Effects of Jackfruit (*Artocarpus heterophyllus*) Root Extract against Escherichia Coli

Cadwising, Jhaniela B.
Dep-as, Daryl Ann C.
Guay, Ruth H.
Catapang, Mary Rose B.

Benguet State University, La Trinidad, Benguet.

Keywords: Jackfruit, Artocarpus heterophyllus, root extract, escherichia coli

Abstract

The study aimed to determine the effect of jackfruit root extract against the bacteria E. coli. Specifically, it aimed (1) to determine the phytochemical components of jackfruit root that have antibacterial properties and (2) to determine the effect of the four different concentrations of jackfruit root extract (100%, 75%, 50%, 25%) and sulfamethoxazole+trimethoprim (Cotrimoxazole) 400 mg/80 mg in controlling the growth of E. coli bacteria. Moreover, this study is designed to determine if there is a significant difference between the different treatment levels in controlling the growth of E. coli.

The study was conducted at the Microbiology Laboratory of the CAS, BSU. The experimental research design was used. The effects of jackfruit root extracts were tested at four different concentrations. In the experiment, three E. coli-cultured agar plates were used for each treatment. The agar plates applied with different treatments, 100%, 75%, 50%, 25% jackfruit root extract concentrations and the control treatment, sulfamethoxacole+trimethoprim 400 mg/80 mg. Completely Randomized Design (CRD) and Analysis of Variance (ANOVA) were used for the statistical treatment.

Results showed that there are phytochemical components of jackfruit root that have antibacterial effects. These are the alkaloids, tannins, flavonoids, and saponins. Furthermore, there is a highly significant difference in the effects of the five treatments being studied. The 50% concentration of jackfruit root extract was the most effective followed by the control treatment.

It was concluded that the jackfruit roots have antimicrobial effect against E. coli. The treatment consisting of 50% jackfruit root extract concentration is more effective than the control, sulfamethoxacole+trimethoprim.

With the conclusions derived from the study, the researches recommend for future researchers to conduct further studies using other kinds of bacteria and compare the effects of jackfruit root extracts accordingly; to use other antibiotic drugs; to use other methods of extraction such as methanol extraction, steam distillation, and solvent extraction; to conduct further studies utilizing other parts of the jackfruit such as the seeds, bark, and leaves; and to conduct similar studies to validate the findings.

Conclusions

1. Alkaloids, tannins, flavonoids are the components of jackfruit roots that have activity.
2. The 50% concentration of jackfruit root extract was the most effective followed by the treatment.

Recommendations

With the conclusions derived from the study, the following recommendations are proposed for considerations in future researches on this subject.

1. Use other kinds of bacteria and compare the effects of jackfruit root extracts accordingly.
2. Use other antibiotic drugs.
3. Use other methods of extraction such as methanol extraction, steam distillation or solvent extraction.
4. Use other parts of the jackfruit such as leaves and the fruit.
5. Similar studies should be conducted to validate the findings.

Bibliography

A. Books

Banaken, G.L. (2009). Antimicrobial Property of Selected Plants Found in La Trinidad, Benguet.

Deglin, J., Vallerand, A. (2005). Davis Drug Guide for Nurses. 9th Edition. Philadelphia: F.A. Davis Company pp 1058-1059

Kozier, B., Erb, G., Berman, A., Synder, S. (2004). Fundamentals of Nursing: Concepts, Process and Practice. Pearson Education Inc., 8th Edition. Pp 171-172

McClave, J., Sincich. (2003). Statistics, 9th Edition. Prentice Hall, Upper Saddle River, New Jersey.

Lippincott W. (2007) Drug Handbook.

Quimsumbing, E. (1998). Medicinal Plants of the Philippines.

Smeltzer, S., Bare, B. (2004). Brunner and Suddarth's Medical and Surgical Nursing. 10th Edition. p 2129.

Tortora, G., Funke, B., Case, C. (1992). *Microbiology: An Introduction* (4th ed.) Benjamin/ Cummings Publishing Company, Inc.

Udan, J. (2004). *Mastering Fundamentals of Nursing: Concepts and Clinical Application*. Educational Pub. House.

B. Journals/ Articles

Borris R.P. (1996). Natural Products Research: Perspectives from a Major Pharmaceutical Company. J Ethnopharmacol.

Dixon R.A., Dey, P.M., Lamb, C.J. (1983) Phytoalexins: Enzymology and Molecular Biology. Adv. Enzymol (PubMed)

Ghoshal, S., Krishna P.B.N., Lakshmi V. (1996). Antiamoebic Activity of *Piper longum* fruits againts *Entamoeba histolytica* in vitro and in vivo. Ethnopharmacol.

Haslam E., (1996). Natural Polyphenols (vegetable tannins) as Drugs: Possible Modes of Action. J Nat Product.

Jones, G.A., McAllister, T.A., Muir, A.D., Cheng, K.J. (1994). Effects of Sainfoil (*Onobrychis viciifolia* scop.) Condensed Tannins on Growth and Proteolysis by Four Strains of Ruminal Bacteria. Appl Environ Microbial.

Moerman, D.E. (1996). An Analysis of the Food Plants and Drug Plants of Native North America. J Ethnopharmacol.

Hostettmann, K., Marston, A. (1995). *Saponins*. Cambridge: Cambridge University Press.

Scalbert, A. (1991)., Antimicrobial Properties of Tannins. Phytochemistry.

Schultes, R.E. (1978). The Kingdom of Plants. In: Thomson W A R, editor. Medicines from the Earth. New York, N.Y: McGraw-Hill Book Co.

Tsuchiya, H., Sato, M., Miyazaki, t., Fujiwara, S., Tanigaki, S., Ohyama, M., Tanaka, T., Iinuma, M. (1996). Comparative Study on the Antibacterial Activity of Phytochemical Flavanones against Methicillin-resistant *Staphylococcus aureus*. J Ethnopharmacol.

Wei, Bah-Luh Jing-Ru Weng et al/ J. Agric. Food Chem., (2005). Anti-inflammatory Flavonoids from Artocaarpus heterophyllus and Artocarpus communis.

C. Websites

Achindra Online Marketing Pvt. Ltd (2011). Benefits of Jackfruit from http://www.justeat.in/articles/fruits/benefits-of-jackfruit/view/33.

Crane J., Balerdi, C.F., Maguire, I. (2012). Components of Jackfruit. http:// www.edis.ifas.ufl.edu/mg370 retrieved on September 21, 2012

Fruitsinfo. (2004). Jackfruit. http://www.fruitsinfo.com/Jackfruit.php.

Hagerman, A. (1998). Tannins. http://chemistry.muohio.edu/hagerman.

Morton, Julia. (1987). Uses of Jackfruit from http://www.hort.purdue.edu/newcrop/morton/jackfruit_ars.html.

Myres, C. (2012). Escherichia Coli infection. http://article.wn.com/view/2012/07/28/ .

Stuart, G. (2012). Researches on Jackfruit.
http://www.stuartxchange.org/Langka.html. Retrieved on September 16, 2012.

Worldwide realtors Company Limited. (2001). Jackfruit roots.
http://www.getjamaica.com.Jackfruit. Retrieved on September 16, 2012.

Zhang, Xiaorui. (2011). Traditional Medicines.
http://libdoc.who.int/publications/2004/924152214_eng.pdf

Effects of Jackfruit (Artocarpus heterophyllus) Root Extract on Escherichia coli|
Cadwising, Jhaniela B., Dep-As, Daryl Ann C., Guay, Ruth H., Catapang, Mary Rose B. March 2013.

