.

Borassus flabel lifer, graphic is:



Picture 2, Borassus flabel lifer in pH graphic: In no ultrasonic is black line; In continuous ultrasonic is red line and in periodic ultrasonic is blue line, Elfa khoirotul fajriyah ²⁾.

Cow milk graphic is:



Picture 3, Cow milk in pH graphic: In no ultrasonic is blue line; In continuous ultrasonic is red line and in periodic ultrasonic is green line, Nur fariha ³⁾.

4 DISCUSSION

Explanation from each the mediums (Sugarcane juice, Borassus flabellifer, Cow milk) will have difference in composition of chemical and microorganism: The difference in composition of chemical and microorganisms in medium and the 48 kHz ultrasonic transmit with tremble, than the difference two particles can be collision, between hard particle (chemicals matter) and soft particle (microorganisms), to show: the dead of microorganism as same as in pH indication value. The difference composition of chemical and microorganisms at medium are trembling at 48 kHz ultrasonic of radiation, that all mass particles tremble, if the two particles have a difference mass, so they're can be collision, between hard particle (chemicals matter) and soft particle (microorganisms). in this research to show dead microorganism at pH value same as acid index. The graphic coordinate picture between time scales and pH scales: In without ultrasonic is showing decrease line at pH value in some medium at each time observation, but In continuous ultrasonic is having horizontal line at pH value in Sugarcane juice or in Cow milk, and graphic in Borassus flabel lifer is very attractive at each time observation, what's happening?, so that collision between hard particles and soft particles. In periodic ultrasonic is radiating in 30 minute (with function generator on) is having decrease pH value, what's happening in this phenomena?, that's collision, but in 30 minute later with function generator off is having increase pH value, what's happening in this phenomenon?, that's multiply growth, and so on.

5 CONCLUSION

The different pattern graphic of pH value at no ultrasonic, with continue ultrasonic and periodic ultrasonic in liquid mediums are showing crash impact between chemical (hard particles) and microorganism (soft particles). So Bacteria in mediums with periodic ultrasonic (= transmit at 30 minute first) is inactive (decrease pH value), and 30 minute second (= no ultrasonic) is growing very active (increase pH value), and keep on like this in each replication. Bacteria in medium Borassus flabel lifer, with continue ultrasonic is showing very attractive in each measurement pH value, and furthermore is inactive too, but Bacteria in medium Sugarcane juice and cow milk are directing dead, that is showing a linier graphic.

6 REFERENCES

- [1] Jawetz, Melnick, & adelberg's, 2010. Medical Microbiology 25th Ed, McGraw-Hill Companies Inc, (edisi. Bahasa Indonesia).
- [2] Syamsul Arifin., Ni'mahtuzahroh, Soegianto, R Apsari, Suharingsih 2013. Aquatic Bacteria Of Pseudomonas Aeruginosa Growth Model In Tube Ultrasonic, International Journal of Scientific & Technology Research (IJSTR), volume 2 – Issue 8, August 2013 Edition - ISSN 2277-8616.
- [3] R Fauzantoro Ahmad, 2014. Si-Manis (Tebu) Dengan Beribu Manfaat, <http://biotek.bppt.go.id/index.php/artikel-sains/122-si-manis-beribu-manfaat>, down load 05 march 2014; 17:38.

- [4] Khamidatus Sariroh, 2014. Analisis Derajat Keasaman Pada Sari Tebu Antara Yang Tidak Dipapar Ultrasonik Dengan Yang Dipapar Ultrasonik, Akademi Analisis Kesehatan (AAK) Delima Husada Gresik.
- [5] Elfa Khoirotul Fajriyah, 2014. Analisis Kadar Keasaman Pada Legen Terfermentasi Antara Yang Tidak Dipapar Ultrasonikn Dengan Yang Dipapar Ultrasonik, AAK Delima Husada, Gresik.
- [6] Dawud Achroni, 2013. Kiat Sukses Usaha Ternak Sapi Perah, Trans Idea Publishing, Jogjakarta.
- [7] Nur Fariha, 2014. Analisis Kadar Keasaman Pada Susu Sapi Perah Antara Yang Tidak Dipapar Ultrasonik Dengan Yang Dipapar Ultrasonik, AAK Delima Husada Gresik
- [8] Raichel Daniel R, 2006. The Science and Applications of Acoustics, 2ND Ed, CUNY Graduate Center and School of Architecture, Urban Design and Landscape Design The City College of the City University of New York (E-Books)