

The Potential of Darmo Black Soybean Varieties as an Alternative of A Promising Food for Future

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Abstract— Most soybean varieties are still relying on imports from abroad. Therefore, soybean prices are still fluctuating, Indonesia still depends on the high number of imports due to the lack of white soybean production in this country. It's Necessary to find an alternative of raw materials that are produced domestically. Black soybean is one of the varieties of soybeans that has many advantages, both in terms of health and economic. Since the year of 2009, Padjadjaran University has developed a superior black soybean seed which can adapt with minimal input of agriculture process namely "Darmo". Darmo black soybean varieties were characterized and compared with other types of black soybeans that had previously cultivated. The physical characteristics of Darmo black soybean varieties include sphericity 0,74; volume of seed 80 mm³ seeds / grains; bulk density 0.71 g / ml; particle density of 1.69 g / ml. Chemical characteristics of black soybean of Darmo varieties respectively: moisture 10.87%, protein 35.62%, fat 16%, ash of 5.3% and carbohydrate 32.21%. When compared to the Black Soybean Varieties of Malika, black soybean Darmo varieties has nearly the same nutritional composition so that the potential to be developed into a valuable source of food nutrition and high efficient.

Keywords— Darmo varieties, black soybean, physical characteristics

I. INTRODUCTION

Soybean (*Glycine max* L. Merr) has been the most widely raw material used into tempeh. Soybeans are commonly used are white soy. Most soybean varieties are still relying on imports from abroad. Therefore, soybean prices are still fluctuating. The high number of imports due to the lack of white soy production in Indonesia. For it is necessary to find alternative raw materials that are produced locally.

Alternative materials that can be used include black soybean (*Glycinesoja*). Black soybean is native to tropical Asia in Southeast Asia and is widely used as a basic ingredient of food. Black soybeans have an important role in the industrial sector. In Indonesia, black soybeans are widely used as raw material for the manufacture of soy sauce.

A black soybean variety is one that has many advantages, both in terms of health as well as economic. Black soybean utilization for a variety of processed food products is less optimal than white soybean that has been used for diverse types of preparations. Lack of black soybean utilization is due because the color is black and has a less desirable effects on various products as well as the lack of information about how the proper handling and processing.

Black soybean occupies the top list with the highest antioxidant activity, compared to other types of soy (soy red , brown , yellow and white). Black color on the skin indicate that soy contains anthocyanin compounds, which is one source of anti -oxidants. Black soybeans also contain fiber. Black soybean crude fiber content of 26.51 % (db).

Soy has a high protein content. With this high protein content of soy is needed by the community in the effort to fulfill the vegetable protein which is cheap and easy to develop . Soy contains three macro nutrients (proteins , carbohydrates and lipids) and complete mineral content, as in [1]. Soybean lipid composition consists of 86 % unsaturated fatty acids , especially linoleic and oleic acids , making it beneficial for health, as in [2].

Since the year 2009, Padjadjaran University has developed a superior black soybean seed that adapt on minimal inputs of agricultural system. Trials planting have been conducted in the area of Sliyeg, Indramayu, West Java. Black soybean varieties developed is named "Darmo". Reference [3] mentions that during the period of 93 years (1918-2012), the Indonesian government has release 73 varieties of soybeans and seven are black.

The results obtained in the crop growing season of 2013 was very encouraging, in which the amount and quality of soybean seed production has been in line with expectations.

The next step needed to increase the interest and the public interest to plant varieties of Darmo black soybeans varieties. Physical and chemical characterization needed due to develop the potential of processing and product generated.

The object that will be observed is the physical and chemical characteristics of Darmo black soybean varieties which are being developed by the University of Padjadjaran. Darmo black soybean varieties is a type of black soybeans which is developed to anticipate extreme climate change. Darmo black soybean varieties are tolerant soybeans in lack of production inputs (minimal water and fertilizer) during the process of production and planting.

Characterization of black soybean varieties Darmo, is expected to provide information on the physical, chemical and quality characteristics that can be taken into consideration to follow-up the handling and processing of suitable alternatives.

Information is physical and chemical characteristics of Darmo black soybean varieties to complete the research on the characteristics of black soybean, post-harvest handling and processing of black soybeans are aligned according to the characteristics of black soybean varieties Darmo obtained.

II. RESEARCH METHOD

The method used is an experimental method with a descriptive analysis (explanatory research). The research object is Darmo black soybean varieties which is cultivated by farmers in Sliyeg, Indramayu. The results of the analysis will be compared with the results of the study of [2] and Malika Black Soybean varieties. The characteristics observed were :

1) Characterization of Physical Properties of Darmo Black Soybean Varieties

- a. Dimensions Seeds [4]
- b. Sphericity [5]
- c. Bulk Density [6]

2) Chemical Composition Testing [7]

- a. Water content
- b. Fat content
- c. The ash content
- d. Protein content
- e. Levels of carbohydrates by difference

III. RESULT AND DISCUSSION

The physical characteristics of black soy are necessary for handling and groupings based on quality grade. Physical characteristic data presented in Table 1.

From the above data it can be concluded that the black soybean seed varieties Darmo has a size that is not round , oval with a value approaching 0.74 sphericity. Size of black soybean seed varieties Darmo also relatively small as indicated by the volume of seeds, diameter average and seed surface area smaller than the others black soybean varieties or strains Cikuray KB 9. Additional information bulk density of Darmo black soybean varieties is 0.71 g/ml and a particle density of 1.69 g/ml.

TABLE I
PHYSICAL CHARACTERISTIC OF DARMO BLACK SOYBEEAN VARIETIES COMPARE WITH OTHERS

Physical Characteristics	Cikuray	CK 13	CK 8	DETA MI	JT 13	JT 3	KB 9	KH 4	DAR MO
Sphericity	0,98	0,98	0,98	0,99	0,98	0,98	0,99	0,98	0,74
Seed Volume (mm ³)	139,00	70,50	78,80	125,80	69,60	75,60	141,10	118,70	80,00
Diameter (mm)	6,90	5,50	5,70	6,50	5,40	5,60	6,80	6,50	5,07
Surface area of Seed (mm)	131,90	84,60	90,60	122,50	83,20	88,10	132,60	118,90	80,78
Source: Zanetta <i>et al</i> (2013)									

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Chemical Characteristics of Black Soybean varieties of Darmo black soybeans varieties compared with other types are presented in Table 2.

TABLE II
CHEMICAL CHARACTERISTIC OF DARMO BLACK SOYBEEAN VARIETIES COMPARE WITH OTHERS

Composition	Cikuray	CK 13	CK 8	DETA MI	JT 13	JT 3	KB 9	KH 4	DAR MO	MALIK A
Protein (%)	33,90	33,00	31,00	34,50	31,80	32,60	35,00	33,20	37,90	37,90
Carbohydrate (%)	0,90	1,60	3,40	1,30	0,90	0,90	1,30	2,60	2,95	3,33
Lipid (%)	16,50	15,50	16,50	16,50	16,00	17,00	17,50	24,00	16,57	16,55
Ash (%)	4,90	4,60	4,20	5,00	5,10	5,00	4,90	4,70	5,00	5,00
Source: Zanetta <i>et al</i> (2013)										

Based on the table above we can conclude that the protein content of Darmo black soybean varieties has a higher value than other local black soybean (compare with study [2]) and has a protein content equivalent with malika varieties which is known to have high nutritional value.

The high value of protein compound of Darmo black soybean varieties make this very potential to be processed into a variety of processed foods in order to improve public health. The use of Darmo black soybean varieties will make one of the solutions for low income family in fulfilling their nutrient to provide a source of protein in the diet of their family. This is possible, because Darmo black soybean varieties relatively very cheap price, easy to be cultivated and high productivity in the cultivation.

Based on the results of the study also obtained data on total crude fiber which contained in the Darmo black soybean varieties approximately 6.48%. This suggests that consumption of Darmo black soybean varieties can healthy and for some people with certain health problems, black soybeans can be used as an alternative food solving health problems in them. The high fiber in Darmo black soybean varieties also has the potential to be developed as a source of prebiotics food/symbiotic beverages.

IV. CONCLUSIONS

Darmo black soybean varieties are one of the new food that has a good composition which is promising to be developed. The high nutrients contained in the Darmo black soybean varieties allow to be processed into a variety of food that is healthy and adapted to its purpose. Physical characteristics almost identical to most other black soybeans, equivalent to the variety of its chemical characteristics of Malika varieties.

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