THE INFLUENCE OF TYPE COOKING ON LEVELS OF CRUDE FIBER FROM WATER SPINACH BOILED AND STEAMED

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ABSTRACT

Fiber is part of a carbohydrate, largely derived from plant cell walls contain cellulose, hemicellulose and lignin. The role of dietary fiber on health began to emerge after the experts compare the high incidence of colon cancer in advanced industrial countries that consumption of fiber is low compared to developed countries. Based on the results of research conducted in America, Africa and Asia found that people with a Western diet is generally low in fiber, many people who have found the incidence of colon cancer (Kusharto, 2006). The average fiber consumption of Indonesian society was 10.5 g / day, which is still below the recommended nutrients, ie 20-30 g / day.

The largest source of fiber found in vegetables, one of the vegetables that contain fiber are water spinach. The research results, Rahayu (1998) in Hery (2001) shows the dietary fiber in vegetables after cooking changes. For it is necessary to study the fiber content of water spinach that has undergone a cooking process to determine the effect of cooking on the type of crude fiber content (Crude Fiber) water spinach boiled and steamed. Crude fiber content research will be carried out by methods Apriyanto (acid hydrolysis method) with two trials (Duplo).

From the results obtained crude fiber content in 100 grams of water spinach namely by boiling (5,12%), steamed (2,38%) and then the water spinach with the untreated / fresh (1,33%).

Keywords: Fiber, Water Spinach, Boiled, and Steamed

INTRODUCTION

Among the various substances in food, fiber is non nutritional substances most widely discussed benefits to health. Fiber is part of a carbohydrate, largely derived from plant cell walls contain cellulose, hemicellulose and lignin. The chemical composition of dietary fiber varies depending on the composition of the producing plant cell walls. Dietary fiber is divided into two groups, namely:

1. Dietary fiber soluble (soluble dietary fiber), are included in this fiber is pectin and gum is the inside of the cell vegetable food. The fiber found in many fruits and vegetables
2. Insoluble fiber (insoluble dietary fiber), are included in these fibers are cellulose, hemicellulose and lignin, which are found in cereals, legumes and vegetables

According Astawan and Wresdiyati (2004) in Dyah (2011), Dietary fiber can not be digested and absorbed by the human digestive tract, but it has a very important function for health maintenance, disease prevention and as an important component in nutrition therapy. For school age children, the fiber is also important because it will provide health effects on adult life, in order to prevent degenerative diseases such as coronary heart disease, diabetes mellitus, and colon cancer (Puspamika, 2014).

The average fiber consumption of Indonesian society was 10.5 g / day, which is still below the recommended nutrients, ie 20-30 g / day. Source of dietary fiber that is very easy to be found is on vegetables and fruits. Vegetables is a menu that is almost always present in the daily dish of Indonesian society, both in the raw state (fresh vegetables) or after processed into various forms cuisine. One of the vegetables that contain fiber are water spinach. Water spinach is always of vegetables produced in Indonesia. From the survey of vegetable production in Indonesia in 1997-2013 conducted by Badan Pusat Statistik said that the production water spinach in 2013 amounted to 308477.2 tons (Badan Pusat Statistik, 2014). IPB student research results, Rahayu (1998) in Hery (2001) shows the dietary fiber in vegetables changes after cooking.

Spinach is not the type of vegetables consumed in a raw state (fresh vegetables) so that the vegetables water spinach will do the cooking process. With the ripening process the vegetables it will affect the fiber content contained in these vegetables. The results Rahayu (1998) in Hery (2001) shows the

dietary fiber in vegetables changes after cooking. In this study samples of the type cooking water spinach will be limited, which kind of cooking water spinach is boiling and steaming. While crude fiber content of research will be done with Apriyanto method (method Hidolisis Acid) with two trials (Duplo).

MATERIALS AND METHODS

Time and Place Research : This study was conducted in March 2014. The experiments were conducted at the Laboratory of Chemical Integrated Basic in Politeknik Kesehatan Kementerian Kesehatan Riau.

Materials : Water spinach, H_2SO_4 0.325 N, NaOH 1.25 N, dan Aseton / Alkohol.

Instrument : Erlenmeyer, flask, Spray Bottle, chemical glass, Petridisk, Hot Plat, Funnel, Spatula, Autoclave, Whatman filter paper 41, Oven, Analytical Scales, Pipette Volume, Stove, Knives, Test Sieve 60 Mesh, Waring Blender, and Thermometer.

Sample Preparation

Fresh water spinach sorted and washed, then finely chopped and separated into three sections. The first part steamed (T = 100 ° C, t = 7 min), the second part is boiled with water temperature of 100 ° C for 3 minutes, while the third part is not done any treatment. Then the whole water spinach dried in an oven (T = 60 °C, t = 6-12 hours) with a separate container. Once dried, milled water spinach with waring blender and sifted 60 mesh.

Determination of Levels of Crude Fiber

A total of 2 gram sample of free water was added to 500 ml Erlenmeyer flask and add 100 ml of H_2SO_4 0.325 N. The mixture is hydrolyzed in an autoclave for 15 minutes at a temperature of 105°C and cooled and 1.25 N NaOH is added 50 ml. Then do the hydrolysis back in the autoclave for 15 minutes. Examples filtered with filter paper that has been dried and known weight. The filter paper was washed successively with hot water, 25 ml of 0.325 N H_2SO_4, hot water and finally using acetone / alcohol 25 ml. The filter paper is dried in the oven at 105°C for 1 hour and continued until the weight.

RESULT

Sample was identified in the Laboratory of Botany Department of Biology, State University of Riau with the identification type / species as follows:

Kingdom	: Plantae
Division	: Magnoliophyta
Class	: Magnoliopsida
Nation	: Solnales
Tribe	: Convolvulaceae
Marga	: Ipomea
Species	: Ipomoea reptan Poir
Local Name	: Kale

Crude fiber are plant fibers that are not soluble in water. Insoluble fiber is considered as fiber healthy intestinal. This fiber does not dissolve in water, so the this fiber passes through the gastrointestinal tract relatively intact, and accelerate food trip and waste through the intestines. Insoluble fiber is very beneficial for our body, because it helps smooth bowel movement reducing constipation and diarrhea. Insoluble fiber also helps to remove toxins from the colon, and reduce the risk of colon cancer because insoluble fiber helps maintain the pH (degree of acidity) of the intestines (Wibowo, 2012).

Based on the test results crude fiber content that has been done using acid hydrolysis method (Apiyantono, 1988) it is known that the crude fiber content of 3 types of treatment on the sample is a sample control, sample boiled and steamed samples can be seen in Table 1.

Table 1. Crude Fiber Content Research Results

Types of treatment	Crude fiber content in 100 g
Water spinach Control	1,33%
Boiled Water spinach	5,12%
Steamed Water spinach	2,38%

Based on the table can be seen that there are differences in the content of crude fiber content between water spinach from each treatment. High crude fiber content of most of the research that has been done is water spinach with this type of trial, namely by boiling (5,12%), steamed (2,38%) and then the water spinach with the without trial / fresh (1,33%). Water spinach has a manifold fiber hemicellulose, so the water spinach include

sources of insoluble fiber. Boiled water spinach has a higher fiber content caused by cooking medium used. At the time of boiling, water spinach directly in contact with water for 3 minutes at a temperature of 100°C, thereby it will reduce levels of soluble fiber which then will increase levels of insoluble fiber.

While the steamed water spinach has a lower fiber content than the boiled water spinach because of steamed water spinach has a cooking medium in the form of water vapor so the water spinach is not directly in contact with water, thereby decrease of the soluble fiber is not as much as steamed water spinach water spinach stew. Water spinach without treatment has a lower fiber content than the other treatments because the water spinach is not cooked so that the levels of soluble fiber does not experience many changes.

CONCLUSIONS

There are differences of crude fiber content in water spinach after cooking process of each treatment**.** High crude fiber content of most the research that has been done is water spinach with this type of treatment, namely by boiling (5.12%), steamed (2,38%) and then the water spinach with the untreated / fresh (1,33%).

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