THE USING OF DURIAN PEELS TRASHES AS A POTENTIAL SOURCE OF FIBER TO PREVENT COLORECTAL CANCER

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ABSTRACT

The development of technology give many effects to the human life, one of it is increasing the human expectation life that will increase the number of people with degenerative disease. Cancer is a kind of degenerative disease that will be need more attention because of emotionally and physically effect that will be suffered by cancer’s patients. One of the most familiar cancer’s type is colorectal cancer. The incidence of this cancer always increase every years. One of the colorectal cancer etiology is fiber deficiency.

Organic trashes are the most dominant in Indonesia. It spends 60-70% from totally trashes. One of the source of these organic trashes is fruit, that peels and seeds are the useless parts, the example is durian peels. Durian only have 20-35% parts that can be eaten, and the peels (60-75%) is dumped as trashes. Durian peels are rich of soluble and insoluble fiber. Soluble fiber on durian’s peels are lignin (15,45%), hemicelluloses (13,09%), and celluloses (60,45%). Whereas, insoluble fiber are pectin, etc.

This writing use literature study method that based on trustworthy validity outcome, related each other, relevance with publicity journals and support explaining analysis. In this writing, writers try to discuss about durian peels which have potential fiber’s source to prevent colorectal cancer. Hopefully, this new source of fiber can be used, moreover the using of this new source will reduce environment pollution by reduce number of organic trashes.

Durian peels which contains both of soluble and insoluble fiber is potential to prevent colorectal cancer. Durian’s peels here can act as prebiotic that may modulate intestinal microbiota population that can alter energy metabolism, microbial and immunological profile. Durian peels needs more researches and continuing study to anticipate restriction number of foods in the future, moreover to reduce environment pollution.

Key words : durian peels, colorectal cancer, prebiotic
PART I
INTRODUCTION

A. Background

Recent the development of technology give many effects to the human life. One of the positive effects is on medical world. This development give best and quick on early detection and handling of various diseases. All of that things give consequences, like increasing human expectation life. In the US, the approximation of human expectation life on the people who age 65 or over will be 71 million on 2030 (CDC, 2009). While in 2009, the increasing of Indonesian expectation life can be seen on data that said on the last five years, human expectation life have increased from 68,6 years old to 70,7 years old. This number will have increased on the next years (Fajarwati, 2009).

Increasing of human expectation life don’t mean there’s no problem. One of the negative effect is increasing degenerative disease that will be suffer by the 65 years old or more. In the US, causes of death on the 65 years old people or more are cardiovascular disease (29,7%), cancer (21,7%), stroke (6,9%), Alzheimer’s disease (4,0%), Diabetes (3,1%) (CDC 2005 cited CDC 2009). Although the number of people’s mortality on cancer not as many as cardiovascular disease, cancer still need more attentions because of emotionally and physically effect that suffer by cancer’s patient (Kumar, Ramzi, Robbins., 2004).

One of the most familiar cancer’s type is colorectal cancer. The incidence of this cancer always increase every years. One of the example is the incidence on Dharmais Hospital, Jakarta (2001), they found that incidence of colorectal cancer is 6,5% from all of the patients that checked lower gastrointestinal tract. While on Cipto Mangunkusumo Hospital, Jakarta, 5 years ago, found 224 cases colorectal cancer, and on year 2001, the sum of colorectal cancer increased up to 50% (Nutrisi Bali, 2010).

One of the colorectal cancer etiology is fiber deficiency. On March 2003, Researcher from European Prospective Investigation into Cancer and Nutrition...
(EPIC) said that increasing on fiber consumption on Europe population, exactly had effect on decreasing risk of colorectal cancer up to 40% (Nutrisi bali, 2010). Dietary fiber made stool bulkier and more voluminous, so the transit time on rectal would be shorten. If the transit time on rectal too long, especially fatty stool, it would make bacteria compose bile acid to deoxycholic acid and lithocholic acid. Two of these bile acids are known as carcinogenic (something that initiate cancer).

Organic trashes are the most dominant in Indonesia. It spends 60-70% from totally trashes (Hatta, Violet., 2008). Recycling of this type trashes will give considerable impact on decreasing environment’s pollution. One of the source of these organic trashes is fruit, especially on fruity harvest, this number will reach 930 m³/day (Dinas Tata Kota Banjarbaru, 2005). The useless parts of fruit that being ignored are peels and seeds, for example durian’s peels. The characteristic of durian’s peel is tight and thorny. It makes this peel unworthy (Sinar Tani Online, 2008). Actually durian’s peels have potential source of fiber with total crude fiber is 5,44% (Wahdah et al., 2003). Durian peels are rich of soluble and insoluble fiber. Soluble fiber on durian’s peels are lignin (15,45%), hemicelluloses (13,09%), and celluloses (60,45%). Whereas, insoluble fiber are pectin, etc (Khedari, 2000)

Durian is a potential fruit. But, the using of all the parts of this fruit is still limited. It’s just 20-35% of durian that can be eaten. The rest of the durian like peels (60-75%) and seeds (5-15%) are dumped as trashes. Durian is a well-known fruit from Indonesia. Biro Pusat Statistik said that production of durian have increased every year, from 194,539 ton (1999) to 741,841 ton (2003). Imagine how much parts of durian will be useless if there’s no effort to use the trash of durian’s peels and seeds (Wahyono, 2009).

Based on that facts, writers interests to discuss about durian’s peels which have potential fiber’s source to prevent colorectal cancer. Hopefully, durian’s peels that being useless will be worthy, so in the few years next, the sum of organic trashes will be decreased, and moreover it will prevent cancer in society.
B. Writing Concept

Are durian peels can be used as a potential source of fiber to prevent colorectal cancer?

C. Writing Purpose

Knowing that durian peels can be used as a potential source of fiber to prevent colorectal cancer.

D. Advantages

1. Common advantage
   
   This writing explain durian peels that can be used as a potential source of fiber to prevent colorectal cancer.

2. Special advantage
   
   As a material for continuing studies and research of durian peels. So, it will increase the using of durian’s peels in the future. Thus, it will be decrease environment pollution.
PART II
LITERATURE OF STUDY

A. Durian

Durian is a tropical fruit from Southeast Asia. Name of Durian was estimated come from Malay term that is “duri” get suffix –an becomes durian. Durian also called the king of fruit. The specific taste from this fruit makes a lot of people like it. In Indonesia, this plant is found at outlying place of Java and Sumatra. Whereas in Kalimantan and Papua, it is usually found at forest, periphery of river stream.(Prihatman, 2000)

The content of durian is some kind of high nutrition component; sodium, carbohydrate, fiber, protein, calssium, fosfor, carotene, potasium, iron, vitamine C, thiamine, niacin, and riboflavin. It has 67 g of water, 28.3 g of carbohydrate, 2.5 g of fat, 2.5 g of protein, 1.4 g of fiber dan 520 kj of calori per each 100 gr. The contain of Durian’s leaves is saponin, flavonoid and polifenol. On the other hand, the content of Durian peels is pectin, Ethanol–benzenesolubility 16.65 %, Ethanolslubility 2.68 %, Lignin 15.45 %, Holocellulose 73.54 %, α-cellulose 60.45 %, Hemi-cellulose 13.09 %, and Ash 4.35 % (Khalderi, 2000)

Durian can prevent effect of extensic aging, increasing blood pressure, swollen healing, skin disease, and jaundice. Durian’s peels can be used as a repellent, healing of skin eruption, constipation, and menstruation regulating. On the other hand, the durian’s leaves can be used as an antipyretic (Deddy, 2005).

B. Fiber

Fiber is the part of fruits, vegetables, and grains that is neither digested nor absorbed. Fiber is a group of carbohydrate consist of cellulose, hemicellulose, pectin, gum, and lignin. Despite can not digested by intestinal enzyme, fiber can broken down by intestine bacteria. The main source of fiber are vegetables, fruits, seeds, and beans. The total fiber that we must consume is 20-35 g/day or 10-15 g/1000 kkal menu (Gsianturi, 2003).

The definition of dietary fiber was divided into 2 groups, physiologically and chemistry point of view.
a. Physiologically: Dietary fiber is the residue that left into the colon after digested food or after protein, fat, carbondioxide, vitamin and mineral is absorbed in gastrointestinal tract. This residue have not any enzyme to assimilate it.

b. Chemically: Dietary fiber is a somekind of nonstarch polysaccharide which complex carbohydrate was formed by some simple compound of glucose that merge become one (idionline.com).

Terminologically, dietary fiber have an actual differentiation with general crude fiber in material on food. In general, crude fiber is a part of plant that can’t be hydrolised by using sulphate acid (H2SO4) 1,25% and Natrium Hydroxide (NaOH) 1,25%. Whereas dietary fiber is a part of food that can’t be hydrolyzed by intestine enzymes. There are two kinds of important fiber namely soluble fiber and insoluble fiber. Insoluble dietary fiber is a structural component of plant, whereas soluble dietary fiber is a nonstructural component of plant. Insoluble dietary fiber is mainly found in wheat peel, seeds, vegetables and beans. Whereas soluble fiber is mainly found in dried beans and peas, oat bran, rice bran, barley, and fruit pectin. Soluble dietary fiber such as pectin, gum, beta glucans, and mucilages. Insoluble dietary fiber such as selulose, hemiselulosel, and lignine. Gum and pectin are derivate of simple glucose found in plant. Pectin is synthesized by compound of glucose and galacturonat acid. If pectin in liquid added by glucose and acid, it will be formed as gel (Kuswara, 2000).

Fiber has some physical characteristics. It has an ability to hold the water out and viscosity, bind organic substance and cation, and can be fermented in lower gastrointestinal tract. Fiber has physiological role in increasing stool mass, defecation frekuency, reducing transit time, postponing unoccupaid of gaster, increasing satisfied after eat, decreasing glucose absorbtion, changing the pancreatic and intestine enzyme activity, increasing bile secretion and changing mineral balance (Lanny, 2005).

Research prove that Indonesian rate of fiber consumption is still far away from recommendation (30g/day). Urban people suffer less fiber consumption than rural people. In rural, we got a rate 10.7±8.1g whereas in urban
9.9±6.0 g per day. In the North America, they just ate 8-12 g fiber per day, in considerable part of America, they consumed 10-15g fiber per day, and in Canada 4.5-11 g/day (idionline.com, Nutrisi Bali, 2010).

C. Pectin

Pectin is a long chain of pectic acid and pectinic acid molecules. Because these acids are sugars, pectin is a polysaccharide. It is prepared from citrus peels and the remains of apples after they are squeezed for juice. In the plant, pectin is the material that joins the plant cells together. When fungus enzymes break down the pectin in fruit, the fruit gets soft and mushy. Pectin for use in food is defined as a polymer containing galacturonic acid units (at least 65%). The acid groups may either be free, combined as a methyl ester, or as sodium, potassium, calcium or ammonium salts, and in some pectins amide groups may also be present (Science Toys, 2010).

Pectin is a thickener in many products. If there is sufficient sugar in the mixture, pectin forms a firm gel. Jams and jellies are thickened with pectin. Pectin binds water, and thus keeps products from drying out. It stabilizes emulsions. Pectin combines with the calcium and whey proteins of milk, stabilizing foams and gels made with cream or milk. Pectin is not digested, and is considered a beneficial dietary fiber (IPPA, 2001).

Consumption of pectin has been shown to reduce blood cholesterol levels. The mechanism appears to be an increase of viscosity in the intestinal tract, leading to a reduced absorption of cholesterol from bile or food (Wikipedia, 2010). In the large intestine and colon, microorganisms degrade pectin and liberate short-chain fatty acids that have positive influence on health (prebiotic effect). Pectin increases viscosity and volume of stool so that it is used against constipation and diarrhea. Pectin is also used in throat lozenges as a demulcent. In cosmetic products, pectin acts as stabilizer. Pectin is also used in wound healing
preparations and specialty medical adhesives, such as colostomy devices. In the cigar industry, pectin is considered an excellent substitute for vegetable glue and many cigar smokers and collectors will use pectin for repairing damaged tobacco wrapper leaves on their cigars (Wikipedia, 2010)

D. **Colorectal Cancer**

Colorektal cancer is a kind of cancer where found in colon or rectum in gastrointestinal tract. This is one of big health problem who’s faced by developed nations such as North America, Australia, New Zealand, and considerable part of Europe. In a general way, we found that colorectal cancer is tend to increase after close on 50 years old. It is a kind of phenomenon that was stimulated by life style and carcinogenic things. In epidemiologically, colorectal cancer occupy the second factor of cause the dying in America as a cancer consequence. Every year, more than 150,000 of new cases was diagnosed in America and the level of mortality close on 60,000 person. In our country, as wrote on National Cancer Registration Record in 2001 that was issued by Direktorat Pelayanan Medik in Health Departement working together with Perhimpunan Patologi Anatomi Indonesia, we find a different number. The weird thing is a tend of younger people get more cases than the older. Report from Patologi Anatomi Division in FK UI 2001, we found that people who younger than 40 years old got colorectal cancer 35,265%. Not only that, we got an indication of colorectal cancer cases were 6,5% from all the patient that had examined lower gastrointestinal tract in Jakarta Cancer Dharmais hospital (Nutrisi Bali, 2010). In Banjarmasin Hospital, 32% from 34 bloody rectal cases were detected intestinal cancer. In 1996, we found 224 cancer colorectal cases in RSCM Jakarta. The rate have increased up to 50% in five years next. All the cases were began by some difficulties in loosen the bowels (idionline.org).

General symptom in colorectal cancer according to PPC Parkway Cancer Centre:

1. Alteration in habit when loosen the bowels (diarhea or constipation)
2. Colon was not entirely empty
3. Bloody stool
4. Insignificant stool
5. Filled with air or too full in eating
6. Loss weight in unreasonable cause
7. Feel tired
8. Nausea and vomitus

There are some risk factors of colorectal cancer (Sudoyo et al, 2006):

1. Having colon inflammation for years. Example, colitis ulcerative or Crohn’s disease.
2. Having cancer history. People who ever suffered colorectal cancer, possible to have colorectal cancer again. Moreover, women with endometrium cancer’s history have higher risk to suffer colorectal cancer.
3. Having family history of colorectal cancer. If in your family have history of colorectal cancer, your probability to have colorectal cancer will higher than people with no family history of colorectal cancer. Especially, if your family suffer this colorectal cancer when young.
4. Life Style. Smoking or having dietary patterns like high-fat consumption, low consumption of fruits and vegetables, will be have higher risk to suffer colorectal cancer.
5. Age >50 years. Epidemiologic data said that colorectal cancer usually happen to they who have age 50 years or over, and 90% people who suffer colorectal cancer have complete diagnosis after 50 years or over.
PART III
WRITING METHOD

A. Collection Data dan Information

This writing is using quantitative and quality’s secondary data. that collect from many kinds of source of references or relevance literatures that discuss about the topic. We use inclusion criteria such as articles, journals, and books that issued between 1995-2010, whereas exclusion criteria such as articles which include opinion without give writer or source in it. We got data from the internet, scientific journals, textbooks and other trustworthy source like New England Journal of Medicine; Journal of Leucocyte Biology; Science Technology, Application Microbial Biotechnology, Academic Journal; Alternative Therapies in Health and Medicine; NIJM; NCBI; Biology and Medicine with key words: durian, durian peel, and colorectal cancer.

B. Tabulation of Data and Information

This scientific writing use literature study method that based on trustworthy validity outcome, related each other, relevance with publicity journals and support explaining analysis.

C. Analyze and Synthesis

After collecting data, we tabulate it systematically and logically. The basic method we use to arrange this scientific writing is exposition method that explain a mechanism, with descriptive point of view. We discuss about using of wasted thing, durian’s peel, to prevent colorectal cancer.
D. Frame of Thought

Durian Peel

Insoluble Dietary Fiber

Soluble Dietary Fiber

\{ Lignin 15.45% \\
Hemi-cellulose 13.09% \\
cellulose 60.45% \}\n
\{ Pectin \}\n
Potential Fiber Source

Raw material of Jam and Jelly Fruit

Transit time faster
Stool more voluminous and bulkier

Daily food

Protect and Prevent the Probability of Cancer

Colorectal Cancer

Fat
Carbohydrate
Protein etc

Fatty Food in Colon and Rectum

Intestinal Microbiota

Short Chain Bile Acid

Deoxycholic acid
Lithocholic acid

Iniator and Promoter in Carsinogenesis

Bad life style (higher fat, lower fiber)
Alcoholic
Polyp in colon or rectum
Genetic

Notes:
- - - - influence
--- cause
| - - - inhibit
PART IV
DISCUSSION

Someone who have low fat and high fiber consumption, like vegetarian pattern of food, was known have low incidence of colorectal cancer. One of the reason is because time of transit in gastrointestinal become shorter. As knowing, microbacteria in colon and rectum can form fat food into short chain of bile acid such as deoxycholic acid and lithocholic acid. These bile acid are inisiator and promoter in carsinogenesis, so they can make and accelerate the occurence of cancer. Consumption of high dietary fiber will faster the transit time in gastrointestinal tract before foul out from colon as a stool because dietary fiber make stool mass bulkier and more voluminous., so the time of contact between the bile acid and the mucosa of colon-rectum will be faster. It give advantages because colon just for a moment have contact with carsinogenic’s substance. Overall, the transit time that become faster makes the probability of colorectal cancer become lower (Wikipedia, 2010).

Microbiota in colon-rectum have important parts in making food become benefit or harm. It depend on what we eat. So, it’s true if wise man said that you are what you eat. Intestinal Microbiota will form enzymes that have functioned for our body. Not only that, but also intestinal microbiota digest both of non-digestible and slow digestible dietary carbohydrate to release short chain fatty acids and sugar. They alter energy metabolism, microbial and immunological profile, leading to either health or diseases. Dietary phenolics and their aromatic bacterial metabolites may modulate intestinal microbiota population, by acting as metabolic prebiotics (Yuan-Kun Lee, 2010).

A prebiotic is a non-digestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or the activity of one or limited number of bacteria colon. Probiotics are defined as living microorganisms which, on ingestion in certain number, exert health benefits beyond inherent general nutrition (Isolauri and Salminen, 2005). This is our focus, why fiber is important
to our body because fiber is an example of prebiotic. Fiber will be degraded by intestinal microbiota into undigested or unabsorbed food and will produce some vitamins, in the other word, probiotics.

The defence mechanisms of intestinal mucosa acting in both lumen and mucosal to restrict colonization by pathogenic bacteria by interfering with the adherence of micro-organisms in the mucosal surface. Such colonization resistance may also take place through competition for nutrients an attachment space as well as modified metabolic activity of the microbiota hindering the survival of intruding foreign bacteria. The gut microbiota prevent the overgrowth of potential pathogens in the gastrointestinal tract, and act as probiotics by production of antimicrobial substances (Sumadiono, 2010).

Summary, intestinal microbiota can benefit our health in many different ways. First, the microbiota degrade our undigested-unabsorbed dietary carbohydrate, including dietary fibers and starch that is resistant to digestion and poorly absorbed sugar and sugar alcohol. In turn, the bacteria produce some vitamins as well as short chain fatty acids that our cell can use as an energy source. Intestinal bacteria also stimulates our immune defences and may prevent the overgrowth of pathogenic bacteria in gastrointestinal tract. Healthy bacteria may help to prevent invasion of our tissue by pathogenic bacteria by creating a barrier on the intestinal wall (DeBruyne, Pinna, Whitney, 2008). That is the point, we eat something good (high fiber for example) and this food will help our intestinal microbiota to make useful things for the sake of our health.

Fiber give advantages to decrease risk of colorectal cancer in many ways. There are several explanation for that. First, fiber increase peristaltic. In the intestinal walls, there are many potentials toxins that have greater chance to make cells in the intestinal walls becoming cancerous. So, everything that decreases the contact time between the stools and intestinal wall will lower the risk of cancer. A high-fiber diet result softer and bulkier stools. It can stimulate peristaltic (the involuntary muscular contractions), so it keep digested food moving through the intestines. In the other words, fiber acts like a biological broom that sweep potential toxic waste products through the intestines more quickly. Thus, a high-
Fiber diet can cut the transit time in half, thereby reducing the time that lining of the bowel walls are exposed to potential cancer-causing substances. Second, fiber binds carcinogens. Besides moving carcinogens through the bowels faster, fiber binds these substances, lessening their contact time with the intestinal wall. The water and bulk of the stools also dilutes carcinogens, so decreasing their potential to do harm. Besides, fiber absorbs bile acids and other potential irritants that may predispose the intestinal lining to cancer. Third, fiber promotes healthy intestinal bacteria. Fiber promotes overall colon health by discouraging the growth of harmful bacteria in the intestines and encouraging the growth of beneficial bacteria. Fiber also contributes to a friendlier intestinal environment, the friendly bacteria in the colon ferment fiber into short-chain fatty acids (SCFA’s), healthy nutrients that can be used by the body. The friendly bacteria in the intestines seem to prefer rice bran and barley bran, balanced sources of soluble and insoluble fiber, to make these nutritious fatty acids. These foods are also rich in vitamin E compounds called “tocotrienols”, which are natural cholesterol-lowering substances (Family Nutrition, 2006).

Fiber comes in two forms, soluble and insoluble. Each acts differently in the intestines and benefits the body in different ways. Soluble fiber acts like a sponge, while insoluble fiber acts like broom. Durian peels contains soluble and insoluble fiber. Lignin, hemicelluloses, cellulose are the kind of insoluble fiber that can be found on durian peels. Besides that, for soluble fiber, durian’s peels contains pectin. Soluble fiber absorbs water in the intestines, mixes the food into a gel, and thereby slows the rate of glucose digestion and consequent absorption in the bloodstream. While, insoluble fiber (means it doesn’t dissolve in water) can absorb many times its own weight in water. This water adds bulk and softness to the stools and keeps them moving along more comfortably.

There are many ways to process durian peels to become something that we can eat daily. Jam and jelly fruit are the simple and quick way to process durian peels to become something that we can eat daily. Jam is a kind of food product that have thick or semi-thick consistency, with ratio fruit : sugar is 45 : 55. Whereas, jelly fruit almost same with jam, the difference is jelly fruit use sari
buah, the ratio between sari buah and sugar is 45 : 55. Three main ingredients to make jam and jelly fruit are acid, sugar, and pectin, which consist in durian’s peel.

The materials to make jam or jelly fruit are sugar (3/4 kg), sitrat acid, Natrium benzoate as preservatives, salt, and vanilli. While, the devices are bottle, filter material, mangkok, panci, parutan, mixer, knife, spoon, wajan, washbasin.

To make jam, there are several steps. First, wash durian’s peel then boil it on the hot water for approximately 30-45 minutes, then let it be on room temperature for 12 hours. After that, add sugar, vanilli, and natrium benzoate, then mix it and cook for one hour. After become thick, directly put it into bottle and let the bottle position flip over for 5 minutes. And then, make the bottle on the originally position.

To make jelly fruit, wash the peel and then boil it on hot water for approximately 30-45 minutes, after that let it be on room condition for 12 hours. Then, filter it with filter material. Let the results on room condition for one hour. Take sari buah (the clear parts). Add sugar, natrium benzoate. Taste it, if don’t taste sour, sitrat acid can be add until found out the balance taste. After that, bring it to the boil until thick or semi-thick. For the last step take it to the bottle. To be attention, don’t take the sugar too little or too much because change of comparison between sugar and peel can change consistency of jam or jelly fruit. Next, pay attention when cook, hotter will cause change on jam or jelly fruit’s consistency.
Here, the conclusion of making Jam and Jelly fruit from Durian’s Peel.

**Durian peel**

- Boil on hot water (+30-45 minutes) and let it be on room temperature for 12 hours
- Filter
  - Water
    - Cook with sugar (3/4 kg) + vanilli
    - As material for jelly fruit
    - **JELLY**
  - Fruit’s waste
    - Cook (1 hour)
    - Put into bottle
    - Make the bottle on flip over position
    - **JAM**

**Durian peel**

- Boil on hot water (+30-45 minutes) and let it be on room temperature for 12 hours
- Filter
  - Sari buah
    - Let it on room temperature for 1 hour
    - Sari buah (the clear parts)
      - Add sugar, Na-benzoat or sitrat acid if the taste don’t balance
      - Cook until thick
      - **JELLY**
  - Fruit’s waste
    - As the material of jam, etc.
As conclusion, durian peels that always be dumped as trashes have big potential to become our fiber source. Using durian peels give many advantages. Not only, it’s a cheap source that every parts of society can use it. Using durian peels will reduce environment pollution. This potential makes durian peels as a hope for fiber source in the future in cases where the source of food is limited.
PART V
CONCLUSION AND SUGGESTION

A. Conclusion
1. Dietary fiber have related to prevent colorectal cancer. Fiber can decrease risk factor of colorectal cancer by increasing of peristaltic of gastrointestinal tract, binding of carcinogens compound and promote healthy of intestinal bacteria.
2. Pectin from fiber of durian’s peel can be used as a potential source to prevent colorectal cancer by making them as a jam or jelly fruit.

B. Suggestion
Need more researchs to optimize the using of durian peel.
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