International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

http://ijpsat.ijsht-journals.org
Vol. 13 No. 2 March 2019, pp. 261-266

Diversity of Species and Chemicals Elements Contents of Liquide Rumen Bacteria as Fermentor Medicine Herbal with Medical Ecological Approach

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Abstract- **Diversity of species and chemicals elements contents of liquide rumen bacteria as fermentor in the fermentation process of organic fertilizer and liquide herbal skin medicine in March-June 2017..The objectives of this study reveal the bacteria that play an important role in the make up organic fertilizer and multifunctional skin medicine herbals, easily isolated and can be cultured easily and effectively associated with the approach of medical ecology. The methods of this research iare bacterial isolation and culture, species identification and content analysis using XRF Pan Analytical and F1TR for antibiotic test content of Streptomycin. The results are identification of bacteria that have been done in the Laboratory of Microbiology State University of Padang obtained 3 types of bacteria namely Pasteurella spp, Pseudomonas alcaligenes, and Bulkhoideria cepacia. The chemical content of bacterial culture of fermentor consists of the dominant element (% / 100 ppm samples) are Mg 36.58%, P 26.42%, Al 16.41% and Si 10.53%, respectively. Furthermore, the content of antibiotics in 100 ppm samples is 55%. The conclusion of the results of this research are the three types of organic bacteria are non-pathogenic, plays an important role in producing effective organic fertilizer and herbal skin drugs are multifunctional y friendly, effective and easy to make up.**

Keywords — biodiversity, chemicals compound and ecological condition.

I. INTRODUCTION

Cattle, buffalo, goats and sheep are all ruminant mammals that are capable of converting fibrous feed stuff such as hay into meat and milk. They are capable of digesting this fibrous feedstuff from green plant with the help of microorganism growing in their rumen (forestomach). These microorganism anaerobically degrade the feedstuff and to synthesize cellular protein with use energy [1].

Biotechnology science to a viable microorganism describes the compounds into more compounds simple. These microorganisms are known with microorganisms of rumen cow that are have mixed cultures (mixed cells). This according the results of research [2] Diversity of species and chemicals elements contents of liquide rumen bacteria as fermentor in the fermentation process of organic fertilizer and liquide herbal skin medicine .This fermentor effective and stabilize by diversity of species microorganism in

rumen cow.

Ruminant mammalias, such as cattle, buffalo, goats and sheep , are important livestock animals and acquire much of their protein from microbes growing in rumen. These rumen microbes do not use all energy for grow up, but probably direct some energy towards storage like glycogen synthesis, maintenance of body, energy spilling and production of heat . Whereas stored energy (glycogen) can be used later for growth, energy directed towards maintenance and spilling cannot. Energy spilling and maintenance thus depress efficiency of microbial growth, decrease microbial protein available to the ruminant, and cause need for more protein to be fed to ruminants. Although glycogen synthesis, maintenance, and energy spilling have been measured using pure cultures of bacteria, they have not been Rumen bacteria until now, not many researcher can isolated and develop some isolate bacteria from rumen cow for make as fermentor for many products like organic fertilizers, feed fish organic, fish probiotic and bioremidiation and reclamation land after mining exploitation and reuse organic waste for some products .For

produce some product have need halal labelling, it is problem if we are not develop self the fermentor The objectives of this study reveal the bacteria that play an important role in the make up organic fertilizer and multifunctional skin medicine herbals, easily isolated and can be cultured easily and effectively associated with the approach of ecological medicine. The approach of Ecological Medicine Ecological Medicine is a new field of inquiry and action to reconcile the care (traditional and modern medicine) and health of ecosystems, populations, communities, and individuals [3]

II. . MATERIALS AND METHODS

A. Materials

Materials and Methods should emphasize on the procedures and data analysis. For field study, we collect leaf surian (Toona *sinensis*) from Tanah Datar Regency and Pinang leaf from Kota Padang at Balai Gadang Village. he materials used in this study consist of isolated rumen cow fluid [4], aquadest, spritus, 70% alcohol and bayclin for sterilization, NA medium (Nutrien Agar) as bacterial growth medium. Crystal color reagent violet, lugol, 96% ethyl alcohol, and fuchsin color reagent for Gram staining activity.

The tool used in this research consists of beaker glass, petridish, stirrer, erlenmeyer, electric stove, Laminar Air Flow (LAF), wrapping, aluminum foil, cotton, gauze, tissue, analytical scales, knives, paper labels, needle ose , bunsen, autoclave, enkas, and glass objects. Microscopic observation activities use binocular microscopy and macroscopic observations using a stereo microscope.

B. Procedures

1. Samples Preparation

Samples The tools and materials used for the research should be in a sterile state. Sterilization can be done in two ways: wet sterilization and dry sterilization. Wet sterilization is done by washing the tools to be sterilized (beaker glass, test tube, erlenmeyer, etc.), then dried and wrapped with newspaper or HVS paper. The tools have been wrapped in sterilization in an autoclave with a temperature of 121 ° C and pressure of 15 PSI (Per Square Inchi) for ± 15 minutes. Medium that has been made can be sterilized using autoclave. Non-heat-sterilizing devices are sterilized by dry sterilization using 70% alcohol (5]. Sterilization by passing on fire bunsen can also be done for ose needle and dry glass.

a. Making Medium Natrium Agar (NA)

Preparation of perliter media: take NA powder as much as 20 g, put into 1000mL measuring cup, add with sterile distilled water to 1 L. The medium is heated while stirring until homogeneous and boiling, then poured into 250mL Erlenmeyer and sealed with gauze and aluminum foil . The medium was sterilized in an autoclave at 121ºC and 15 PSI for 15 minutes

b. Isolation Rumen Bacteria

The scratch method is used to isolate bacteria from cow rumen. The ose needle prior to use is sterilized by direct heating method of ignition. Ose needles that have been previously dipped in alcohol, chill burn on flame bunsen flame until red, then cooled briefly and then dipped into cow rumen fluid. The next needle and scratch on one side of the NA medium that is on the petri dish. The ose needle is then burned again until it is red, and then used to attenuate the bacterial isolate, which is on the first stroke, using the streak plate technique. Petri dish subsequently incubated at 37 ° C for 2x24 hours.

c. Purification Rumen Bacteria

The purification technique is done after obtaining a single colony with a scratch method (streak plate). Single colonies are moved to the NA slant that has been provided. Tilting is used to store pure cultures [6].

2. Samples Analysis

The materials contents from products fermentation fixed, enter the cuvette XRF and for antibiotics compound and organic compound analysis This analysis was carried on Chemicals Laboratory Mathemayics and Sciences Facult

III. RESULTS AND DISCUSSION

A. Results

Table 1. Diversity species and Pathogenity of Rumen Bacteria as Fermentor

ISOLAT	Species of Bacteria	Type GRAM	PATHOGENITAS
1.	*Achrobacterium antropi*	Gram Negatif	Negatif
2.	*Bacillus subtilis*	Gram positif	Negatif
3.	*Burkhoidera cepacia*	Gram Negatif	Negatif
4.	*Pseudomanonas alcaligenes*	Gram Negatif	Negatif

We found few bacteria Achrobacterium antropilis, Bacillus subtilis, Burkhoidera cepaia, and Pseudomonas alcaligenes. This bacteria category gram negatives and negatives pathogenity. According Table 2. We found eight microelements and these oxide essentials for cow and human life. These elements are Magnesium, Aluminium, Silicone, Phospor, Chlor, Kalium, Calsium and Ferrum. Besides that, we got oxide like Mg O, Al2O3, Si O, PO4, Cl O2, K2O, Ca O and Fe2O

Table 2. Diversity Chemical Element of Liquide Culture Rumen

No.	Elements content	Persentage/100 ppm	Types of Compound	Persentage/100 ppm
1.	Magnesium (Mg)	36,53	Magnesium Oksida	41,12
2.	Aluminium (Al)	16.42	Aluminium Oksida	16,37
3.	Silicon (Si)	10,53	Silicon Oksida	10,74
4.	Fosfat (P)	26,42	Phospat Oksida	26.72
5.	Chlor (Cl)	0.82	Clorida	0.37
6.	Kalium (K)	2,55	Kalium Oksida	1.19
7.	Kalsium (Ca)	6.44	Kalsium Oksida	3.38
8.	Ferrum (Fe)	0.30	Ferro Oksida	0.15

B. Discussion

Diversity species rumen bacteria. We found few bacteria *Achrobacterium antropilis, Bacillus subtilis, Burkhoidera cepaia, and Pseudomonas alcaligenes*. This bacteria category gram-negatives and negatives pathogenity. *O. anthropi*, formerly known as Achromobacter *species* , is a common soil we call alphaproteobacteria that colonizes a wide spectrum of organisms. This bacteria is being increasingly recognized as a potentially give some problems and bacteria opportunistic and nosocomial human pathogen. (Chain, *et al*., 2011 [7] Romero *et al*,. 2004). [8] Though it is extremely rare for it to affect a healthy human, there have been numerous published cases being associated with the presence of indwelling medical devices, such as central venous catheters, drainage tubes, and intraperitoneal catheters. It is also characterized by a broad spectrum of antibiotic resistance Adrian Kettaneh *et al.,* 2003 [9]

Originally named *Vibrio subtilis* in 1835, this organism was renamed *Bacillus* subtilis in 1872. Other names for this bacteria also include *Bacillus uniflagellatus*, *Bacillus globigii*, and *Bacillus natto*. *Bacillus subtilis* bacteria were one of the first bacteria to be studied. These bacteria are a good model for cellular development and differentiation (Entrez Genome Project). *Bacillus subtilis* cells are rod-shaped, Gram-positive bacteria that are naturally found in soil and vegetation. *Bacillus subtilis* grow in the mesophilic temperature range. The optimal temperature is 25-35 degrees Celsius (Entrez Genome Project). Stress and starvation are common in this environment, therefore, *Bacillus subtilis* has evolved a set of strategies that allow survival under these harsh conditions. One strategy, for example, is the formation of stress-resistant endospores. *Bacillus* organisms, isolated by soil sprinkle technique, are responsible for producing antibiotics. The most antibiotic activity was seen in *Bacillus subtilis* MH-4. The most optimal activity occurs at a temperature of 37 degrees Celsius and a basic pH of 8. Glycerol is the optimal carbon source and L-glutamic acid is the optimal source of nitrogen. The antibiotic bacitracin was determined to be

affective on Gram-positive bacteria only (Jamil 2007) [10]. Other antibiotics that *Bacillus subtilis* form are polymyxin, difficidin, subtilin, and mycobacillin. Polymyxin is affective against Gram-negative bacteria, whereas difficidin has a broader spectrum [11].

Burkholderia cepacia complex (BCC), or simply *Burkholderia cepacia*, is a group of catalase-producing, lactose-nonfermenting, Gram-negative bacteria composed of at least 20 different species, including *B. cepacia*, *B. multivorans*, *B. cenocepacia*, *B. vietnamiensis*, *B. stabilis*, *B. ambifaria*, *B. dolosa*, *B. anthina*, *B. pyrrocinia* and *B. ubonensis*.[1] *B. cepacia* is an opportunistic human pathogen that most often causes pneumonia in immunocompromised individuals with underlying lung disease (such as cystic fibrosis or chronic granulomatous disease).[2] Patients with sickle-cell haemoglobinopathies are also at risk. The species also attacks young onion and tobacco plants, as well as displaying a remarkable ability to digest oil. *Burkholderia cepacia* is an aerobic gram-negative bacillus found in various aquatic environments. *B cepacia* is an organism of low virulence and is a frequent colonizer of fluids used in the hospital (eg, irrigation solutions, intravenous fluids).

B cepacia rarely causes infection in healthy hosts. Based on phenotypic and genotypic analyses, *B cepacia* is divided into 9 genomovars that constitute the *B cepacia* complex (BCC). *Pseudomonas* alcaligenes is a Gram-negative aerobic rod belonging to the bacterial family *Pseudomonadaceae* and is a common inhabitant of soil and water. A recent study showed that *P. alcaligenes* is useful as a microbial inoculant for the biodegradation of toxic polycyclic aromatic hydrocarbons (1). *P. alcaligenes* has also been known as a rare opportunistic human pathogen 12] Based on 16S rRNA gene sequence analysis, *P. alcaligenes* was classified in the *Pseudomonas aeruginosa* group (Vandamme et al., 2001)[13]. However, little is known about the clinical importance of *P. alcaligenes* and its virulence factors, mainly because of the difficulties in identifying and distinguishing this bacterium from closely related *Pseudomonas* species in medical settings..

Diversity elements.

The general function of minerals and trace elements can be summarised as follows: Minerals are essential constituents of skeletal structures such as bones and teeth. Minerals play a key role in the maintenance of osmotic pressure, and thus regulate the exchange of water and solutes within the animal body. Minerals serve as structural constituents of soft tissues Minerals are essential for the transmission of nerve impulses and muscle contraction. Minerals play a vital role in the acid-base equilibrium of the body, and thus regulate the pH of the blood and other body fluids.

Minerals serve as essential components of many enzymes, vitamins, hormones, and respiratory pigments, or as cofactors in metabolism, catalysts and enzyme activators.Magnesium is an essential component of bone, cartilage and the crustacean exoskeleton. Magnesium is an activator of several key enzyme systems, including kinases, (ie. enzymes that catalyse the transfer of the terminal phosphate of ATP to sugar or other acceptors), mutases (transphosphorylation reactions), muscle ATPases, and the enzymes cholinesterase, alkaline phosphatase, enolase, isocitric dehydrogenase, arginase (magnesium is a component of the arginase molecule), deoxyribonuclease, and glutaminase. [14] Biological function: The principal biological functions of phosphorus may be summarized as follows; Phosphorus is an essential component of bone, cartilage and the crustacean exoskeleton.Phosphorus is an essential component of phospholipids, nucleic acids, phosphoproteins (casein), high energy phosphate esters (ATP), hexose phosphates, creatine phosphate, and several key enzymes. Biological function: Sodium, potassium, and chlorine occur almost entirely in the fluids and soft tissues of the body, sodium and chlorine being found mainly in the body fluids, and potassium occuring mainly in the cells. They serve a vital function in controlling osmotic pressures and acid-base equilibrium. They also play important roles in water metabolism.Sodium is the main monovalent ion of extracellular fluids; sodium ions constituting 93% of the ions (bases) found in the blood stream. Although the principal role of sodium in the animal is connected with the regulation of osmotic pressure and the maintenance of acid-base balance, sodium also has an effect on muscle irritability, and plays a specific role in the absorption of carbohydrate.

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pressure and the maintenance of acid-base balance, sodium also has an effect on muscle irritability, and plays a specific role in the absorption of carbohydrate. Potassium is the major cation of intracellular fluid, and regulates intracellular osmotic pressue and acid-base balance. Like sodium, potassium has a stimulating effect on muscle irritability. Potassium is also required for glycogen and protein sysnthesis, and the metabolic breakdown of glucose.

Chlorine is the main monovalent anion of extracellular fluids; chlorine ions constituting about 65% of the total anions of blood plasma and other extracellular fluids within the body (ie. gastric juice). Chlorine is therefore essential for the regulation of osmotic pressue and acid-base balance. Chlorine also plays a specific role in the transport of oxygen and carbon dioxide in the blood, and the maintenance of digestive juice pH.

IV. CONCLUSION

These isolats are potentials for functions as fermentor The chemicals elemnet from ten isolats from this research have many essentials element important for produce some products like skin medicine and another organic herbals medicine

ACKNOWLEDGEMENTS

Special thank for Rector UNP, Director Graduate Programme UNP and Chairman LP2M UNP give oppurtunity and appreciation my research and supported my publication in journals and financial support for the work must be fully acknowledged

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