กำหนดการ

การประชุมวิชาการและวิจัยระดับชาติและนานาชาติทางเทคนิคการแพทย์ ครั้งที่ 5

"5th National and International Conferences on Medical Technology 2017"

The 25th Anniversary Walailak University; 20th Anniversary Walailak Medical Technology; 60th Anniversary Thai Medical Technology

"Infectious Diseases and Innovation for Clinical Diagnosis"

วันที่ 28-29 มีนาคม 2560 ณ โรงแรมทวินโลตัส จังหวัดนครศรีธรรมราช

วันที่ 28 มีนาคม 2560			
08.30-09.00 น.	ลงทะเบียน		
09.00-09.15 น.	กล่าวต้อนรับ **ห้องประชุม:** ห้องบงกชรัตน์ 3		รศ.ดร.จิตรบรรจง ตั้งปอง คณบดี สำนักวิชาสหเวชศาสตร์
09:15-10:30 น.	โรคติดเชื้ออุบัติการณ์ใหม่ การติดเชื้อไวรัส และแนวทางการสร้างงานวิจัยจากงานประจำทางเทคนิคการแพทย์ **ห้องประชุม:** ห้องบงกชรัตน์ 3		ศ. นพ. ยง ภู่วรวรรณ จุฬาลงกรณ์มหาวิทยาลัย
10.30-10.45 น.	พักรับประทานอาหารว่าง ชมนิทรรศการ ผู้สนับสนุนการจัดงาน		
10.45-12.00 น.	Molecular analysis of Parasitic infection **ห้องประชุม:** ห้องบงกชรัตน์ 3		Assoc.Prof.Dr.Veeranoot Nissapatorn, University of Malaya
12.00-13.00 น.	พักรับประทานอาหารกลางวัน และชมนิทรรศการ/ EQA Program โดย ณัฐภูมิ ไชยศร (บรรยายพิเศษ)		
	กลุ่มย่อย 1 เทคโนโลยีความก้าวหน้าทางเทคนิคการแพทย์ **ประธาน** ผศ.ดร.วรางคณา จุ้งลก ดร.นันทวัน วังเมือง **ห้องประชุม:** ห้องปทุมลาภ	**กลุ่มย่อย 2** งานวิจัย R2R และนวัตกรรม/ การนำเสนอผลงาน **ประธาน** รศ.ดร.มณฑล เลิศคณาวนิชกุล ดร.จิรารัตน์ สองสี **ห้องประชุม:** ห้องจงกลนี	Session 3 International conferences/ Oral presentation Chair Assoc.Prof.Dr.Veeranoot Nissapatorn/ Dr.Nurdina Charong **ห้องประชุม:** ห้องอุบลฉัตร
13.00-14.00 น.	**การบรรยายพิเศษ** Hyperimmune Plasma to EV71 for treatment severe	**การบรรยายพิเศษ** Innovation (Patent) for Clinical Analysis of *H. Pylori*	Special Topic Anti-bacterial activity of natural products: Research

	infection: Pilot study Dr.Boonrat Tassaneetrithep, Faculty of Medicine Siriraj Hospital, Mahidol University **ห้องประชุม:** ห้องปทุมลาภ	 ผศ.ดร.สืบตระกูล วิเศษสมบัติ มหาวิทยาลัยวลัยลักษณ์ **ห้องประชุม:** ห้องจงกลนี	and innovation Assoc.Prof.Dr.Christophe Wiart, Nottingham University, Malaysia **ห้องประชุม:** ห้องอุบลฉัตร
14:00-14:30 น.	Quality management in Thailand 4.0 ดร.สมศักดิ์ ฟองสุภา	**การนำเสนอผลงานวิจัย (Thai or English Session)** 14:00-14:20 น. Performance Comparisons of Microhematocrit Determination by Using Proficiency Testing *Mr. Poonnapatch Sakaew* 14:20-14:40 น. Preparation of Pooled Blood Samples for Utilization as a Proficiency Testing Material for Hemoglobin A_{1c} Testing *Ms. Phanthira Wongsri* 14:40-15:00 น. Development of competitive ELISA to quantify protein adsorbed onto PLGA microspheres *Ms. Piyachat Roopngam*	**Oral presentation (English Session)** 14:00-14:20 น. Non Leishmania donovani – A Search from In Vitro Study for Novel Natural Therapy *Ms. Nadiah Syafiqah binti Nor Azman* 14:20-14:40 น. Utilization Clay Soil Kutai for Reducing MPN Coliform and Escherichia Coli in Domestic Wastewater *Mr. Blego Sedionoto* 14:40-15:00 น. Phylogeny of *Vermamoeba vermiformis* Isolated from a Freshwater Fish in Lake Taal *Prof. Dr. Giovanni D. Milanez*
14:30-15:00 น.	EQA Program you should know ทนพ.ประภพ ด่านเศรษฐกุล **ห้องประชุม:** ห้องปทุมลาภ	 **ห้องประชุม:** ห้องจงกลนี	 **ห้องประชุม:** ห้องอุบลฉัตร
15.00-15.30 น.	พักรับประทานอาหารว่าง ชมนิทรรศการ ผู้สนับสนุนการจัดงาน		

Utilization Clay Soil Kutai for Reducing MPN *Coliform* and *Escherichia Coli* in Domestic Wastewater

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ABSTRACT

High levels of microbial pathogens in domestic waste is potentially on water pollution . The measurements obtained E coli and Coliform MPN 9.2 X 104 on drainage around the settlement in Samarinda appropriate so that the necessary technology to reduce microbial pathogen with activation utilization clay Kutai with manufacture of effervescent tablets. This research was a lab with experimental design, with a measurement of the level of efficiency reduction of 100% clay Kutai after activation of the MPN coli and trial manufacture of effervescent tablets of clay Kutai Selected formula has properties of clay with clay content of 55.90. The highest of reduction the formula A (concentration clay 10 gr) at 99.9%. Comparative effectiveness clay Kutai in the form of powder with and without a mixture of white cement visible effervescent tablets of clay with the largest reduction rate of 99.99% rate of effectiveness. The use of effervescent tablets of clay Kutai in a laboratory test has high effectivity reduction of MPN coli even without the addition of white cement and can be developed in the application of appropriate technology in order to reduce microbial pathogens in domestic waste in particular.

Keywords: Reduction, Clay Kutai, Microbes Pathogen

1. Introduction

The problem of domestic waste is a problem that many face each municipal government or district. Domestic waste have an influence on the health of the environment because of domestic waste can be a contribution polluter large enough on the body of water is the main source taps it is because of material contamination present in household waste or domestic, especially the content ditergent and heavy metals from a variety of community activities, especially industry tumah ladder in the production process removing heavy metals in liquid waste generated as well as domestic waste has the potential to become a hotbed of disease vectors and rodents.

Domestic waste material that has been contaminated with discharges of patients with a particular disease becomes a source of transmission. Domestic waste often contain toxic substances, into water and soil pollution and in terms of pollution of water can disturbing the ecosystem of water bodies. Thus the amount of domestic waste

generated, then the problem that always arises is about getting berpotensinya ketercemaran water bodies that have a major role for the availability of water in the settlement.

Domestic waste generated sizeable urban region With an average use of 150 liters of water per day with the townspeople Semaka will produce domestic waste amounted to 120 million liters per day, even with the increasing number of the population further increase the amount of domestic waste that the current conditions.

Management of domestic waste is generally only supplied with drainage systems keselokan or city channels and will go kebadan water without any treatment can reduce the content of contaminants present in the domestic waste, the composition of domestic waste 70% organic matter and 30% of inorganic materials including heavy metals. High concentrations of organic material has great potential in the decomposition thus increasing the number of pathogenic microbes in water, the use of power absorption white clay and cement can function in the reduction of microbial pathogens Coli MPN indicator. Basically wastewater treatment, which generally consists of: (1) the physical processing such as screening, sedimentation, and filtration; (2) the processing of biologically either aerobic or an-aerobic, to decompose organic substances contained therein; and (3) chemical processing, namely affixing the waste water with a coagulant such as aluminum salts, or ferric, or synthetic polyelectrolyte, for memflokulasi organic colloids in it. (Purdom, 1990). While processing domestic waste households can be done effectively with a system of communal use of the treatment plant, but not every district / city government's commitment to make it happen so that this study was developed to be directly accessible technology waste treatment by society at large, and produces tablets waste will have a huge benefit as of appropriate technology

2. Literature

Clay And Potential Absorbance

Soil organic fraction consisting of large rocks, small rocks, gravel, sand, silt, and clay. Lampung include all inorganic solid materials effective diameter <0.002 mm (<2 m), and is regarded as a colloid, although rather simply the clay fraction which is a colloidal clay. Some clays can be amorphous, such as silica gels, alumina

and iron oxide. (Tan, 1992).

Cation exchange reaction, interaction between clay and organic compounds, complex reaction between metal ions and organic and inorganic colloids are additional implications of the electrochemical behavior of soil colloids. The forces responsible for adsorption clays are physical force, hydrogen bonding, electrostatic bonding, coordination and reactions. Physical style of the most important is the Van der Waals force, which is a dipole-dipole interaction short distance. Its role is only important in the close range, because the style of this type decreases dramatically with increasing distance. (Tan, 1992).

In laboratory practice, stirring is an attempt to shorten the distance that the contact between the dipoles. This adsorption will increase with increasing molecular size. The molecules of decomposition of waste (in leachate) still contains many molecules of large size, so it will be more easily adsorbed by Van der Waals forces.

Clay Kutai And Microbial Reduction

Based research and Ade 2014 Blego prove the effectiveness of the reduction of clay kutai against microbial pathogens Coli MPN parameters and E coli, showed the results of MPN coli reduction amounted to 99.65% of prior treatment 9.2 X 104 to 350 colonies and the rate of reduction of E coli reached 99.82% after treatment and the remaining 170 colonies have achieved quality standards with the standards of the Ministry of the Environment 1000 colonies / 100ml

3. Research Methode

Research design

This research is a lab with experimental design, with a measurement of the level of efficiency reduction of 100% clay

Tools and Materials Research

1. Equipment

Equipment used in addition to glassware, heating my level clay oven, analytical balance also used other special equipment.

2. Materials

a. Materials used are; Domestic waste taken from households in Samarinda.

b. Waste absorbent material such as clay kutai liquid form of clay paddy fields in East Kalimantan

c. Tabletation sentesa chemical bonding solution and chemical spreaders. (Sodium bicarbonate with citric acid or tartaric acid)

Research Samples

Samples are wastewater (domestic sewage)

taken from households in Samarinda.

Research procedure

Absorbent Preparation and Determination of Optimum conditions.

This study is a research laboratory that uses jar-test to test the effectiveness of the concentration of the best formula. Clay Kutai from rice mixed with plenty of water, then filtered with gauze or fine sieve, precipitated and separated from the water and the mud dried 105º C for 24 hours. The results are cooled and crushed and sieved with a sieve usual. In the pilot used a mixture between. Each test using a weight of 10 grams, 7.5 grams, 5gr, and 2,5gr

The mixture was stirred respectively with 100 ml of domestic waste. Each sample is treated with a stirring speed of 100 rpm for 3 minutes, followed by stirring 60 rpm for 2 minutes and awaited deposition for 3 minutes. The result (the part that did not precipitate) was tested in laboratory parameters concentration of the metal before and after treatment.

About the timing of 3 minutes stirring, and precipitation as well as the repetition, is determined based on empirical experience that these times provide results that are optimal

Measurement of Microorganisms

Measurement of the content of coliforms and E. Coli carried out at the contact time of 2.4 and 6 minutes. The method used for the measurement of coliforms and E. Coli is a method of Most Probable Number (MPN) or Total Estimated Nearby (JPT). MPN method consists of three stages, namely the prediction test (*presumtive test*), confirmation test (confirmed test), and a test of completeness (completed tests). Test conjecture is preliminary tests on whether there is the presence of coliforms based on the formation of acid and gas due to lactose fermentation by coliform group of bacteria. Test provision is a continuation of the alleged test. This provision test is performed to determine the type of bacteria E. Coli. Completeness test is a test conducted after the test provisions to determine E. coli or fecal coli.

Effervescent Tabletisasi

The second stage of this research is done after the standard formula of the mixture obtained in the first phase. In the second phase of this research, the process of making tablets and effervescent tablets increase in the manufacture of absorbent waste Kutai made of clay with the addition of a mixture of sodium bicarbonate with citric acid or tartaric acid which, when immersed in water

it will be bubbly or CO2 gas form

4. Result and Discussion

Chemical and Physical Examination Results Clay Kutai And Bacterial Pathogen Reduction Potential

Chemical Characteristics

Chemical soil characteristics are shown in Table 1 as follows

Tabel 1. Chemical characteristics Fomula Tablet of Clay Kutai

No	Parameter	Methode	Result Analysis	Unit
1	pH H_2O (1:2,5)	Electrode	4,90	-
2	pH KCl 1N (1:2,5)	Electrode	3,62	-
3	Kation Basa (NH4-Oac)pH 7			
	Ca2+	AAS	0,98	Meq/100gr
	Mg2+	AAS	0,13	Meq/100gr
	Na+	AAS	0,43	Meq/100gr
	K+	AAS	0,41	Meq/100gr
4	KTK	Hitung	16,95	Meq/100gr
5	Al3+	Titrasi	5,17	Meq/100gr
6	H+	Titrasi	9,83	Meq/100gr
7	N Total	Kjeddahl	0,13	%
8	C Organik	Walkley & Black	3,00	%
9	Ratio C/N	Hitung	23,31	%
10	P_2O_5 Tersedia (Btay 1)	Spectronic	0,56	ppm
11	K_2O Tersedia (Btay 1)	AAS	76,65	ppm
12	Kejenuhan Basa	Hitung	11,51	%
13	Kejenuhan Al	Hitung	30,48	%

Chemical quality clay kutai shows Clay CEC value of 16.95 mEq / 100g at the observation station.

Physical Characteristics

Examination of physical quality of the clay kutai seen in the data below:

Table 2. Result Examination Of Physical Quality Of The Clay Kutai

No	Parameter	Methode	Result of Analysis	Unit
1	Silt	Pipet	24.60	%
2	Clay	Pipet	55.90	%
3	Coarse sand	Sieve	0.00	%
4	Medium sand	Sieve	0.00	%
5	Fine sand	Sieve	19.50	%
6	Total sand	Hitung	19.50	%
7	Texture	Triangle Text	Clay	-

Results of laboratory analysis of physical quality clay Soil Laboratory Pusrehut Unmul show on clay formula chosen has the properties of clay with clay content of 55.90.

Potential reduction of clay soil kimawi kutai based analysis looks at the content of CEC (cation exchange capacity of the soil) both dititik station 1 maupu 2 looks quite high at 16.95 mEq / 100g at station 2 and sebesar1661 mEq / 100gr.

Cations are positively charged ions such as Ca2 +, Mg + ,, K +, Na +, NH4 +, H +, Al3 +, and so on. In soil cations are dissolved in the groundwater or sequestered by the soil colloids. The number of cations (in milliequivalents) that can be sequestered by the soil per unit weight of soil (usually per 100 g) is called the Cation Exchange Capacity (CEC). Cation exchange capacity is expressed in units of chemistry that milliequivalents per 100 grams (me / 100 g). One equivalent is the amount that is chemically equivalent to 1 gram of hydrogen.

Cation exchange capacity of a chemical nature which is closely related to soil fertility. Soil with a high CEC is able to adsorb and provide better nutrients than soil with a low CEC. Soil

with a high CEC when it was dominated by the alkaline cations, Ca, Mg, K, Na (high base saturation). Quality clay kutai seen from Ca 2+, Mg 2+, Na +, K + respectively, at station 2:0,98 ; 0,13; 0,43 ; 0,41 Meq/100gr showed the highest levels of alkali cations on clay station 2 Ca2 + and K +

Analysis of the potential for microbial reduction seen in the bondage of cation exchange in the process of mixing the waste fluid interaction with clay given formula. Such as occurs in the antimicrobial performance of chitosan used in the preservation of fish praduk ynng maximize the performance of hydroxy C-2 khitin substituted with amino groups (NH2) so that it can reduce microbes. (Sedjati, Sri, DKK 2007), only the most principle perpedaan on waste water containing microbial pathogen reduction that occurs in bondage cation on mimbran microbial cells resulting in the death of microbes.

The physical characteristics of clay also has potential as an antimicrobial to exploit the potential of clay that is visible with the content of clay in the clay stations 1 and 2 respectively 40.90% and 55.90%. Cation exchange reaction, interaction between clay and organic compounds, complex reaction between metal ions and organic and inorganic colloids are additional implications of the electrochemical behavior of soil colloids.

The forces responsible for adsorption clays are physical force, hydrogen bonding, electrostatic bonding, coordination and reactions. Physical style of the most important is the Van der Waals force, which is a dipole-dipole interaction short distance. Its role is only important in the close range, because the style of this type decreases dramatically with increasing distance. (Tan, 1992). In laboratory practice, stirring is an attempt to shorten the distance that the contact between the dipoles. This adsorption will increase with increasing molecular size. The molecules of decomposition in domestic waste still contains many molecules of large size including the content of pathogenic microbes, so it will be more easily adsorbed by Van der Waals forces.

Effervescent Tablet Test Results Effectiveness Against Microbial Pathogen Reduction (MPN Coli)

Tablet Effervesent Effectiveness Test Results Against Microbial Reduction Pathagen (MPN coli) are listed in Table 3 as follows:

Tabel. 3. Effervescent Tablet Test Results Effectiveness Against Microbial Pathogen Reduction (MPN Coli)

No	Sampel	Result of Observational (MPN/100ml)				Note
		Kontrol	A	B	C	Quality microbiology Standart Water of Riverr 1000 (MPN Coli)Ministry of Environment RI
1	Test 1	>1100	75	1100	210	
2	Test 2	>1100	36	210	460	
3	Test 3	>1100	28	150	291	
Avarage		>1100	46,3	486,7	320,3	
% Reductifity		0	99,9%	55,75%	70,88%	

The above table shows the magnitude of the reaction rate of effervescent tablets of clay with clay concentration of 10 grams (Formula A), 5 grams (formula B), and 2.5 grams (formula C) showed a mean reduction coli MPN of> 1100 colonies to 46.3, 486.7 (formula B) and 320.3 (formula C) with a rate of reduction tertingga the formula A at 99.9%.

The magnitude of the reduction rate of effervescent tablets of clay with clay concentration of 10 grams (Formula A), 5 grams (formula B), and 2.5 grams (formula C) showed a mean reduction coli MPN of> 1100 colonies to 46.3, 486.7 (formula B) and 320.3 (formula C) with a rate of reduction tertingga the formula A at 99.9%. This research is in line with research Suriri and colleagues (2010) conducted to determine the effectiveness of ozone in the disinfection process performed on water samples in the form of shallow groundwater naturally .. This study uses free oxygen from the air that flowed at the rate of 0.75 L / min continuous the ozone generator with the power of 40000 volts. Ozone in the form of gas dissolved in the water stored in the batch system contactor with a volume of 1.5 liters. Measurements were taken at the time of contact 0,2,4 and 6 minutes, this study was obtained from E. coli removal efficiency reached 100% at the contact time of 2 minutes, but the allowance coliform until the 6th minute only reached 78.18%. In the 6th minute residual ozone concentration in the sample reached 0.0288 mg / L .Karakteristik water will affect the concentration of residual ozone dissolved in water, and will affect the competition between the oxidation

reaction and the process of this research. At this research with a speed of 60-100 rpm stirring 2-3 minutes with the deposition of 1-3 minutes.

Treatment in a variety of formulas composed of clay and that the decomposition of microbiological contaminants in a high concentration of domestic waste will undergo interaction Colinya MPN / chemical reactions such as absorption and style deposition system with power tie with particles or other substances in solution. Cation exchange reaction, interaction between clay and organic compounds, complex reaction between metal ions and organic and inorganic colloids are additional implications of the electrochemical behavior of soil colloids. The forces responsible for adsorption clays are physical force, hydrogen bonding, electrostatic bonding, coordination and reactions. Physical style of the most important is the Van der Waals force, which is a dipole-dipole interaction short distance. Its role is only important in the close range, because the style of this type decreases dramatically with increasing distance. (Tan, 1992).

In laboratory practice, stirring is an attempt to shorten the distance that the contact between the dipoles. This adsorption will increase with increasing molecular size. The molecules of decomposition of waste (in leachate) still contains many molecules of large size, so it will be more easily adsorbed by Van der Waals forces. The results of the preliminary calculation of the average efficiency rate of effervescent tablets of clay kutai against MPN coliform reduction is the formula A with an average rate of 99.99%, some force that causes adsorption, namely: 1) an action of a non-polar Van der Wall, 2) the formation of hydrogen bonds, 3) ion exchange, and 4) the formation of a covalent bond. Adsorption physics often show adsorption Van Derwall, occurs because the adhesion force between the solute to the adsorbent. The most powerful forces that exist in the adsorption of small molecules of the liquid solution is ion exchange and hydrogen bonding. Adsorption of dissolved substances by a solid adsorbent tend to form hydrogen bonds if one group has a hydrogen bond as a donor and the other as an acceptor

Comparative Effectiveness Clay Kutai In Powder Form With and Without Blend White Cement

Results of comparative effectiveness kutai clay in the form of powder with and without a mixture of white cement, shown in Table 4 below.

Tabel 4. Results Of Comparative Effectiveness Kutai Clay In The Form Of Powder With And Without A Mixture Of White Cement

NO	Formula	Degree of Efectivity
1	Clay Kutai	99,65%
2	Clay Kutai and white cement	99,30%
3	Effervescent tablet of Clay Kutai	99,99%

Results of comparative effectiveness kutai clay in the form of powder with and without a mixture of white cement visible effervescent tablets of clay with the greatest degree of reduction in the level of effectiveness 99.99%

Results of comparative effectiveness kutai clay in the form of powder with and without a mixture of white cement visible effervescent tablets of clay with the largest reduction rate of 99.99% rate of effectiveness. This research is aligned with research Darmayasa (2008) associated with the use of antibacterial material, using Delam Sembung leaf extract was able to inhibit the growth of S. aureus and E. coli bacteria in vitro, demonstrated by the formation of barrier zone around absorbant.

Absorption Van der Wall, occurs because the adhesion force between the solute to the adsorbent. Of the upper powerful forces that exist in the adsorption of small molecules of the liquid solution is ion exchange and hydrogen bonding. Adsorption of dissolved substances by a solid adsorbent tend to form hydrogen bonds if one group has a hydrogen bond as a donor and the other as an acceptor (Yun, YS, Park D., and Volesky B., 2001 and Alberty, W., and Cornowell, 1992) In the Dewi (2009). Zone barriers begin to form in the treatment with the extract

konsenfrasi 10,000 ppm, this diameter tends to have added along with increased concentrations were exposed. Diameterzone a major obstacle at the same concentration obtained in the E. coli bacteria test that is equal to 19 mm, while the smallest are found on the test of S. aureus bacteria. Struktrur and the nature of differences in test bacteria may be a deciding factor for the difference in diameter zone barriers on both test bacteria. At a concentration of 1000 ppm to 5000 ppm have not formed a barrier zone. It is also common in controls. No barrier zone formation at these concentrations may be due to the small concentrations that have not been able to cause physiological changes in the bacterial cell test systems, thus the bacteria are able to grow.

Clay Kutai with the addition of white cement Optimum, in this study with a composition of 75% clay and 25% of white cement is very effective in According Mustika and Rachmat (1993) in Darmayasa (2008) the concentration of a substance that serves as an antimicrobial is one of the determining factors great little ability to inhibit the growth of microbes tested. The formation zone around the obstacles in absorbance disc shows that in Delan Sembung leaf extract contained compounds that act as an antibacterial against S. aureus and E. coli. In accordance with previous studies of this plant also has the ability to inhibit the growth of bacteria and fungi Pseudomonas solanacearumi Phytopthora infestans which is a pathogen in plants.

5. Conclusions and Recommendations

Conclusion

1. Formula elected have properties of clay with clay content of 55.90.
2. Measurement of effervescent tablets of clay with the highest weight of 650 mg and 630 mg lowest weight with an average weight of 640, while the constant diameter of 1.26 cm with an average thickness of 0.45 cm.
3. The test results demonstrate the solubility and pH-soluble fastest time of 1 minute 40 seconds and the longest 1 minute 50 seconds, and the average pH 5.33
4. The level of reduction of effervescent tablets of clay with clay concentration of 10 grams (Formula A), 5 grams

(formula B), and 2.5 grams (formula C) showed a mean reduction coli MPN of> 1100 colonies to 46.3, 486, 7 (formula B) and 320.3 (formula C) with a rate the highest of reduction is the formula A at 99.9%.

5. Comparison of the effectiveness of clay kutai in the form of powder with and without a mixture of white cement visible effervescent tablets of clay with the largest reduction rate of 99.99% rate of effectiveness.

Suggestion

The use of effervescent tablets of clay in a laboratory test is very effective in the reduction of MPN coli even without the addition of white cement and can be developed in the application of appropriate technology in order to reduce microbial pathogens in domestic waste in particular.

6. References

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