



PROCEEDING

Food Globalization:
**New Technology in
An Era of *Change***

The **10**th 
National Student Conference
on food science & technology

Soegijapranata Catholic University
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Proceedings

The 10th National Student Conference

**Food Globalization : New Technology in An
Era of Change**

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Preface 10th NSC – “Food Globalization: New Technology in An Era of Change”

This is a proceeding of the 10th National Student Conference on Food Science and Technology done by Food Technology Department, Soegijapranata Catholic University. Seeing that this conference is organized by only the students of the faculty, ten consecutive years of performance deserves quite praise. Thanks to their powerful motivation and energy, this event can be held in routine without skipping a single year.

In this year conference we focused on the development of food in globalization era. As we know it, since globalization has begun there has been lots of changes in many sectors of life including food. On the bright side, it can be seen that globalization has made food become highly varied, more “functional”, and somewhat safer by using new material, more sophisticated technology, or even change the food source’s genetic structure. Although there are a lot of advantages in the era of food globalization, there will be many risks that make people have to be aware in consuming the foods.

The conference was specifically designed to discuss all of these matters, where students of food technology department can share their research and opinion. This proceeding covers two sections of paper that are papers of the keynote speakers and also from the presenters. There are six platform themes that were used: *Food Product Development, Food Quality and Safety, Food Management and Business, Food Engineering, Food Microbiology & Biotechnology* and *Functional Food*. With the ongoing changes in food related to the current globalization, I am quite sure there will be more topics that can be discussed in other student’s conferences or academic communities.

Semarang, January 7, 2010

Alberta Rika Pratiwi
Chairman of the Steering Committee

THE SECRET OF “LEUNCA” FRUIT (*Solanum Nigrum L.*)

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ABSTRACT

“Leunca” fruit (*Solanum nigrum L.*) is produced by wild and un-domesticated plant, belongs to family of *Solanaceae*, and is popular in Javanese traditional dishes. In comparison with other *Solanaceae*, the plant has some secrets both for its growth and the utilization of the fruit. While other species of *Solanaceae* family plants are mostly sensitive to pest and disease, this plants are found widely in most area of Java, from 1 m Above Sea Level (ASL) up to 2000 m ASL, from well cultivated rice field up to the rocky soils of volcanic river, and is available all year round. In Javanese dishes “leunca” can be consumed freshly (locally called as “lalapan”), half cook, and cook. The fruit contains some alkaloid, saponen, and tannin. The alkaloid has long been believed as a natural anticeptic, whereas tannin and saponen have been proven as effective compounds to stabilize blood pressure. These last two compounds also usefull to stimulate appetite. However, the peel of the fruit contains some antocyadin, which are allergic acid, and also contain a toxic acid of cyanidin. The last two compounds are resulting in the sour taste and are aromatic compounds, which are sensitive to high temperature. Therefore the toxic of these two compounds, can be easily denaturated by soaking in hot water of about 60°C for 1 - 2 minutes. Furthermore for consumers who prefer to consume the fruit in fresh condition, it will be wise if the consumption is not conducted everyday at an appropriate amount. Intensive investigation is needed to define the toxic level of fresh leunca consumption at daily basis.

Keywords : *Leunca, Solanum Nigrum L.s, alkaloid, saponen, tannin, antosiadin*

INTRODUCTION

Leunca fruits is a wild and un-domesticated plant which growth in most area of Java. Most Javanese people like to consumed this fruits freshly half-cook, or cook. Javanese said that leunca fruit has specific taste like a sour taste. This taste which make leunca fruits is popular in Javanese, but the sour

taste is produce by aromatic compound as toxic. The toxic is saponin group which use to antiseptic. This toxic will denaturated by soaking in hot water, because the aromatic compound easily breakdown with high temperature. Alkaloids are a group of naturally occurring chemical compounds which mostly contain basic nitrogen atoms. This group also includes some related

compounds with neutral and even weakly acidic properties. Also some synthetic compounds of similar structure are attributed to alkaloids. Beside carbon, hydrogen and nitrogen, molecules of alkaloids may contain sulfur and rarely chlorine, bromine or phosphorus. Most alkaloids have a bitter flavor. It is believed that plants evolved the ability to produce these bitter substances, many of which are poisonous, in order to protect themselves from animals; however, animals in turn evolved the ability to detoxify alkaloids.

Saponin is a class of chemical compounds, one of many secondary metabolites found in natural sources, with saponins found in particular abundance in various plant species. The number of saccharide chains attached to the sapogenin/aglycone core can vary – giving rise to another dimension of nomenclature (monodesmosidic, bidesmosidic, etc.) – as can the length of each chain. Aglycone derivatives can also incorporate nitrogen, so that some saponins also present chemical and pharmacologic characteristics of alkaloid natural products. In plants, saponins may serve as anti-feedants and to protect the plant against microbes and fungi. Saponins, which readily dissolve in water. Tannin (a vegetable tannin, as opposed to a modern synthetic tannin) is an astringent, bitter plant polyphenolic compound that either binds and precipitates or shrinks proteins

and various other organic compounds including amino acids and alkaloids. In sensitive individuals, a large intake of tannins may cause bowel irritation, kidney irritation, liver damage, irritation of the stomach and gastrointestinal pain.

Anthocyanidins are common plant pigments. They are the sugar-free counterparts of anthocyanins based on the flavylium ion or 2-phenylchromenylium(chromenylium is referred also to as benzopyrylium). They form a large group of polymethine dye. In particular anthocyanidins are salt derivatives of the 2-phenylchromenylium cation, also known as flavylium cation. Cyanidin is a natural organic compound. It is a particular type of anthocyanidin (not to be confused with anthocyanins which are glycosides of anthocyanidins). It is a pigment found in many red berries including but not limited to grapes, bilberry, blackberry, blueberry, cherry, cranberry, elderberry, hawthorn, loganberry, acai berry, and raspberry. It can also be found in other fruits such as apples and plums. It is also found in red cabbage and red onion. It has a characteristic reddish-orange color, though this can change with pH; solutions of the compound are red at $\text{pH} < 3$, violet at $\text{pH} 7-8$, and blue at $\text{pH} > 11$. The highest concentrations of cyanidin are found both in the skin of the fruit of leuncha.

Allergic acid is a polyphenol antioxidant found in numerous fruits and vegetables including blackberries, raspberries, strawberries, cranberries, walnuts, pecans, pomegranates, wolfberry, and other plant foods. The antiproliferative and antioxidant properties of allergic acid have spurred preliminary research into the potential health benefits of allergic acid consumption. These properties have generated interest in potential human health benefits from the consumption of allergic acid. However, very little study of these proposed benefits has been reported as of 2010. A small randomized controlled trial involving 19 patients with carotid artery stenosis found that pomegranate juice, which is high in allergic acid, appeared to reduce blood pressure and carotid artery wall thickness. A 2005 controlled study of 48 patients undergoing chemotherapy for prostate cancer found that allergic acid supplementation reduced the rate of chemotherapy-associated neutropenia (though there were no cases of severe neutropenia in either the allergic acid or control group). Allergic acid supplementation did not improve overall or progression-free survival of patients with prostate cancer in this trial.

METHODOLOGY

Our research for this paper included field survey, literature searching and web survey.

The survey was made in a Central Java town of Purwokerto, where leuncha is widely consumed by people. The field survey was made by interviewing leuncha consumers on their consumption habit. We get literature searching and web survey from internet. We use the literature particularly journal and scientific articles. The study was focused on a qualitative study, to find out the consumption behavior of leuncha consumers.

The consumption behavior were made to delight consumers in consuming leuncha, the frequency of consumption in a month and the amount leuncha consumed each time consumption. The preferences of leuncha consumers in consuming in the form of raw or cooked, were also examined qualitatively. All the results of field studies of the leuncha consumers were further analyzed, based on a literature study.

Review of the literature covering the compounds contained in the fruit leuncha, particularly in the skin, flesh and seeds. Then was analyzed more deeply about the food safety of fruits in these three parts of leuncha fruit, as well as the chemical characteristics of compounds. Finally the analysis was addressed to find out the possibilities for the reduction of the chemical contents, by treatment during cooking, especially heating.

RESULT AND DISCUSSION

The leunca fruit contains some compounds in the flesh and peel. There are 5 compounds in leunca. In flesh there are alkaloid, saponen, and tannin. The alkaloid has long been believed as a natural anticeptic, whereas tannin and saponen have been proven as effective compounds to stabilize blood pressure. These last two compounds also usefull to stimulate appetite. However, the peel of the fruit contains some antocyadin, which are allergic acid, and also contain a toxic acid of cyanidin. The cyanidin as a toxic acid and the anthocyadin as a allergic acid.

The alkaloids mostly contain basic nitrogen atoms, and consist lots of Carbon, Hydrogen, Nitrogen, and at small amount of Sulfur, Chlorine, Bromine, or Phosphorus. This compound make leunca have bitter taste. Many of which are poisonous, in order to protect themselves from animals. Then the second compound is saponens have characteristic easily dissolved in water and is an anti-feedant, beside of that, saponen useful to protect the plant against microbes. Aglycone derivates, can also incorporated with nitrogen. Therefore, so some saponens showing pharmacological characteristics of alkaloid's natural products. The third compound is tannin. Tannin as polyphenolic compound that either bound or presipitated in various organic

compounds, such as amino acid and alkanoid. For sensitive people, tannin may cause bowel irritation, kidney irritation, liver damage, irritation of the stomach and gastrointestinal pain.

The cyanidin is a natural organic compound and this is a particular type of anthocyadin. Cyanidin have the characteristic changeable in pH range (ussually reddish-orange color, red at pH less than 3, violet at pH 7 - 8, and turn to blue at pH more than 11). The peel of the fruit consist of highest concentration of this compound. Anthocyadin is a plant pigments and sugar-free. Anthocyadin is counterparts of anthocyanin, based-on the flavylum ion or 2-phenylchromenylium. Anthocyadin is salt derivate of the 2-phenylchromenylium cation, normally called flavylum cation.

Based on the characteristics of these compounds, then the dangerous compounds in leunca are antosiadin (allergic acid) and sianidin (toxic). By reducing the risk of the level of anthocyadin and cyanidin to prevent the growth of cancer cells.

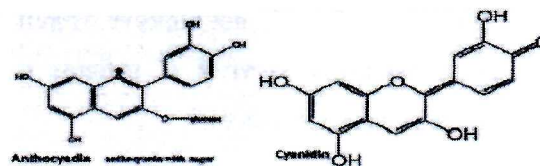


Figure 1 The chemical structure of anthocyadin and cyanidin

There are the chemical structure of anthocyanin and cyanidin. These compounds have aromatic compounds and resulting in a sour taste. This aromatic compound is sensitive to high temperature. Besides that, these compounds have many OH-ion which easily release, so it can make oxidation reaction. Therefore, the compounds called toxic compounds, by denaturation of this compound the level of toxicity is lower. These two compounds can be easily denatured by soaking in hot water of about 60°C for 1 - 2 minutes. Furthermore for consumers who prefer to consume the fruit in fresh condition, it will be wise if the consumption is not conducted everyday at an appropriate amount. Intensive investigation is needed to define the toxic level of fresh leunca consumption at a daily basis.

CONCLUSION

Based on this exploration we come to our conclusion that, the consumption of leunca fruits is acceptable in less dosage to avoid the toxicity of it, and can stimulate the appetite, stabilize blood pressure, and prevent cancer cells. Leunca is safe if in cooked condition. We must reduce the toxicity with soaking in hot water to get the positive effect of leunca, and we can maintain food culture of Indonesia.

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