TITLE

DIFFERENCES THE ESTIMATION EQUATION OF ULTRASONIK CAVITATION CONCEPTS IN CANE JUICE

(Dipped Transducer of Piezoelectric versus Floated Transducer of Crude Palmae Oils versus Floated Transducer of Virgine Cuconut Oils and Dipped Transducer of Piezoelectric versus without ultrasonic will to detect potensial Hidrogen of Cane Juice)

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ABSTRACT

The contains of ordinary Cane juice (OC) has chemical composition of cane juice: Sucrose, Glucose, Fructose, and Starch, Salts, Organic acids, Protein, Gums, Wax, Water: 60 - 70% [1)], Bacteria[2)] and Fungi[3)]. The ultrasonic cavitation technique and potensial Hydrogen (pH) detection of OC by: The dipped piezoelectric ("DP"), the floated liquid transducer of crude palmae oils ("FCPO") or the floated liquid transducer of virgin coconut oils (VCO) and dipped piezoelectric ("FVCOP") ware ultrasonic transducers in OC with 48 kHz, 5 Vpp, 5 Vdc, sinusoidal waves from function generator, the speed of sound in the air at 343 m/s, 20 ^{o}C[4)], that were stabilizing pH value after storage and the positive control was cane juice without ultrasonic exposured. The result of the OC pH in test tube at room temperature in difference transducers concepts: a. The OC pH graph in 0 – 3 hours for linier equation it turns out that "DP" is very highest than "FVCOP", and "FVCOP" is high than "FCPO", where "FCPO" is the same as "OC", b. The OC pH graph after storage 1 – 5 days for exponential equation it turns out that "FVCOP" is first rangk than "FCPO" second rank, "DP" is third rank, and the "OC"is fourth rank, the "FVCOP" is OC extractor that produces normal pH values, no microbes and good intensity.

Key word: Cane juice, Piezoelectric, Crude Palmae oils, Virgin Coconud oils, Potensial Hidrogen, Ultrasonic.

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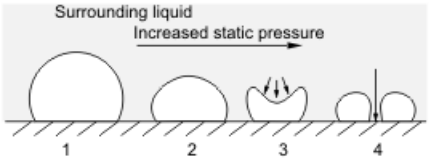
INTRODUCTION

Morphology of Cane stems was straight up (3 – 5 meter), slim, unbranched, hard structure, hard skinned, and black to light green skin[7)] as like dark green skin, yellow, purple. It contains of sugarcane as like: Sukrosa, Glukosa, Fruktosa, Starch, Salts, Organic acid, Proteine, Gumm, and water: 60 – 70 %[1)] or 60 – 70 mL in 100 g OC, as like density of water = 1 g/L in 4 ^{o}C[4)]. Whereas the taxonomy of Palmae that can be produccs CPO has *Kingdom* = ***Plantae,*** *Sub kingdom*: = ***Viridi Plantae*** Devisi = ***Magnoliophyta***, Kelas = ***Liliopsida***, *Ordo* = ***Arecales,*** Famili = ***Arecaceae***, *Genus* = ***Elaeis Jacq***, *Spesies* = ***Elaeis guineensis Jacq***[8)], and the taxonomy of Coconut that can be produccs VCO has *Kingdoms*: ***Plantae,*** Devisi: ***Spermatophyta***, Kelas: ***Magnoliophyta***, *Ordo*: ***Arecales,*** Famili: ***Arecaceae***, *Genus*: ***Cocus***, *Spesies*: ***Cocus nucivera***[9)].

Generally: 1. The density of two types of oils as CPO[10)] and VCO[11)] had the classic phenomenon that the oils density were small than density of OC, so the 1 ml oils floated in 10 ml OC and no reaction among two liquid in test tube, 2. The pH

value of fresh OC[12], fresh CPO and fresh VCO without ultrasonic exposure had same at 5 point, while the herbal has a lot of Bacteria[2], Fungi[3] and others, their can be survive[13] and grown, so they'ld be move independenly in chemical particles of OC, because no ultrasonic and the valency electron of atom or molecular chemical has natural spin vibration in outer line of them[14], 3. The old theory of cavitasion in liquid (without ultrasonic) was phenomena a bubble imploding close to a fixed surface generating a propeller of jet pomp (in 4 step) of surrounding liquid, that was from high-speed pump (clockwise rotation) of fluid impact on a fixed surface[4] (pic. 1), that was collision between the propeller pump and liquid by Pascal theory (1623-1662), that formula has P = F / A, notes: P = Pressure (Pas), F = Forces (Newton), A = Areas (meter^2).



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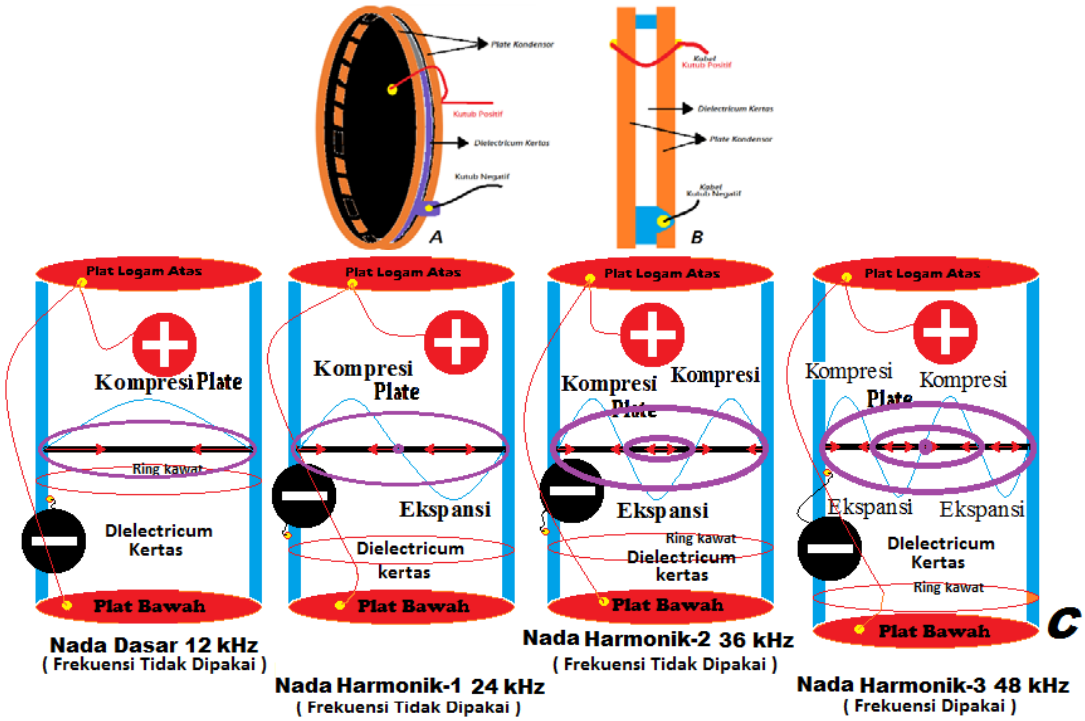
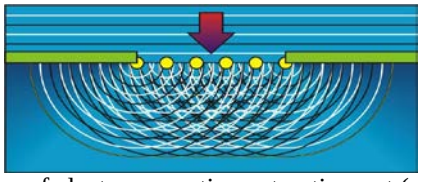
Pic-1. Cavitation bubble imploding close to a fixed surface of surrounding liquid by propeller of jet pomp[4] (Web source[15]).

4. The new phenomena of cavitation was "DP" into some liquid (as: Manihot utillisma juice[3], OC[5] and VCO[16]) where "DP" made from two circle of Cuprum (Cu) metals (called condenser) and among of two Cu metals has dielectrikum material (from hout vrij schrijf papers 70 gram), there'ld bc connected by Cu wire as cathoda polar and the serounded of condenser has circuler Cu wire as anoda polar. There'ld be connected by function generator and signal criteria of generator resouce specially[6], ie: a. Signal: Sinusoid (selected), Square, triangle, b. Frequency: infrasonic, sonic and ultrasonic (selected 48 kHz), c. Range intencities: 0 – 20 Vpp (5 Vpp), d. Range voltages: 0 – 10 Vdc (5 Vdc), e. Range phase: 0 – 90 (0^o), and the work consept 2 polars of piezoelectric connect to polar of probe this instrument and the speed of sound in the air at 349,29 m/s, at room temperatur[22].

The reaction two surface among Cu plates (piezoelectric) and liquid (OC solid molecular and microbes) had mechanical collision two particles among OC composition and Cu particles from condenser piezoelectric. The working principles of ultrasonic in piezoelectric condenser had two area some effect of contraction area and dilation areas in coordinate at circle flat condenser area, as like knowed of contraktion has identic as resource of frequency and ultrasonic (pic 2). Then after "DP" (cavitation) dipped into liquid (as: OC or VCO) then it was made gratings of Cu (identic in longitudinal wave theory as same as electromagnet wave) and after that its has collision between static particles Cu on area contraction and some liquid particle OC in this area and continue to distribute them to other static particles or microbes in OC. This phenomenon as like the Huygens theory and gratings as like the interference theory in transversal wave to change in longitudinal (mechanic) wave by piezoelectric (pic. 3). The explaination of some gratings in condenser (circle) Cu plat had a lot circle holes or cracks as like linier interference Fresnel. The review phenomena ultrasonic that as like contraction – dilation of sound wave in Cu plate in abis (X) – ordinat (Y) or gratings circle area, so that was side view cutout contruction (pic. 2.A, 2.B, 2.C).



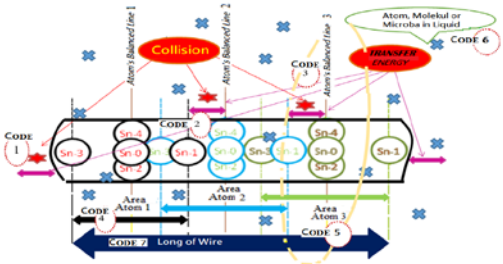
Pic 2.A. Modification Speaker from original Piezoelectric which was dismantled and left over 2 Cu plate condensor and apart from the speaker shell (3 Dmensions). B. The side view of modification speaker piezoelectric (pic 2.A, 2.B[4),18)]). 2.C. The side cut of Modification Piezoelectric by two Cu plate condensers (pic 2.C) as Ilustrasion theoretic of term in physic and biologis used in disertation[16)] as compression as expantion and contraction as dilatasion (in X – Y scale). Theoritic of tone in the ultrasonic (Arifin 2020) has (i). 1st Harmonic = 12 kHz, (ii). 2nd Harmonic = 24 kHz, (iii). 3th Harmonic = 36 kHz and (iv). 4th Harmonic = 48 kHz were dipped one the modifikasi Cu plate piezoelectric in "OC". The simple working technique of condensor (below and upper) as same longitudinal wave (contrasion-dilation) at 48 kHz has 5 compresion in both condenser and the fact between 2 circles plate has paper insulation media (from HVS 70 gram) as semipermiable media, so in their had 5 point of circling form comprasing poin that was resource vibrated in surface OC, illustration by Syamsul Arifin (2020).



Pic 3. The wave front by gratings of electromagnetic contraction out (or to liquid direction) in Huygen theory[21)], as same by new phenomenon cavitation with the condencer piezoelectric (X_1, Y_1) (on side view from two circle plate).

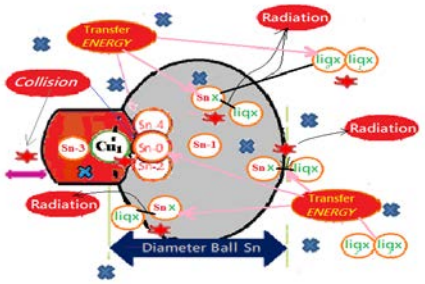
5. The theory of vibration ultrasonic in solid linier wire (pic 4), when there was ultrasonic exposured by one frequention (= 48 kHz). The first particle static in solid plare condencer has collision with resourses of ultrasonic vibrates its particles can be moves back and forth (as swings) in his static area and upon time happened collision and happened of wave propagates at other particles static, it makes some contraction or dilatation in horizontal reaction in 2 plate (pic 4) as

static particles area at solid wire to the end of wire[4)]. The sound vibration of two and more particles was had horizontal wire, direction current arrow moved parallel and same direction between the static particle in wire. Its similar as their exposured frequences ultrasonic (in quantity = kHz), intensity of mechanic wave in quantity = Vpp (voltage pick to pick sinusoid in electromagnetic = 2*Amplitude) as like in longitudinal principal in piezoelectric resouce), and voltage freshold value has in quantity as Voltage direct current (Vdc) or Voltage alternating current (Vac) exposure in liquid on test tube. The phenomenon effect of ultrasonic in linier wire had as some as electromagnetic effect as Oested theory, because particles (atom or molecule) moved on their swing in his static area (see pic 4)



Pic 4. Theori and effect of ultrasonic propagation in Stannum (Sn) wire[19)] in X scale, notice: Code-1, Collision. Code-2, Transfer Energy. Code-3, Atom's Balanced Line. Code-4, Area Atom. Code-5, Area electromagnet Oested. Code-6, Atom, Molecule or Mikroba in liquid. Code-7, Long of Sn Wire.

6. The new radiation phenomena of vibration ultrasonic from knobs (ball) transducer (pic 5), when the ultrasonic propagates from the wire to solid and small ball as radiasion (from one point and spread out in all directions), this was opposited of cavitation, it would be a lot vibrations, continuous moves from piezoelectric, but in Sn ball as the vibration resource can not stopped immediately, there'ld be a storage vibration in ball. So, when it dipped in liquids (as: CPO, VCO or OC) that still vibrates with reaction at liquids and on going at some time. This consept of general radiation phenomena was approximates of Wien theory of electromagnet, but its electromagnet waves were not equal natural scieces with mechanic wave, but the phenomena can be approximated by an equivalence Wien technique, that was $\lambda_{max} . T = C$, and notes:C = constant Wien ($2{,}878 . 10^{-3}$ m.K), λ = length wave of electromagnet and T = ^{o}Kelvin), as:



Pic 5. Theori & Effect of Ultrasonic Propagation in Sn Knob (as Ball) Transducer[17),18)] on room scale (X, Y, Z).

Notes from Pic 5: 1. The "Transfer Energy" was ability to move form ball Sn to liquids, 2. The "Radiation" of ultrasonic from knobs transducer was the process of transmitted ultrasonic wave in all directions to liquid from ball (knobs), 3. The "Collision" of ultrasonic in metal or liquid was double of crash process, because chemichal particle moved back and forth around the point of equilibrium. In this the liquid was causing the collision on both sides with direction can not prediction, 4. The "Cu-…" in Cu wire was atomic move as linier and parallel in the core of equilibrium as point of collision with core else atom, 5. The "Cu-1" was particle atom of Cu in wire, it will be collision with one atom ("Sn-0") of Sn in ball, so "Sn-0" was collited, that showed by moved forth (to "Sn-1"), and moved back ("Sn-3") around the point of equilibrium ("Sn-0" or "Sn-2"). The Cu wire connected Sn ball was called Knob, 6. The "Sn-…" each compiler on the inside transducer knobs Sn has a lot of Sn atomic core equilibrium and after one annoyance, atom moved by vibration causes in the big impact at first then weaken afterward, because Knobs as ball, then it has reflection of vibration inside of ball and forward outside of ball at to liquid "liqX" as refraction of Sn vibration. 7. The "liqX" was more chemical particles ("Che") or microba ("Mic") in liquid as vibration media of target refraction to become collision. 8. The "Che" creteria was: Solid, stand alone, can react with its partner and produses waste. When exposed to ultrasonic vibrations can break apart and react with other molecule of salts or free of chemical molecule, 9. The "Mic" creteria was cell biotic (Bactery, Fungi, Virus), survive in liquid, and after ultrasonic exposure, their can be die or mutation cell. 10. The "↔" was the transfer energy. 11. The liquid transducer after liquid exposure by metal transducer (as piezoelectric or knobs tranducer) can be new group transducer studies in natural science base, ie: Group A. The target liquid (as CPO[20)], VCO[11)], OC[5)]) as free collision in all direction like as bilyard ball, Group B. The floats liquid transducer as "FCPO" or "FVCO" in surface of the target liquid as OC (Pic 6), Group C. The combination of piezoelectric an VCO as transducer (as "FVCOP") on the target liquid (OC). The OC and VCO as the target liquid ultrasonic treatment by piezoelectric transducer as cavitation and chemical atomic (particles) in OC or VCO had free moved and free collision (solid) as bilyard ball, and atomic direction after collision: •Had spreader on a room of liquid, •Had chemical reaction among particles or •Had chemical molecules break apart, but the microba in OC after floated by VCO can be die, because bacteri aerob in OC can not connected from the air, or fungi and bacteri anaerob die because continue vibration by liquid transducer, this had a new effect. The new consept about atom, particles and microba in OC by 2 liquid (CPO[6)] or VCO[11)]).

Pic 6. The CPO after radiated ultrasonic by *Knob* at 3 hours then it was floated transducer of CPO[6)] in the surface OC on test tube, as liquid ultrasonic transducer and ultrasonic exposured by cavitation at "OC" and then tested the colony of microbes with pour plate method in solid media of agar in cfu/ml.

8 The R&D as new consept as the "FVCOP", that floated VCO and dipped piezoelectric transducer in OC, and then it was exposured 3 hours by piezoelectric on reaction tube (pic 7). That the multy consept of cavitation by the DP and then by the VCO in OC (bellow and upper) then after 3 hours DP stopped exposure, and then the FVCO taken over exposure cavitation, and because all of particle had the same structure and equal mass (for electric and non eletric), its was vibrated in same direction, but particle at no same mass or microbes so it'ld be chemis reaction or be died at after their collided and membrane of microbes leaked. After 5 days in storage and VCO took over of vibration to thrill of "OC" in test tube at all the time. Its became OC was steril of microba.

Pic 7. The FVCO transducer and then DP transducer (ultrasonic cavitation) into OC at test tube. The DP exposured with high intensity at 3 hours, after that the FVCO exposured with low intensity during 5 days[16)].

METHODS AND MATERIAL

This artichel reports some graphical differences in OC pH value data from several previous researches with various of transducers were principal concept used: a. The electromagnetic sinusoid signal from the function generator merk protec type VOM VFG 3020 DDS with 48 kHz, 5 Vpp, 5 Vdc, and speaker piezoelectric that convert from electromagnet waves into the mechanic wave, b. The volume of OC in short test tube was 10 mL, c. The average of inner diameter of test tube was 1.25 cm and the average of long the tube 10 cm, d. The creterias of OC: The pH of fresh OC was 5 point, the density (ρ) of fresh OC was 1.08 g/mL at the room temperate (30 ^{o}C), the OC color was turbid dark green, and the smell was typical of cane, e. The creterias of CPO: The pH of fresh CPO was 5 point, the density (ρ) of fresh CPO was 0.915 g/mL at the room temperature (30 ^{o}C), the CPO color was clear yellow, and the smell was typical of CPO, f. The creterias of VCO: The pH of fresh VCO was 5 point, the density (ρ) of fresh VCO was 0.94 g/mL at the room temperature (30 ^{o}C), the VCO color was clear white, and the smell was typical of VCO. g. The direct exposure in form of straight line to OC can be carried out by transducers: •"DP" (dipped piezoelectric in OC), •"FCPO" (floated CPO in CO), •"FVCOP" (floated VCO with dipped piezoelectric in OC), and after certain time the pH was checked and the end result of OC had a very good pH value after 5 days without ultrasonic exposure.

The material of pH detector was paper of potensial Hydrogen merk macherey nagel (MN) Germany, www.mn-nrt.com ref 921-10 pH-fix 0 -14.

Statistics analysis used: a. The plotting diagram has axis-X (Time) and ordinat-Y

(average of pH), b. The Kruskal wallis test, c. The curve estimation of regression linier from datas plot among times storage

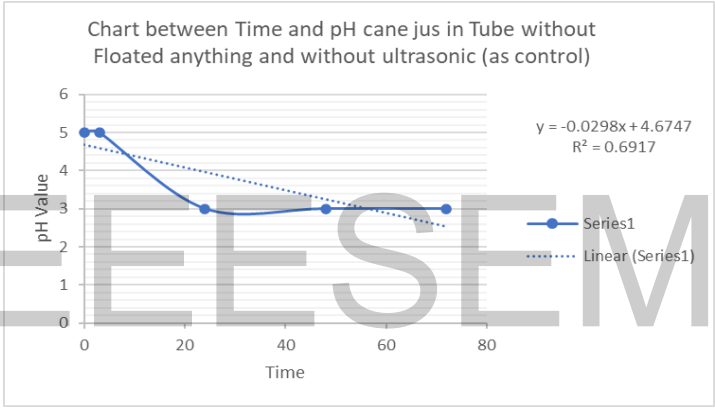
FINDINGS

1. The Equation OC pH value in Tube without Floated anything and without ultrasonic.

(i). The Data

Times	0 hours	3 hours	24 hours	48 hours	72 hours
OC pH value	5; 5; 5; 5; 5	5; 5; 5; 5; 5	3; 3; 3; 3; 3	3; 3; 3; 3; 3	3; 3; 3; 3; 3
Average (pH point)	5	5	3	3	3

(ii) The Data Plot by average of OC pH without ultrasonic exposure in test tube[5)]



Pic 8. Data Plot by average of OC pH without floated liquid anything and without ultrasonic during 5 days storage

b. The Kolmogorov-Smirnov Test and then Kruskal-Wallis Test

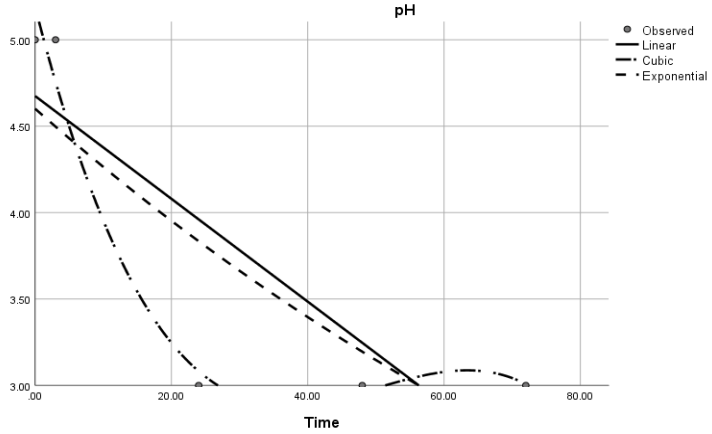
(i). Normal distribution (0.000 < 0.05 was no Normal) and Unifrom distribution (0.000 < 0.05 was no uniform).

(ii). So, in Kruskal-Wallis T.est (= 0.000) in $\alpha < 0.05$. Decision: There was an effect of storage time on the OC pH .

e. The graphic (pic. 8) from the two graph plots: i. At 0 – 3 hours by equation theory from area or two-point coordinate (X_1, Y_1) and (X_2, Y_2) ii. At 1 – 5 days (storage datas) by SPSS (in Linier estimation of Regression).

The pH graphic of OC at 0 – 3 hours was Y_1 =,5 and m_1 = 0, but at 1 – 5 days was Y_2 = -0.0253 X+ 4.4288, m_2 = – 0.0253, that indicated “OC” had a lot of microbes grown.

d. GraphicAnalisis of SPSS (pic. 9):



Pic 9. The graphic pH value of OC in test tube during 5 days storage (without ultrasonic treatment)

e. The curve Estimation of Regression from the Graphic in all Data OC pH.

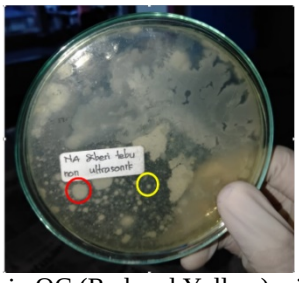
In cubic was $Y = -0.155.X^3 + 0.003.X^2 + 0.000002197.X + 5{,}191$; the coefficient of determition (R^2) = 0.989, statistically the cubic estimation equation of determination was very strong when comparared to: In liniear was $Y = -0.0281.X + 4.563$; (R^2) = 0.692 (69,2%), and in exponential was $Y = -4{,}601.e^{(=0{,}008.X)}$; R^2 = 0,692 (69,2%).

d. The Linier Equation of OC pH (without Ultrasonic) between Zero – 3 Hours (formula of through two points coordinate).

There was $Y_1 = 5$ and the gradient (m) of the line was zero.

f. The Microbiology atas of OC in Storage without Ultrasonic.

The colony microbiology of OC after 5 days storage without ultrasonic (no cavitation) had a lot of microba by diplo observasion. The comparison of theory as the total colony count was the number of colonies per plate point the than consentrasion faktor[13)], and the classification number of colonies per petri disk has 25 – 250 cfu/mL as normally, and has higher than 250 cfu/mL as spreader and has lower than 25 cfu/mL as null colony, and Microbiology media of Bacteri detection was Nutrien Agar (NA) and media of Fungi detection was Sabouraud Dextroksa Agar (SDA) and antibiotic.



Pic. 10. The result colony of Bacteria in OC (Red and Yellow) without ultrasonic after storage 2 – 3 days and photo detect after pourplate and incubated (24 hours) was spreader (as a lot) of Bacteria in NA media and criterias in this Petridisk was big diameter as red circle and small diameter as jellow circle[6)].

Pic. 11. The result colony of Fungi (in red circle) in OC without ultrasonic after storange 2 – 3 days and foto detect after pourplate and incubated (24 hours) has some Fungi in SDA (without antibiotic), with the criterias of Fungi has some fili in fungi epiderm[6)].

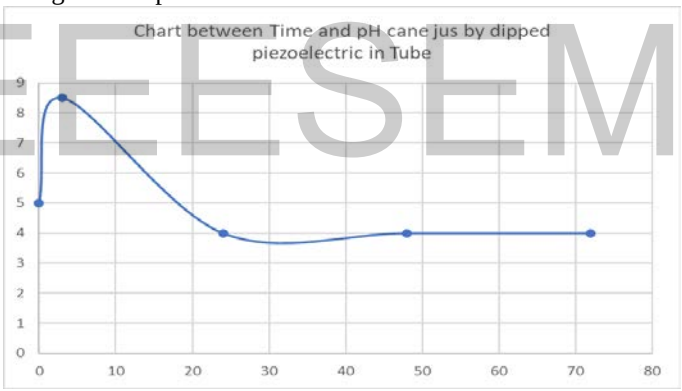
2. The Equation OC pH value by "DP" Exposured Cavitation (3 hours) and storage during 5 days in test tube

a. The Datas and Datas Plot:

(i) The Data

Times	0 hours	3 hours	24 hours	48 hours	72 hours
OC pH value	5; 5; 5; 5; 5	8; 9; 8.5; 8; 9	4; 4; 4; 4; 4	4; 4; 4; 4; 4	4; 4; 4; 4; 4
average of pH (point)	5	8,5	4	4	4

(ii) The Data Plot by average of OC pH value



Pic 12. Data Plot OC pH after "DP" exposured cavitation (3 hours) in test tube and than its storage during 5 days[5)].

b. The one-sample Kolmogorov-Smirnov Test and Kruskal-Wallis Test.

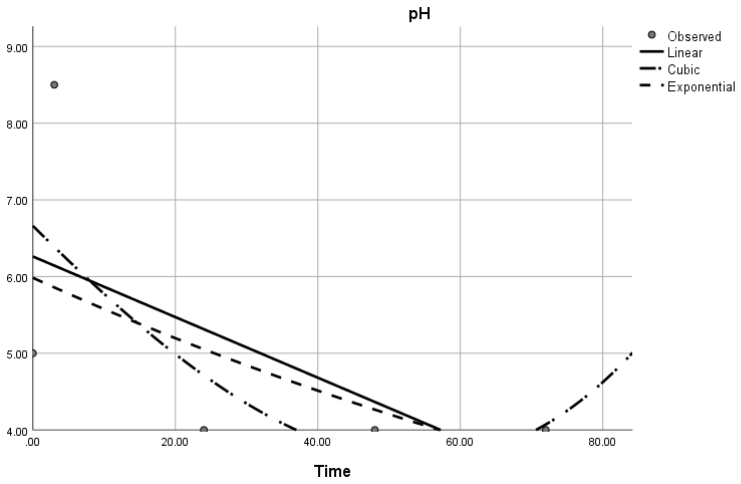
(i). Normal distribution (0.000 < 0,05 was not normal) and Unifrom distribution (0.000 < 0,05 was not uniform).

(ii). So, in Kruskal-Wallis Test (= 0.000 < 0.05), Decision: There was an effect of after exposured cavitasion (by transducer Piezoelectric) and the time storage without exposured cavitasion to OC pH value.

c. The curve estimation of regression from the graph plots all the OC pH data

In Cubic was Y = $-0.93.X^3$ + 0.000006555.X + 6.661; R^2 = 0.484. Statistically the cubic estimation equation of determination was strong when comparared to the liniear and exponential that eq uation in Linier was Y = - 0.040 X + 6.262; R^2 = 0,385; and in Exponential was Y = - 5.984. $e^{(=0,007.X}$; R^2 = 0.37.

d. Graphic:



Pic 13. The OC pH value graphic after "DP" exposured cavitation (3 hours) in test tube during 5 days storage.

e. The linier equation OC pH value with expresure ultrasonic by "DP" between zero – three hours (formula of through two points coordinate).

The OC pH value at 0 until 3 hours was $Y_1 = 1{,}16\ X + 5$ and m = +1,16, Decision: effect and impact of "DP" after cavitasi exposure in OC to pH value from 5 increase to 8,5 was very high value (Δ pH = 3.5) this indicate OC can be high of componen alkalis.

f. The curve estimation of regression in linier from the graph plots in storage datas until 5 days by not exposure ultrasonic.

The OC pH value after storage and after exposured cavitation until 5 days was $Y_2 = -0.0569\ X + 7.215$ and $m_2 = -0.0569$. Decision: The effect after storage a force moves vibration higher loss from OC pH value was 8.5 down to 4 (Δ pH = 4.5) that indicated exposure cavitation with "DP" in OC was very strong and then after storage without exposure was weakly intensity of ultrasonic,

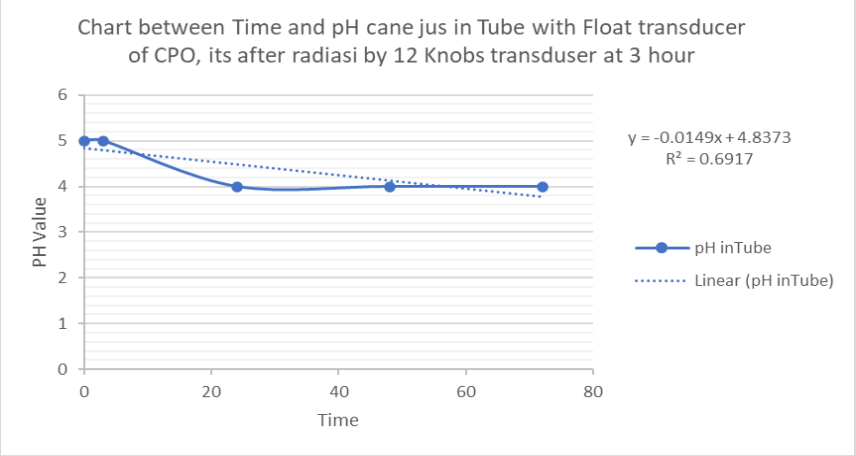
3. The equation OC pH value by "FCPO" exposured cavitation (3 hours) and storage during 5 days in test tube.

a. The Datas and Datas Plot

(i) The Data

Times	0 hours	3 hours	24 hours	48 hours	72 hours
OC pH value	5; 5; 5; 5; 5	5; 5; 5; 5; 5	4; 4; 4; 4; 4	4; 4; 4; 4; 4	4; 4; 4; 4; 4
average of pH (point)	5	5	4	4	4

(ii) The Data Plot by average of pH value



Pic 14. Data Plot of OC pH in test tube with float transducer of CPO and storage 5 days

b. The one-sample Kolmogorov-Smirnov Test and Kruskal-Wallis Test.

(i). Normal distribution was (0.000 < 0.05: No normal) and Unifrom distribution was (0.000 < 0.05: No uniform).

(ii). So, in Kruskal-Wallis Test (= 0.000) in $\alpha < 0.05$, Decision: There was an effect of the time storage (5 days) of OC after cavitasion by "FCPO" to OC pH value, that made of CPO transducer by dipped 12 Knobs transducer into CPO and connected to Piezoelectric and function generator and Cu wire[10].

c. The Curve Estimation of Regression from the graph plots all the OC pH data. In Cubic was $Y = -0.077.X^3 + 0{,}002.X^2 + 0.00001098.X + 5.096$; $R^2 = 0{,}978$ (97,8 %). Statistically the cubic estimation equation of determination was very strong when comparared to the liniear and exponential that equation in Linier was $Y = -0.015\ X + 4.837$; $R^2 = 0{,}692$ (69,2 %) and in Exponential was $Y = -4{,}822.e^{(=0{,}003.X}$. $R^2 = 0{,}692$ (69,2 %).

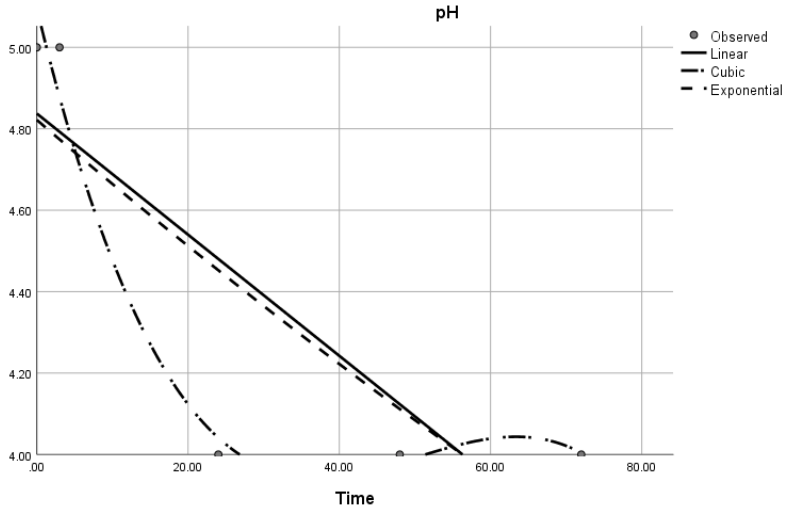
d. The equation OC pH value by "FCPO" between zero – three hours (formula of through two points coordinate).

The equation OC pH value after exposured to ultrasonic cavitation by "FCPO" between zero – three hours[10] was vibrated in a low intensity and graphic equation OC pH value was $Y = 5$ and $m_1 = 0$.

e. The equation pH value of OC after storage and "FCPO" still exposured until 5 days in test tube[6].

The equation graphic pH value of OC was $Y = -0.0126\ X + 4.7144$ and "m_2" = –0.0126, and $R^2 = 0.5687$, that moderate dicrease of OC pH from 5 to 4 (Δ pH = 1).

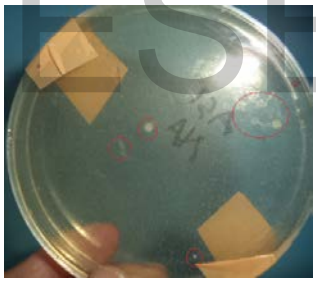
f. Graphic



Pic 15. The OC pH value graphic with "FCPO" and storage 5 days in test tube

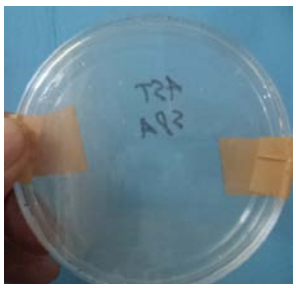
g. The Microbiology Datas of OC after Storage in 4 – 5 days[6)]

The OC after floated transducer of CPO in test tube has low intensity and low cavitation and after storage during 3 – 4 days by Microbiology detection by Bacteri with NA media in diplo observasion has 7 colony Bakteri in Petrydisk-1 and 5 colony Bakteri in Petrydisk-2 (pic. 16). The result was:



Pic 16. The example picture of Bacteria colony on OC after "FCPO" and pourplate by NA media had = 7 colony in petridisk as identic null cfu / mL Bacteria[6)].

and Fungi with SDA media without antibiotic has null colony Fungi (pic. 17), but has some Bacteria. The result was:



Pic 17. The example picture of Fungi colony on OC after "FCPO" and pourplate by SDA (without antibiotic) had 0 colony as null cfu/mL Fungi[6)]

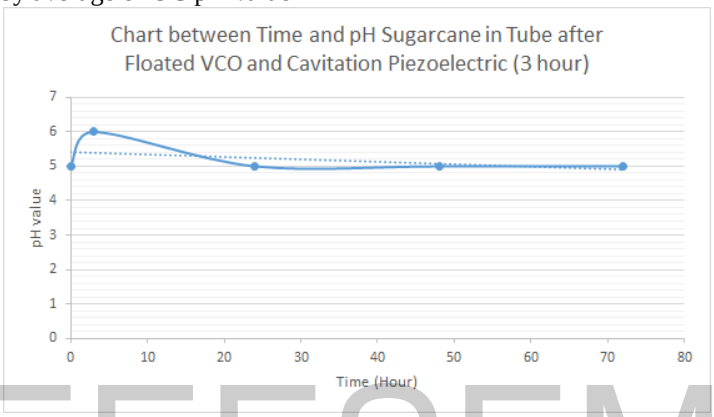
4. The Equation OC pH value by "FVCOP" (floated treatment by VCO along Time with Piezoelectric exposured cavitation only 3 hours) on test tube[16)]

a. The Datas and Datas Plot

(i) The Data

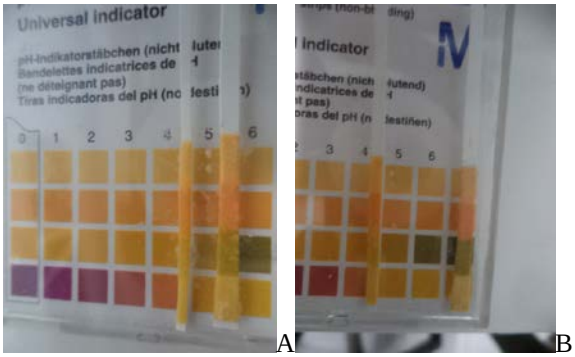
Times	0 hours	3 hours	24 hours	48 hours	72 hours
OC pH value	5; 5; 5; 5; 5	6; 6; 6; 6; 6	5; 5; 5; 5; 5	5; 5; 5; 5; 5	5; 5; 5; 5; 5
average of pH (point)	5	6	5	5	5

(ii) The Data Plot by average of OC pH value



Pic 18. Data Plot of OC pH in test tube with float transducer of VCO (5 days storage) and after dipped Piezoelectric and Exposure in 3 hours in test tube

(iii). The Data of pH Detection



A B

Pic 19. Data universal pH indicator from OC before (code A) and after ultrasonic treatment (code B).

b. The one-sample Kolmogorov-Smirnov Test and Kruskal-Wallis Test.

(i). Normal distribution (0.000 < 0.05) was No normal and Unifrom distribution (0.000 < 0.05) was No uniform.

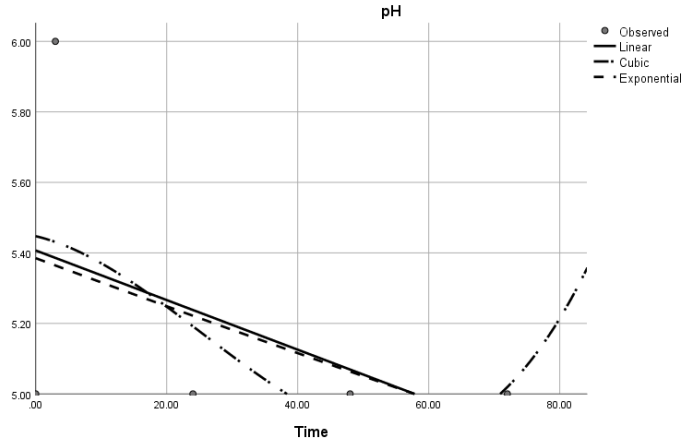
(ii). So, in Kruskal-Wallis Test (= 0.000) in $\alpha < 0.05$, Decision: There was an effect time storage after cavitasion by "DP" on 3 hours and "FVCO" transducer and after storage (5 days) to OC pH, where the Piezoelectric connected in function generator by probe cabel.

c. The Curve Estimation of Regression from the graph plots all the OC pH data.

In Cubic $\rightarrow Y = - 0.004.X^3 + 0.00000501 X + 5.447$: $R^2 = 0.289$ (28.9 %).

Statistically the cubic estimation equation of determination was very strong when comparared to the liniear and exponential that equation in Linier was Y = - 0.007 X + 5.407; R^2 = 0.232 (23.2 %) and in Exponential was Y = 5.385.e $^{(=0.001\ X)}$; R^2 = 0.232 (23.2 %), but planning to predict OC pH value in the future is better to use the exponensial equation because it was contant of OC pH value, but in linier can result of OC pH in negatif prediction (< 0) and in cubic can result OC pH in very high level prediction (> 5) see pic.20.

d. Graphic:



Pic 20. The OC pH value graphic in test tube during 5 days storage and after float VCO and after dipped and Exposure of Piezoelectric (3 hours)

e. The equation OC pH value by "FVCOP" among zero – three hours (formula of through two points coordinate).

The equation OC pH value after exposured to ultrasonic cavitation by "DP" (on) among zero – three hours was vibrated and graphic equation OC pH value was Y = 0.33 X + 5 and m_1 = 0.33, Decision: effect and impact of "DP" on was cavitasi exposure in VCO and OC then OC pH value increase from 5 to 6, it was moderate level (Δ pH = 1) and indicate componen OC can be alkalis.

e. The equation OC pH value after storage or after "DP" off and "FVCO" still exposured until 5 days in test tube.

The equation graphic OC pH value after "DP" off was Y = –0.0126 X + 5.7144 and "m_2" = –0.0126, and R^2 = 0.5687, that the pH value as same as OC pH value before exposure "DP".

DISCUSSION

1. The difference (Δ) in concept and in result about cubic equation of OC pH value in all the time detection (0 until 5 days) among with "DP"[5], "FCPO"[6], "FVCOP"[16], and without ultrasonic[6] as control. Discussion: `There had an increase and decrease OC pH value, where the deffrence in the highest pH value (Δ pH as 3.5 point) occurs when the OC was exposured to transducer "DP" then the other exposures, and the difference (Δ) in the lowest pH value occured when the OC was exposured to transducer of "FVCO" after being storage for up to five days than the other exposures (Δ pH as 0 point).

2. The difference (Δ) in concept and in result about linier equation of the OC pH value in storage from 3 hours to 5 days of the time detection among with: "DP", "FCPO", "FVCOP", and without ultrasonic as control. Discussion: `There had a

decrease OC pH value, where the best final pH value in 5 days of storage was 5 points and this phenomenon as same as the OC pH at fresh point was exposured OC by transduser "FVCOP"

3. The OC microbes had not survived in exposured by "FVCOP" after 5 days storage, because: (i). result from the research transducer "FVCOP" like process of "FCPO" would be continued tu vibration for more then 5 days, this new vibration phenomena, (ii).The OC microbes ware lived thing that can move any way and some can not, so after the OC was cavitated by "FVCOP" and after "DP" off in 3 hours for 5 days storage, it would become a beverage of microbial free and saved to drink. Discussion: The floatation, vibration and cavitation of VCO made OC microbes unable to survived and unmultiply.

4. The phenomenon from control reseach: The OC pH without ultrasonic and without floated oils until 5 days had dicrease value of pH and a lot of microba (after incubation on NA for Bacteria and on SDA without antibiotic for Fungi), their ware spread in surface medias at petridisk (> 250 cfu/mL). Discussion: In this section of risearch reinforced the above opinion: The detection of microbes can be with pH indicator as alternative as same as detection microba with media NA or SDA. That is cheap and easy.

5. The OC pH value before and after cavitated by "DP" (as cavitation fenomena) in 3 hours had pH increase from 5 to 8.5 point (Δ pH = 3.5) and than OC pH value after storage during 5 days without ultrasonic had dicreased from 8.5 to 4 (Δ pH = 4.5), noted: (i). The piezoelectric transducer has vibrated particles and microba in OC very strong of intencities at range 3 hours[5)], because the new technique of cavitation has elaborated water (H_2O) molecular by piezoelectric[18)]. (ii). The OC has a lot of chemical particles ie: alcaly, acid and salt, that can react with Hydrogen (H_2) or Oxygen (O_2) during cavitasi on process[4)]. (iii). The OC after storage at range 3 hours and 5 days detected was: OC pH value decreased very fast to drop, because gas as H_2 and O_2 can flied to the air from OC after cavitation. Discussion: (i). This indicates OC and that gas after cavitation had a low reaction between gas (H_2 and O_2) with particle and microba aerob had strong reaction to acid particles but their microba anaerob died. (ii). All of this phenomenon called the weak intensity, that indicate OC pH after storage (5 days) has in 4 point (constant) from 8,5 was indicated the liquid of OC hus self vibrasion (continue).

6. The phenomenon OC pH after FCPO as liquid transducer at surface OC in 3 hours as 5 poins, and OC pH value at along the time storage has decreased in 4 point. The prosedure of got CPO liquid transducer has radiated of CPO by 12 transducers knobs at 3 hours[10)], this CPO can be called the transducer liquid of CPO and its can be self vibrated by continuous more than 10 days. After the CPO transducer floated in upper OC until 5 days, it would detected OC pH value in time storage had dicreases from 5 to 4 point (constant). This indicates "FCPO" ultrasonic transducer had worked at moderate intensity. Discussion: (i). The different Chemical composition of OC pH between: Before as shown normal had in: [Alkali], [Acid] and [Salt] group, and After exposure with "FCPO" in OC as shown had new reaction group of: (a). [Alkali + H_2] and [Alkali + O_2], (b). [Acid + H_2] and [Acid + O_2], (c). [Salt + H_2] and [Salt+ O_2]. (ii). The "FCPO" can made OC insuleted with the air and CPO still vibrated continue, so after storage at 5 days than they ware weak and died: no Bacteri in NA (pic. 15) and no Fungi in SDA without antibiotic (pic. 16). (iii). However, the CPO very dangerous if you drunk it, so CPO as transducer was change with VCO.

7. The OC pH value after "FVCOP" exposure on her surface that was two phenomennon first exposured by dipp of transducer piezoelectric until 3 hour and the result of OC pH was increase from 5 to

6 point, and after that exposured teken over by float of VCO liquid transducer until 5 days and the resul of OC pH decrease (6 to 5 point again). Discussion: The "FVCOP" in OC was good treatment, because: •The ordinary VCO as herbal medicine so it was safe to drinks. •The VCO after exposure ultrasonic with 12 knobs transducer 3 hours as same effect the CPO after exposure ultrasonic with 12 knobs transducer 3 hours and had positive reaction on some group of mices more activitis, after them drank OC with treatment exposured "FCPO" at 3 hours[6)].

8. The previous research was showed the 3 principal concepts detecting of OC pH cavitation phenomena over a period time by transducer, ie: 1). The "DP" exposure 3 hours[5)] was high intensity and when compared to without "DP" (no intensity) in storage in test tube until 5 days, 2). The "FCPO" among after CPO transducer floated and exposured (low intensity) and detected OC pH in test tube and every day detect until 5 days[6)]. Where previous research related to the procedure for making CPO into a liquid transducer by dipping and radiating 12 Knobs of the transducer on CPO, where CPO can continue to vibrate for more than 10 days[10)] and the proven that CPO can not grow bactery and fungi[10)]. The previous research related to that was group of mice drank OC after being exposed to "FCPO" until 3 hours and it turned out, that the mice ware more active than other drinks as water or OC[6)]. 3). The "FVCOP" among the "DP" can cavitation and exposured the OC until 3 hours, and after DP stopped and float of VCO taken over to exposured OC until 5 days[16)]. Discussion of previous research: 1. The procedure of OC after exposure "DP" 3 hours (before off) was made the pH value of OC increased and after "FVCO" taken over was made the pH value of OC dicreased. 2: The OC can stay exposure (vibrated) by cavitation of FVCO in test tube more than 5 days, so microba flora normal in OC can be died. 4). The "OC" without exposured ultrasonic in 5 days storage as a control procedure for all transducers, the principal of cavitation has the OC pH value immerdiately drops to acid that indicated OC had a lot of microbes[2)].

CONCLUSION

The final OC pH value after process treatment 0 – 3 hours and storage until 5 days by the "FVCOP" (evaluable 5 point) was higher than by "DP" (evaluable 4 point) and it equal by the "FCPO" (evaluable 4 point), but by the "OC" (evaluable 3 point), so the best OC pH value after storage was by the "FVCOP".

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