

The Effect of Tahnik Dates and Lactic Acid Bacteria from Asi on Inhibition of Escherichia Coli Bacteria in

Putri California

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ABSTRACT

This research was conducted to determine whether LAB from breast milk and Tahnik dates can synergize in inhibiting *E. coli* and have the ability to better than if BAL from ASI works alone. The method used was experimental to determine antibacterial activity by using antagonism test. LAB and Dates Tahnik and *E. coli* were inoculated into *Escherichia coli* Agar media which is a specific medium for the growth of *E. coli*. The combination of Tahnik dates with LAB from breast milk showed about 25% better results when compared to treatments that only used BAL from breast milk in inhibiting bacteria *E.coli*. Dates that were cultivated also show ed inhibitory power against *E. coli* about 4 times better than unhulled dates. Therefore, it can be concluded that breastfeeding for newborns accompanied by the implementation of Sunnah Tahnik with dates has better benefits for the health of the baby (especially as an antibacterial agent), when compared to breastfeeding alone.

Keywords: Exclusive Breastfeeding, Lactic Acid Bacteria, Dates, Tahnik.

INTRODUCTION

Nowadays, there are many studies stating that exclusive breastfeeding during the first 6 months of birth has a positive impact on the growth and development of babies. Exclusive breastfeeding is breastfeeding without any liquid or solid food (not even water is allowed), with the exception of rehydration fluids, or vitamins in the form of drops or syrups, minerals or drugs when needed, up to the age of months (*World Health Organization*, 2001) . Exclusive breastfeeding is known to prevent obesity (Monasta, 2010), reduce the risk of high blood pressure in adulthood and reduce the risk of diabetes mellitus types 1 and 2 (Ip, 2007), prevent gastrointestinal and respiratory tract infections (Dujits, 2009), optimize nerve development and baby intelligence (Oddy, 2011), prevents celiac disease (*European Food Safety Authority*, 2009) and prevents intestinal inflammation (Hörnell, 2013).

Research on breast milk content conducted by Nuraida (2007) shows that there are Lactic Acid Bacteria (LAB) in breast milk. These bacteria have potential as probiotics which have resistance to stomach acid and bile salts. Lactic acid bacteria are able to inhibit the growth of pathogenic bacteria by producing lactic acid and acetic acid which

can lower the pH of the intestine so that it is not suitable for the growth of bacteria. In addition, LAB is also able to maintain the balance of the intestinal microflora and produce anti-microbial substances in the form of bacteriocins (Setianingsih, 2010).

If we look at it from an Islamic point of view, there are different perceptions about the concept of exclusive breastfeeding. Several authentic hadiths state that *Rasulullah Sallallahu 'alayhi wa Sallam* exemplifies the Sunnah of Tahnik for babies new born. Al-Asqolani (1959) in the book *Fathul Bari* wrote a quote from the hadith narrated by Al-Bukhari from Anas bin Malik *Radhiyallahu'anhu*, namely: "I went with Abdullah bin Abi Talha to *Rasulullah Sallallahu 'alayhi wa Sallam* when he was just born. I went to the Prophet *sallallahu 'alayhi wa sallam* who was painting a camel with tar. He said to me "Are there dates with you?". I replied, "Yes (there is)". He then took some dates and put them in his mouth, then chewed them until they were crushed. Then he raw, by inserting the remaining dates in his mouth into the baby's mouth, then the baby began to move the tip of his tongue (tasting these dates). Seeing that *Rasulullah Shallallahu 'alayhi wa sallam* said, "The Ansar people's favorite is dates". Then he named him Abdullah ". Al-Asqolani also said that Rawnik is better done with dry dates (tamr), if it is not easy to get dry dates (tamr), then with wet dates (ruthab) ". The

wisdom of the highly recommended sunnah tahnik is using dates and not with ingredients. others have been strengthened by studies that show the benefits of the content of dates. Some of them are the research of Saleh and Otaibi (2013) which shows that date palm extract has potential as an antimicrobial against pathogenic bacteria, and has a more significant inhibitory activity against Gram positive bacteria. namely *Listeria monocytogenes* and *Staphylococcus saprophyticus* compared with inhibitory activity of Gram negative bacteria such as *Escherichia coli*, *Pseudomonas aeruginosa* and *Salmonella enterica*. In contrast to research Mahmood (2012) who showed that methanol extract of dates is effective in inhibiting the growth of *E. coli*.

THEORETIC

Exclusive

Breast Milk (ASI) is an emulsion of fat in a solution of protein, lactose, and inorganic salts secreted by the mother's mammary glands and is useful as food for her baby (Siregar, 2004). Breast milk contains high quality nutrients which are useful for

the growth and development of children's intelligence. The nutritional content found in breast milk includes taurine, DHA, AA, immunoglobulin A (IgA), lactoferrin, lysozyme, and bifidus factors in addition to the main nutrients, namely lactose, fat, oligosaccharides, and protein (Shin et al., 2004). At birth until several months afterward, the baby is not able to form its own immunity completely. Breast milk provides immune substances that the baby cannot yet make, so a baby who is fed breast milk gets sick less often, especially early in life. The many anti-infectious components in breast milk will protect the baby from various kinds of infections, both those caused by bacteria, viruses, and other antigens.

Lactic Acid Bacteria in Breast Milk

Lactic Acid Bacteria are often found naturally in food and are also known to be present in breast milk (ASI). Colostrum is milk that comes out from the first day of the mother who gives birth to the seventh day (it could also be up to the 10th day). In this colostrum, there are a lot of nutrients that are needed by babies, one of which is the bifidus factor, which is a type of carbohydrate that contains nitrogen and can support the growth of bacteria *Lactobacillus bifidus* (Cox, 2006). According to Salminen et al. (2004), found a strain of *Bifidobacterium bifidum* (which later became known as *L. bifidus*) in breast milk, particularly due to the presence of N-acetylglucosamine. In breast milk there are also glycoproteins which can also increase the growth of LAB. In addition, breast milk also contains lactoferrin, which is a protein that binds to iron. By binding to iron, lactoferrin can support the growth of LAB and inhibit the growth of certain bacteria, such as *Staphylococcus aureus* and *Escherichia coli*.

Characteristics of Lactic Acid

Bacteria Lactic acid bacteria are physiologically classified as Gram positive bacteria which consists of a relatively thick peptidoglycan layer while Gram negative has an outer layer in the form of lipopolysaccharide, which is a thinner peptidoglycan layer. These bacteria are in the form of cocci or stems that do not form spores, and can ferment carbohydrates to produce lactic acid, are catalase negative, do not have cytochromes, are facultative anaerobic, require sufficient nutrition (*fastidious*), resistant to acids (*acid tolerant*), not motile or little motile, microaerophilic to anaerobic, and mesophilic or optimal at 10-40°C. LAB is often associated with habitats that contain many nutrients such as various food products (milk, meat, drinks, vegetables), but some

of them are also normal flora in the mouth and intestines of mammals (Setianingsih, 2010).

Metabolism of Lactic Acid Bacteria Lactic acid

bacteria do not have an electron transport mechanism and cytochromes so that they cannot carry out respiration and their metabolism depends on the phosphorylation of the substrate to produce energy (Salminen et al., 2004). Lactic acid bacteria are generally divided into two groups, homofermentative and heterofermentative. The homofermentative group only produces a single product, namely lactic acid during the sugar fermentation process, while the heterofermentative group can form ethanol, diacetyl, formate, acetoin, acetic acid, carbon dioxide together with a large amount of lactic acid (John et al., 2007).

Sunnah Tahnik

Ibn Hajar Al-Asqolani (1959) explains the meaning of tahnik, "Tahnik is chewing something then putting or putting it in the baby's mouth and then rubbing it against the roof of the mouth. This is done in order for the baby to be trained in food, as well as to strengthen it.

The guidelines for the sunnah tahnik are described in several authentic hadiths, including narrated by Al Bukhari from Abu Burdah from Abu Musa, he said, "I was blessed with a son, then I brought him before the Prophet *sallallaahu. 'alayhi wa sallam*, then he gave him the name Ibrahim and the technique with a date (tamr)" (Al-Asqolani, 1959).

Dates

Dates are the fruit of a plant from the family *Arecaceae* that has seeds with one institution (monocot) (Rahmadi, 2010). Dates contain 70% carbohydrates, therefore this fruit is a high source of energy and 100 g of the pulp can provide 314 kcal of energy (Baliga et al., 2011).

METHOD

This research is an experimental method which aims to compare the ability of the combination of LAB from breast milk and dates of Tahnik with the original LAB. Breast milk alone is used in the inhibition of *E. coli*. The research design used in this study was a completely randomized design (CRD) with 6 treatments and 2 replications.

Antibacterial activity testing was carried out in 3 stages, namely the antagonism test, the contact test for lactic acid bacteria and the total plate. Count (TPC) after the antagonism test The antagonism test was carried out on pathogenic bacteria, namely *Escherichia coli* and was carried out by using the the method *Broth Dilution* (Chen et al., 2012). The test was carried out by mixing 1 ml of LAB culture in the phase *midlog* with a concentration of 10^6 cells / ml and 1 gram of tahnik dates with 1 ml of culture *Escherichia coli* in the phase *midlog* with a concentration of 10^6 cells / ml in 20 ml of *Nutrient Broth* then shaking for 24 hours .

RESULT

Isolation and Morphological Observation Results of Lactic Acid Bacteria from ASI

Isolated Lactic Acid Bacteria (LAB) from breast milk that has been aseptically donated from 5 donor mothers obtained by inoculating 1 ml of breast milk into 50 MRS media *broth*. This is done so that the obtained isolates are specifically selected, because MRS media is a specific medium for the growth of lactic acid bacteria (Safitri et al., 2016). In addition, this method is also carried out to enrich LAB so that isolates can be obtained optimally. According to Ibrahim (2015), the macroscopic identification of Lactic Acid Bacteria shows results in the form of isolates that have a milky white color, round shape, edge *entire*, smooth surface and convex elevation, these characteristics are in accordance with the results of observations of the morphology of LAB colonies in all breast milk samples. in this research. LAB isolates that will be used as test bacteria are isolates from the E ASI sample, because if the LAB isolates from sample E are observed, the number of colonies produced is more than the other 4 samples, even though the total is more than 300 colonies.

Growth of Lactic Acid Bacteria from Breast Milk The

growth of LAB can be determined by measuring the cell mass using the turbidimetric method, which is a measurement based on the turbidity of culture with a spectrophotometer at a wavelength of 660 nm. This stage is carried out by culturing LAB into Nutrient Broth (NB) media and incubating it, then the *optical density* of the culture is observed every 1 hour for 24 hours, so that at the end of the observation a growth curve will be obtained. Growth curve stages are carried out to determine the time it takes for LAB to reach the phase *midlog*.

Antagonism

The antagonism test was carried out to see the interaction between the 6 tested treatments (BAL + KT, BAL + KNT, LAB, KT, KNT and AL) against the *Escherichia coli* bacteria in order to know which treatment was the most effective in inhibiting the growth of *E. coli*. The antagonism test was carried out in Nutrient Broth media because the media is a growth medium for organisms that have a wide range of bacterial species, so that it can be a good growth medium for all bacteria related to this study. This test is carried out by inoculating LAB and *Escherichia coli* when the two bacteria are in the irphase *midlog*, so that the two bacteria are in the most optimum conditions where in that phase the bacterial cells divide rapidly and the production of bacteriocins increases in line with increase in bacterial cells can run optimally.

Results of Lactic Acid Bacteria Contact Test (LAB)

The contact test was carried out as a supporting test to determine whether LAB remained until the end of the antagonism test, because it was feared that there were factors that made LAB not regenerate properly, one of which was the lack of growing media at the time. -The end of testing because it has been used in conjunction with *Escherichia coli* and other bacteria from saliva. Therefore, each culture with 6 different treatments was tested by inoculating 0.1 ml of culture into 6 petri dishes containing MRS agar medium which is a specific medium for LAB growth. The inoculation results were then calculated using the Total Plate Count method.

CONCLUSION

The combination of Tahnik dates with LAB from breast milk showed about 25% better results when compared to treatment that only used BAL from breast milk in inhibiting bacteria *E. coli*. Dates that were cultivated also show edinhibitory power against *E. coli* about 4 times bettert han unhulled dates. Therefore, it can be concluded that breastfeeding for newborns accompanied by the implementation of Sunnah Tahnik with dates has better benefits for the health of the baby (especially as an antibacterial agent), when compared to breastfeeding alone.

REFERENCES

Al-Asqolani, I. H. 1959. *Fathul Baari*. Beirut: Darul Ma'rifah. 9: 558.

- Al-Daihan, S., Bhat, S. 2012. Antibacterial Activities of Extracts of Leaf Fruit, Seed and Bark of *Phoenix dactylifera*. *African Journal of Biotechnology*. 11: 10021-10025.
- Al Farsi, M. A. dan Lee, C. Y. 2008. Nutritional and Functional Properties of Dates: a Review. *Critical Reviews in Food Science and Nutrition*. 48: 877-887.
- Ajizah, A. 2004. Sensitivitas *Salmonella typhimurium* Terhadap Ekstrak daun Jambu Biji (*Psidium guajava* L.). *Bioscientia Universitas Lambung Mangkurat*. 1(1).
- Baliga, M. S., Baliga, B. R. V., Kandathil, S. M., Bhat, H. P., & Vayalil, P. K. 2011. A review of the chemistry and pharmacology of the date fruits (*Phoenix dactylifera* L.). *Food Research International*. 44(7): 1812-1822.
- Chen, L. J., Tsai, H. T., Chen, W. J., Hsieh, C. Y., Wang, P. C., Chen, C. S., Yang, C. C. 2012. In Vitro Antagonistic Growth Effects of *Lactobacillus fermentum* and *Lactobacillus salivarius* and their Fermentative Broth on Periodontal Pathogens. *Brazilian Journal of Microbiology*. 43(4): 1376-1384.
- Cowan, M. M. 1999. Plant products as antimicrobial agents. *Journal of Clinical Microbiology*. 12: 564.
- Cox, SG. 2006. Expressing and Storing Colostrum Antenatally for Use in The Newborn Period. *Breastfeeding Review*. 14(3).
- Duijts L, Ramadhani M.K., Moll H.A. 2009. Breastfeeding Protects Against Infectious Diseases During Infancy in Industrialized Countries. *Maternal and Child Nutrition Journal*. 5: 199-210.
- EFSA Panel on Dietetic Products Nutrition and Allergies. 2009. Scientific Opinion on the appropriate age for introduction of complementary feeding of infants. *EFSA Journal*. 7: 38.
- Fábián TK, Hermann P, Beck A, Fejérdy P, Fábián G. 2012. Salivary Defense Proteins: Their Network and Role in Innate and Acquired Oral Immunity. *International Journal of Molecular Science*. 13(4):4295–4320.
- Habib, H. M. dan Ibrahim, W. H. 2009. Nutritional Quality Evaluation of Eighteen Date Pit varieties. *International Journal of Food Sciences and Nutrition*. 60: 99-111.
- Hasibuan, Sawarni. 2013. Karakteristik Fisikokimia dan Antibakteri Hasil Purifikasi Minyak Biji Nyamplung (*Calophyllum inophyllum* L.). *Jurnal Agritech*. 33(3): 311-319.
- Ibrahim A, Fridayanti A, Delvia F. 2015. Isolasi dan Identifikasi Bakteri Asam Laktat (BAL) dari Buah Mangga. *Jurnal Ilmiah Manuntung*. 1(2):159-163.
- Ip S, Chung M, Raman G, Chew P, Magula N, DeVine D. 2007. Breastfeeding and Maternal and Infant Health Outcomes in Developed Countries. *Medline Journal*.
- Jauhari, L. T. 2010. Seleksi dan Identifikasi Kapang Endofit Penghasil Antimikroba Penghambat Pertumbuhan Mikroba Patogen. *Skripsi. Departemen Biologi Fakultas Sains dan Teknologi. UIN. Jakarta*.
- John, R. P., Nampoothiri, K. M., & Pandey, A. 2007. Fermentative production of lactic acid from biomass: an overview on process developments and future perspectives. *Applied Microbiology and Biotechnology*. 74(3): 524-534.
- Kusuma, S.A.F. 2010. *Escherichia coli*. Fakultas Farmasi Universitas Padjajaran: Bandung.
- Kusmiati dan Malik, Amarili. 2002. Aktivitas Bakteriosin dari Bakteri *Leuconostoc mesenteroides* Pbac1 pada Berbagai Media. *Jurnal Makara Kesehatan*. 6(1).
- McGee, Harold. 2004. *On Food and Cooking*. New York. 714

- Monasta L., Batty G.D., Cattaneo A, Lutje V, Ronfani L, Van Lenthe F.J. 2010. Early-Life Determinants of Overweight and Obesity: a Review of Systematic Reviews. *Obesity Review*. 11: 695–708.
- Muslim. 2000. *The Translation of the Meanings of Summarized, Sahih Muslim*. Darussalam: Riyadh.
- Nawawi, I. 1972. *Syarh Muslim*. Beirut: Dar Ihya' At Turost. 14: 124.
- Nuraida, L. dkk. 2007. Evaluation of Probiotics Properties of Lactic Acid Bacteria Isolated From Breast Milk and Their Potency As Starter Culture. *International Journal of Food, Nutrition and Public Health*. 5(1):33-60.