

Innovation of Kepok Banana Hump Bread (*Musa paradiciasa* L.) as Diabetes Diet Therapy: Literature Review

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ABSTRACT

Purpose: Diabetes has become a health problem that causes chronic complications such as heart disease, kidney failure and the risk of death which can reduce life expectancy and can increase mortality rates therefore intervention is required, especially in dietary intake. Management of low-carbohydrate and high-fiber diet is important for diabetics to prevent the occurrence of other complications. Kepok Banana Hump Bread could be alternative food choice for diabetes mellitus diet. This paper to review the Kepok Banana Hump Bread innovation as diet therapy for diabetics.

Methodology: This research using a literature review method pra experimental, true experimental, and literature review of research designs from 20 international and national journals. The literature search was carried out on the Google Scholar and Researchgate databases using three keywords, namely analysis of antidiabetic compounds on the Kepok Banana Hump; the potency of the Kepok Banana Hump; the impact of Kepok Banana hump powder on blood sugar levels.

Results: Kepok Banana Hump Bread that utilizes Kepok Banana Hump Flour in its production can be an alternative in diet management. Kepok Banana Hump Flour contains 25.5 glycemic index and 26,72% fiber. The addition of 40% banana hump flour can produce a distinctive flavor of banana hump flour with a strong taste, rough texture, slightly hard, and dark brown color. This Kepok Banana Hump Bread innovation is expected to be an alternative diet in the process of treating diabetes mellitus.

Application: Kepok Banana Hump, Glicemix Index Kepok Banana Hum, Kepok Banana Hump Bread, Diabetes Mellitus

BACKGROUND

Diabetes mellitus has become a health problem that has a fairly high prevalence in the world. Based on information from the International Diabetes Federation (2015), stated that in 2015, 415 million people suffered from diabetes mellitus worldwide. It is estimated that in 2040 there will be an increase to reach 642 million people suffering from diabetes mellitus with 193 million undiagnosed cases which cause the death of 5 million people. Indonesia is one of the countries with a high number of diabetics. Reporting from the International Diabetes Federation (IDF), it was confirmed that in 2017 Indonesia was ranked as the sixth highest diabetic after Chinese, India, the United States, Brazil, Mexico.

Diabetes is a metabolic disease with symptoms of hyperglycemia due to defects in insulin secretion, insulin action or both (Adi, 2018). Diabetes is also called the silent killer because it often occurs without the sufferer realizing it (Kemenkes, 2014). Risk factors for diabetes are individuals over the age of 30 years, obesity, heredity, and a lifestyle factor that tends to eat sweet and high sugar foods (Ramu, 2015). Diabetes mellitus can cause various complications such as heart disease, kidney failure, stroke and the risk of death which can reduce life expectancy, quality of life, and can increase health and mortality rates (Kemenkes, 2014). To suppress the occurrence of various intervention complications in people with diabetes mellitus, it is necessary to do something such as through discipline in applying the diet. The application of a diet for diabetics has the principle of high fiber and low glycemic index.

The Banana plant is a type of plant where the whole parts can be useful, such as fruit, flowers, leaves, including the stem part of the hump. The hump is the part of the plant that is submerged in the soil where the roots come out. Banana hump has a low glycemic index, high fiber and antioxidants which are good for diabetics. Banana hump (*Musa Paradiciasa* L.) is a part of the banana plant that

is easy to obtain, economical, but its use is often neglected. Banana hump contains 20% water, 76% starch, and 4% other ingredients (Sjofjan, 2021).

Compared to the Ambon banana hump and Raja banana hump, the Kepok banana hump has the lowest Glycemic Index content. Where the Ambon banana hump flour has a glycemic index value of 32.5; Raja banana hump flour of 45.6; and Kepok banana hump flour of 25.5 (Ridlo, 2021). Consumption of foods that contain a low glycemic index is very good for people with diabetes mellitus (Last, 2006). The glycemic index (GI) is one of the concepts important things to ask in choosing the right food suitable for Diabets Mellitus patients. GI is a measure of speed a food increases blood glucose levels after consumed (Noviyanto, 2016). Low GI value is below 55, medium GI between 55 to 69, and GI high above 70 (Atayoğlu, 2016). Utilization of kepok banana hump can be done by processing it into a food, such as bread. Bread making using kepok banana hump flour has a high fiber content of 26.72% (Sjofjan, 2021). The recommended fiber intake of 25 grams per day prioritizes fiber in vegetables and fruit. In the large intestine, fiber can be fermented by colonic bacteria and can produce short chain fatty acids that may inhibit fatty acid mobilization and reduce gluconeogenesis. This will affect the insulin secretion, use of glucose, and glucose utilization by liver cells. This is reinforced by the previous research conducted by Chakraborty R et al (2021) in the manufacture of biscuits using kepok banana hump flour. This Kepok Banana Hump Flour can be used as an alternative material used in making bread. In addition, the characteristics of bread which is one of the most preferred foods and the process of making it is quite easy. Therefore, with the innovation of Kepok Banana Hump Bread it can be an alternative diet therapy that can be implemented for people with diabetes mellitus.

METHODS

Literature search strategy

The literature review was collected from 2 databases as follows Google scholar and Researchgate using 3 keywords, in the following: (1) The Analysis of Antidiabetic compounds in pseudo-stem of banana kepok; (2) A potential of pseudo-stem of banana kepok; (3) The effect of powdered pseudo-stem Banana Kepok on blood sugar levels. Inclusion criteria that were used in literature review searching are (Table 1): (1) The article was coherent with the main topic; (2) published last 7 years; (3) Open access and full text; (4) Reputable National and International article. Based on the search result, the total amount of literature review is 20 articles that embraces observational study. The searching flow of the literature can be observed in Table 1

Table 1. Literature Selection Criteria.

Criteria	Inclusion	Exclusion
Population (P)	Pseudo-stem banana kepok	Other part of banana kepok
Intervention (I)	None	None
Comparators ©	None	None
Outcomes (O)	Powdered pseudo-stem banana kepok is potential to decrease of blood sugar levels.	Powdered pseudo-stem banana kepok is potential to increase of blood sugar levels.
Study Design and Publication type	Pra experimental, true experimental, and literature review of research designs	Study Design and Publication type
Publication years	After 2015	Before 2015
Language	English and Indonesian	Other language than English and Indonesian.

Study selection dan quality assessment

An explanation of study selection and quality assessment will be presented in the form of a diagram in Figure 1

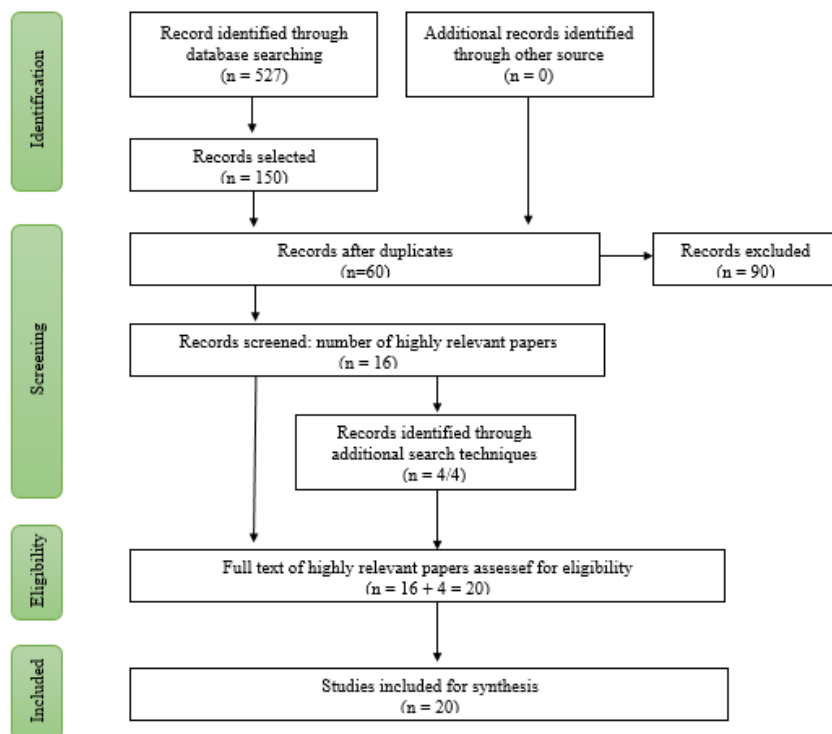


Figure 1. Study selection dan quality assessment.

RESULT AND DISCUSSION

Banana plants that have been harvested can not bear fruit again. This can increase the amount of organic waste, so it is necessary to use the remaining banana plant waste. One of the remaining waste in banana plants that can be utilized is the banana pseudostem. The banana pseudostem is the soft part of the banana stem and contains many components that are beneficial to health, one of the benefits possessed by banana pseudostem is the antidiabetic content which is proven to inhibit the performance of the α -glucosidase enzyme and contains a low total glycemic index (Aziz, 2011). Therefore, the Banana pseudostem is safe for a patient with diabetes and glucose intolerance.

From several studies, it was found that banana pseudostem is a high-fiber food ingredient, including kepok banana pseudostem. Banana pseudostem contains 20% water, 76% starch, and 4% other ingredients (Sjofjan, 2021). Other component that contained in the wet banana pseudostem plant is 43% calories; 0.36% protein; 11.6% carbohydrates; 15% calcium; 60% phosphorus; 0.5% iron; 0.01% vitamin B1; 12% vitamin C; and 86% water. Meanwhile, in the dried banana pseudostem contains 245% calories; 3.4% protein; 66.2% carbohydrates; 60% calcium; 150% phosphorus; 2% iron; 0.04% vitamin B1; 4% vitamin C; and 20% water (Sheng, 2010). Banana pseudostem also contains potassium and vitamin B6 which can help the process of insulin and hemoglobin production in the human body. Therefore, banana pseudostem can be used by processing it into food ingredients, one of which is flour. Banana pseudostem flour is made from fresh ingredients through a process of cutting, drying, and grinding (Sjofjan, 2021). Furthermore, banana pseudostem flour can be processed into bread products. This bread product can be one of the innovations in the food industry, especially for diet therapy in diabetics. Based on the results of the journals obtained are described in Table 2

Table 2. Innovation Banana Bread Hump as diabetes diet therapy.

Summary	Structure	Important Found	Methods	Generalization	References
<p><i>Background:</i> To know determine the application of banana hump flour rebinding in the deposition of meat and weight of hybrid duck feathers.</p> <p><i>Results:</i> There was no significant effect ($P>0.05$) in the percentage of deposition of breast meat and feather weight. However, it had a significant effect on foot color ($P<0.01$).</p> <p><i>Conclusion:</i> The application of 20% banana cob flour as a substitute for corn gave positive results in the aspect of hybrid meat and feathers</p>	<p>Title: The effect of replacing maize with re-binding banana hump flour on the meat quality, footpad color, and feather or hybrid duck Authors: O Sjoftan et al. Affiliation: University of Brawijaya Publisher: IOP Publishing Year: 2021</p>	<p>Making banana hump flour starts from the process of cutting, drying and milling. The fiber content in banana hump flour is the crude fiber content of 26.72% and the GE (Gross Energy) content of 2244.20 Kcal/kg.</p>	<p>Data collection method using Completely Randomized Design (CRD) consisting of 5 treatments and four replicate treatments.</p>	<p>Banana Hump Flour has a high crude fiber content</p>	<p>Total: 12 Year: 2015-2021</p>
<p><i>Background:</i> Various parts of Pisang kepok (Musa paradisiaca) that can be used include weevil, but it is still rarely excavated.</p> <p><i>Results and Conclusions:</i> The highest glucose yield was at a concentration of 0.8 N and at a 30 minute reaction it contained 6.25 grams of glucose / 20 grams of dry sample, and the conversion was 27.22% in 20 grams of dry sample.</p>	<p>Title: The Influence of Variation in Time and HCl Concentration to the Glucose Produced from Kepok Banana Authors: Rohman M, Denny and Faisal RM Affiliation: Islamic University of Indonesia, Yogyakarta, Indonesia Publisher: IOP Publishing Year: 2016</p>	<p>The hydrolysis of banana weeds was carried out using HCl as a catalyst. The amount of glucose produced is the result of a good catalyst concentration. 60% NaOH is used to neutralize the pH of the hydrolyzed filtrate The length of hydrolysis time also affects the level of glucose produced. The high level of glucose is obtained from the length of time the hydrolysis reaches the optimum point.</p>	<p>Experiments and Literature using laboratory test and literature from internet references, books, or related university references</p>	<p>The greater the concentration of the catalyst in identifying the kepok banana hump, the greater the glucose level produced</p>	<p>Total: 14 Year: 1958-2013</p>
<p><i>Background:</i> Banana hump is part of the banana plant rarely used, but is rich in nutrients.</p> <p><i>Purpose:</i> Introducing and training</p>	<p>Title: Pemberdayaan masyarakat di Desa Balai Makam dalam pemanfaatan bonggol pisang sebagai</p>	<p>The best banana hump flour from the kepok banana variety after being harvested has the characteristics of 1.02% water</p>	<p>Research Method: Descriptive</p>	<p>Banana hump is high in fiber, carbohydrates and calcium.</p>	<p>Total: 11 Year: 2013-2019</p>

<p>the skills of making flour from banana hump which we named "Tebosang" to the people of Balai Makam Village, Bathin Solapan District, Bengkalis Regency.</p> <p><i>Results and Conclusions:</i> The level of understanding of the community in making banana hump flour is very good, even to the point that some are producing and selling it commercially</p>	<p>rintisan Usaha Mikro Kecil Menengah (UMKM) Authors: Tetty et al Affiliation: University of Riau Publisher: Unri Conference Series: Community Engagement Year: 2020</p>	<p>content, 0.8% ash content, 10.42% yield, 0.37% swellability, 254.3% water absorption, crude fiber 29.2%, resistant starch 39.35%, prebiotic Fructooligosaccharide (FOS) content of 427.03 mg/mL The best quality kepok banana hump flour to be used as flour with lower water content, high water absorption ability and high crude fiber and prebiotics can suppress glucose production The quality of the hump will decrease after three days of cutting down the banana tree, the bulb will change color due to the influence of the respiratory system on the tuber. This respiration causes a decrease in food reserves (in the form of starch, sugar, etc.) in the commodity, reduces the taste of the commodity (tastes bland) and promotes spoilage.</p>	<p>Total: 9 Year: 2004-2016</p>
<p><i>Background:</i> Dried banana hump can be used as flour and has a very high carbohydrate content, so it can be used as an alternative to wheat flour and rice.</p> <p><i>Results:</i> the physical and chemical characteristics of kepok banana hump flour, the water content of banana hump flour is 0.69% and the ash content is 10% and</p>	<p>Title: Karakteristik Fisiko Kimia Tepung Bonggol Pisang Kepok (Musa Paradisiaca F.) Authors: Lailizyach Fitria, Ayu Yusuf Affiliation: Akademi Analis Farmasi Dan Makanan Putra Indonesia Malang Publisher: Akafarma Putra Indonesia Malang</p>	<p>The water content obtained in banana cob flour is 0.69%, in contrast to the water content of wheat flour and tapioca flour by 12% and 9%. The result of the fiber content of banana hump flour is 20% The results of organoleptic physical quality on banana hump flour are in the form of powder, brownish white color,</p>	<p>The content of banana hump flour has a high fiber content and is brownish white in color</p>

<p>the fiber content is 20% and the fat content is 3.74% and the protein content is 3.4% and the carbohydrate content is 65.47% and powder form, brownish white color, distinctive odor and tasteless.</p>	<p>Year: 2018</p> <p>tasteless and the consistency of flour after adding hot water expands to form like porridge.</p>	<p>Total: 26 Year: 1997-2017</p> <p>The anticholesterol effect of banana fiber ethanol extract has been shown to reduce total cholesterol and diabetes</p>
<p><i>Background:</i> Kepok banana peel contains saponins, tannins and flavonoids that can reduce total cholesterol levels. <i>Result:</i> The reduction in total cholesterol levels can be effectively done with nutritional therapy with banana peels, where 8.4 mg/day is more effective than banana peel extract levels of 16.8 mg/day. <i>Conclusion:</i> The anticholesterol effect of banana fiber ethanol extract was shown to reduce total cholesterol in obese male ddY mice (Mus musculus L.).</p>	<p>Title: The Effect of Giving Extract Etanol of Kepok Banana Peel (Musa Acuminata) toward total Cholesterol Level on Male Mice (Mus Musculus L.) Strain Deutschland-denken-yoken (ddy) Obese Authors: Khairun and M. Azzaky Affiliation: Universitas Lampung. Medical Faculty, Universitas Lampung Publisher: Biomedical & Pharmacology Journal Year: 2018</p>	<p>Total: 16 Year: 1999-2018</p> <p>Kepok banana pseudostem flour produces the best quality compared to raja bananas, milk mahuli bananas, milk bananas and ambon bananas</p>
<p><i>Background:</i> This experimental study aims to determine (1) formula for choco cookies with kepok banana pseudostem flour (2) quality of choco cookies with kepok banana pseudostem powder from taste, flavor and texture. <i>Result and Conclusions:</i> The quality of choco cookies the average score of 2.94 obtained with banana pseudostem flour from the aspect of taste, which is in the good category, which</p>	<p>Title: Pemanfaatan Tepung Bonggol Pisang Kepok (Musa Acuminata Balbisiana) Menjadi Choco Cookies Authors: Made Saputra, Risa, Damia Affiliation: Ganesha Singaraja University of Education, Indonesia Publisher: Jurnal Bosaparis: Pendidikan Kesejahteraan Keluarga Year: 2019</p>	<p>Total: 16 Year: 1999-2018</p> <p>Kepok banana pseudostem flour produces the best quality compared to raja bananas, milk mahuli bananas, milk bananas and ambon bananas</p>

means it has a sweet and savory taste. The average score of 2.89 is obtained from the flavor aspect, which is in the good category, which means it has a distinctive flavor of the kepok banana pseudostem. The average score of 2.78 is obtained from the texture aspect, which is in the good category which means it has a brittle texture.

Background: The raw material for nuggets and crackers can be made from banana hump, which is a local food commodity that is high in fiber
Purpose: To determine the fiber content of crackers nuggets with the basic ingredients of kepok banana hump (Musa paradisiaca Var. Balbisina Colla).
Authors: Rifatul Ridlo, Sugeng Maryanto, Riva Mustika
Affiliation: Ngudi Waluyo University
Publisher: Jurnal Gizi dan Kesehatan
Year: 2020
The cracker formulation consists of 3 comparisons, the ratio of banana hump: wheat flour (25%: 75%) (F1), (50%: 50%) (F2), and (75%: 25%) (F3). The cracker formulation consists of 3 comparisons, the ratios of banana hump: tapioca flour (25%: 75%) (F1), (50%: 50%) (F2), and (75%: 25%) (F3). Test the fiber content by the gravimetry method which is then described.
Results : The results in this study was analyzed of the fiber value of nuggets and crackers kepok banana hump every (100g). The

Title: The Analysis of Fiber Content of Nuggets and Crackers with the Basic Ingredients of Kepok Banana Hump (Musa paradisiaca Var. Balbisina Colla)
Authors: Rifatul Ridlo, Sugeng Maryanto, Riva Mustika
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Publisher: Jurnal Gizi dan Kesehatan
Year: 2020

Banana hump are foods that have high fiber. Carbohydrates are fibers in the banana hump which consist of cellulose, hemicellulose, pectin, and lignin.

Experimental design

The high fiber content in foodstuffs is directly proportional to the high component of the banana hump

Total: 22
Year: 1992-2020

<p>highest fiber content of nuggets was F3: 0.514g, F2: 0.322g and F1: 0.186g. The highest fiber content of Kepok banana hump crackers is F3: 0.861g, F2: 0.747g and F1: 0.727g. The fiber value of the kepok banana hump crackers is higher than the kepok banana hump nugget.</p>	<p>Background: Banana pseudostem has been known to have potential as a traditional medicine ingredient.</p> <p>Purpose: Determine the ability of banana pseudostem extract in reducing Blood Sugar Level.</p> <p>Result and Conclusions: Kepok banana pseudostem extract can reduce blood sugar levels in alloxan-induced rats. The best concentration in decreasing blood sugar levels is 200mg/200g body weight of rats. The results of this study are intended to assist the development of antidiabetic medicine that are useful for the health sector in the community.</p>	<p>Title: Pengaruh Ekstrak Bonggol Pisang Kepok terhadap Kadar Gula Darah Tikus yang Diinduksi Alokstan</p> <p>Authors: Desy, Ika, Lisana</p> <p>Affiliation: National Institute of Science and Technology</p> <p>Publisher: Jurnal Ilmu Kefarmasian</p> <p>Year: 2020</p>	<p>Banana extract has hypoglycemic activity where the flavonoid content of bananas is absorbed in the blood so that it can increase blood glucose solubility. Blood glucose becomes easily excreted through urine and blood glucose levels decrease (hypoglycemic effect). Kepok banana pseudostem extract has a hypoglycemic effect due to the synergistic effect of bioactive compounds contained, including flavonoids, saponins, tannins and triterpenoids</p>	<p>Kepok banana pseudostem extract can decrease blood sugar levels in rats. The best concentration is 200 mg/200 g BW rats. This was supported by the results of phytochemical screening which showed that the extract contained flavonoid content, saponins, tannins, triterpenoids</p>	<p>Total: 17 Year: 2013-2018</p>
<p>Background: After the banana plant is harvested, it will produce waste in the form of pseudo-stem. Banana pseudo-stem is usually used to make handicrafts, ropes, cloth, paper, etc. To utilize this remaining waste, banana pseudo-stem can also be used in powder form to produce food that has</p>	<p>Title: Utilization of banana pseudo-stem in food applications</p> <p>Authors: Thorat and H.P. Bobade</p> <p>Affiliation: Maharashtra Institute of Technology, Aurangabad (M.S.) India</p>	<p>Pseudostem flour has high fiber</p> <p>Banana pseudostem has a low glycemic index and has a high content of dietary fiber and antioxidants which are good for diabetes</p>	<p>Dried banana pseudostem can increase shelf life. Banana pseudostem flour can be included in various recipes and can provide health benefits</p>	<p>Total: 15 Year: 1998-2016</p>	

<p>added value. It is useful to help cure kidney stones, gall bladder and also to control obesity. <i>Result and Conclusions:</i> The fortification results from banana pseudo stem powder serve as nutritional improvement, nutraceutical food and can also be useful as medicine.</p>	<p>Publisher: International Journal of Agricultural Engineering Year: 2018</p>
<p><i>Background:</i> Banana pseudostem has the potential to be developed because it has a carbohydrate content percentage of 66.2%. One variant of the use of banana pseudostem is banana pseudostem into flour. <i>Purpose:</i> This study aims to process kepok banana pseudostem flour (Musa Acuminata Balbisiانا) as a substitute for wheat flour in making puskis cakes and to measure people's acceptance of flavor, taste, texture, color. <i>Result and Conclusions:</i> The results of the research through the hedonic test were the puskis products in terms of aroma, taste, texture and color with the criteria of very liking, namely by treatment with the addition of 10% (TBP10) and 20% (TBP20) banana pseudostem flour with the criteria of liking.</p>	<p>Title: Substitusi Tepung Bonggol Pisang Kepok (<i>Musa Acuminata Balbisiانا</i>) Terhadap Tepung Terigu Dalam Pembuatan Puskis Authors: Seltiana, Rafika, St. Hadijah Affiliation: Politeknik Bosowa Publisher: Hospitality and gastronomy research journal Year: 2020</p>
<p>The data analysis used in this study is descriptive statistics with purposive sampling technique as a sampling technique.</p> <p>Banana Hump Flour 40, namely the addition of 40% banana pseudostem flour to the puskis cake dough produces a distinctive flavor of banana hump flour with a thick taste, rough texture, slightly hard, and dark brown color. This happens because the addition of large amounts of banana pseudostem flour will produce a darker color, the dough does not expand, and makes the dough not easy to form.</p> <p>Banana Hump Flour 10 and Banana Hump Flour 20 it produces puskis with flavor and taste similar to control (100% wheat flour dough), soft texture with slightly different color where Banana Hump Flour 10 produces brownish white color, Banana Hump Flour 20 produces milk chocolate color</p> <p>The more addition of banana pseudostem flour in making substitutions will affect the flavor, taste, texture and color of the cake.</p>	<p>The preferred treatment by the panelists was the addition of 10% and 20% banana pseudostem flour, while the treatment that was dislike by the panelists was the addition of 40% banana hump flour.</p> <p>Total: 12 Year: 2016-2019</p>

<p>Background: Banana pseudostem has an efficient inhibitory potential in a certain dose</p> <p>Purpose: to explain the mechanism of the hypoglycemic effect on the banana pseudostem.</p> <p>Results and Conclusions: Banana pseudostem can significantly inhibit the enzyme α-glucosidase in mammalian digestion and starch α-glucosidase. Banana pseudostem can inhibit the hydrolysis of sucrose, maltase, and p-nitrophenyl α-D-glucopyranoside with mixed type inhibition. The in-vivo study found that there is significantly suppressed maltose/glucose induction of plasma glucose postprandial elevations and exerted the effect of antihyperglycemic on normal and alloxan induction in diabetic rats with the oral administration of a pseudostem (100-200 mg/kg) banana hump.</p>	<p>Title: Investigation of Antihyperglycaemic activity of banana (<i>Musa sp.</i> Var Nanjangud rasa bale) pseudostem in normal and diabetic rats</p> <p>Author: Ramith et al</p> <p>Publisher: Wiley Online Library</p>	<p>Inhibitory effect of PSB (Pseudostem Banana) on α-amylase is lower than acarbose (therapeutic drug) α-glucosidase is have higher inhibitory effect when compared to acarbose</p> <p>In normal rats it is known that PSB significantly reduces the postprandial glucose induced by maltose.</p>	<p>Experimental method</p>	<p>PSB showed remarkable inhibition of yeast α-glucosidase compared to the therapeutic drug, acarbose. However, the inhibitory effect of PSP on α-amylase tends to be low compared to acarbose.</p> <p>PSB response in suppressing the increase in plasma glucose levels is relatively higher after administration at a dose of 200 mg compared to giving a dose of 100 mg</p> <p>Oral intake of PSB can significantly reduce postprandial plasma glucose levels in diabetic rats, suggesting that PSB may have anti-diabetic effects.</p>	<p>Total: 41 Year: 1934-2013</p>
<p>Background: Bread using banana pseudostem flour is very good for Diabetes Mellitus sufferers.</p> <p>Results and conclusions: the composition of bread shows a health-promoting agent, this is thought to be on the efficacy of consumers, especially for those</p>	<p>Title: In Vitro starch digestibility of bread with banana (<i>Musa acuminata</i> X <i>balbisiana</i> ABB cv. Awak) pseudostem flour and hydrocolloids</p> <p>Author: Lee Hoon Ho et al</p> <p>Affiliation: Universitas Sultan Zainal Abidin</p>	<p>The lowest total sugar content is found in the bread samples with the addition of 10% Banana Hump Flour</p> <p>The lowest total starch content in bread samples with 10% Banana Hump Flour and the addition of Xantan Gum</p>	<p>Analytical method</p>	<p>All of the bread samples showed a low in vitro starch hydrolysis rate which could provide breads with a low glycemic response</p> <p>Banana Hump Flour which is formulated</p>	<p>Total: 49 Year: 1970-2015</p>

<p>who are required to have a high-fiber diet.</p>	<p>Hydrolysis index and GI note that all samples of bread made in the laboratory showed a significant decrease when compared with commercial bread.</p>	<p>in bread and added with hydrocolloids can provide digestive health effects and can be exploited to be explored in commercial diet intakes for people who must consume low GI foods.</p>	<p>Total: 69 Year: 1951-2020</p>
<p><i>Background:</i> Biscuits with the addition of Kepok Banana Hump Flour contain high protein, low fat and low sugar. Therefore, they are beneficial for diet and health.</p> <p><i>Results and Conclusions:</i> the addition of banana pseudostem flour can reduce the physical quality of the final product. However, the addition of sodium carboxymethylcellulose can increase bread height, volume and density.</p>	<p>Title: Banana pseudostem substitution in wheat flour biscuits enriches the nutritional and antioxidative properties with considerable acceptability Author: Rakhi Chakraborty et all Publisher: SN research artikel.</p>	<p>In total sugar, the highest value was found in the 30% sample with the addition of Kepok Banana Hump Flour (KBHF) and the lowest in the 0% sample with the addition of Kepok Banana Hump Flour. In reducing sugar, the highest value was found in the sample of 0% addition of KBHF and the lowest was found in the sample of 20% addition of KBHF.</p> <p>For the sensory characteristics of biscuits, it is quite acceptable, especially in the 10% KBHF and 20% KBHF samples.</p>	<p>Experimental method</p> <p>Biscuits added with KBHF contain several bioactive compounds such as phenolics, flavonoids, ascorbate, proline. It also exhibits promising free radical scavenging activity.</p> <p>Biscuits with the addition of KBHF are high in protein, low in fat and low in sugar, so that they are beneficial for diet and health.</p> <p>Biscuits with the addition of KBHF have low humidity and high ash content followed by high paste temperatures and low viscosity so that they will provide a relatively longer shelf life.</p>

<p>Background: Bread containing banana pseudostem has high total phenol and antioxidant activity compared to normal bread.</p>	<p>Title: Bread towards Functional Food: An Overview Author: Ibrahim, Salleh, and Maqsood-ul-Haque Affiliation: University Teknologi Mara Publisher: International Journal of Food Engineering</p>	<p>The addition of banana pseudostem flour can reduce the physical quality of the final product. However, the addition of sodium carboxymethylcellulose can increase bread height, volume and density.</p>	<p>Experimental</p>	<p>Natural antioxidants such as flavonoids, tocopherols and phenolic acids can inhibit lipid peroxidase in food and improve food quality.</p>	<p>Total: 38 Year: 1995-2013</p>
<p>Background: Banana plants will produce high residues after the fruit is harvested and the latest research shows a biotransformation method using banana pseudostem extract to be used as a functional juice that contain a high biomolecular value and health benefits. Results and Conclusions: In the pseudostem bioprocess, bananas are estimated to contain prebiotic glucooligosaccharides and D-allulose.</p>	<p>Title: Biotransformation of banana pseudostem extract into a functional juice containing value added biomolecules of potential health benefits Author: Manisha et al Affiliation: Center of Innovative and Applied Bioprocessing (CIAB), Department of Biotechnology (DBT) Publisher: Indian Journal of Experimental Biology</p>	<p>The pseudostem juice extraction yields about 0.15 L of juice per kg of fresh biomass. The filtration is estimated to contain about 27.03 g/L sugar (11.25 g/L sucrose, 6.04 g/L glucose and 9.73 g/L fructose). Meanwhile, banana pseudostem juice which was concentrated as a retention of 5 Da showed 50.14 g/L consisting of 20.45 g/L sucrose, 11.37 g/L glucose, and 18.31 g/L fructose.</p>	<p>Experiment method</p>	<p>The nutraceutical component contained in banana pseudostem juice makes it potential as a healthy food source.</p>	<p>Total: 45 Year: 1995-2017</p>
<p>Background: This paintings offers with impact of banana (candy plaintain or 'kepok' variety) hump flour substituted to wheat flour withinside the making of noodle, on bodily, chemical, and sensory traits of noodle Result: Results confirmed that the exceptional bodily and chemical traits became proven with the aid of using noodle crafted from ten:ninety of banana hump to</p>	<p>Title: Physical, Chemical, and Organoleptic Characteristics of Dry Noodles at Various Ratios of Kepok Banana Hump Flour Authors: Asnani dan Abdul Rahim Affiliation: Tadulako University Palu Penerbit: AGROINTEK Year: 2019</p>	<p>The lower the percentage of banana hump flour substitution, the panelists accept the taste of noodles. So the amount of substitution of banana hump flour as the basic ingredient for making noodles is 10% -20%.</p>	<p>Experimental</p>	<p>The composition of noodles most acceptable of panelists is 10% banana hump flour with 90% wheat flour, and the best addition of banana hump flour is 10% -20%.</p>	<p>Total: 19 Year: 1985 -2013</p>

wheat flour, with 4.59% water absorption, 0.57% cooking loss, 10.37% water content, 34.21% starch content.

Conclusions: end result of sensory evaluation counseled that the maximum appreciated noodle became that crafted from flour percentage of twenty: eighty with 'like' for colour, texture, taste, and average preference and 'like very much' for aroma

Background: Banana is one of the earliest plants cultivated via way of means of guy and nevertheless stays because the staple meals crop for millions of human beings in tropical world. It isn't most effective a wealthy supply of without difficulty digestible carbohydrate however additionally offers critical nutrition B, C and numerous minerals along with potassium, calcium and magnesium and numerous medicinal properties.
Result and Conclusions: Every part of the banana plant has its benefits

Background: Banana is one of the most important and very useful plants in the world. Banana plantations in Indonesia produce organic waste (fruit peel, midrib and weevil) which can cause environmental pollution problems. Some parts of the

Even though it has a sweet taste, the glycemic index of bananas is low, so it doesn't really affect blood sugar. Bananas can help to low the blood glucose levels because of antihyperglycemic properties. Pseudostem contains fiber that can help weight loss.

Title: Medicinal benefits of Musa paradisiaca (Banana)
Author: Rajesh N
Affiliation: JSS College of Arts, Commerce and Science, B. N. Road, Mysuru, Karnataka, India
Penerbit: International Journal of Biology Research Tahum: 2017

Qualitative using literature review
Every part of the banana plant has benefits for humans.
Total: 15
Year: 1984 - 2013

Antidiabetic activity due to presence of flavonoids, phenolics, saponins and tannins, lupenone and sitosterol which show potential antihyperglycemic activity.

Judul: Review of Pharmacological Activity Reviews of Waste of Ambon Banana and Kepok Banana
Penulis: Desy Wenas
Afiliasi: National Institute of Science and Technology

Qualitative using literature review
The waste of Ambon bananas and Kepok bananas has many properties, namely anti-ulcer, antibacterial, antifungal, antioxidant, wound
Total: 34
Year: 1993 - 2016

banana plant have been known as traditional medicine in community.
Penerbit: Sainstech Farma Tahun: 2017

Result and Conclusions: Banana hump is used to treat worms in the digestive tract, diabetes, hemorrhoids, burns and cuts. All stem midribs are used to treat digestive disorders such as diarrhea, dysentery, cholera, removal of kidney stones, urinary tract and antidote to snake venom.

Background: The stem juices from *Musa × paradisiaca* L. banana flowers cultivated of their authentic herbal habitat in Vietnam and people cultivated in a greenhouse withinside the Czech Republic have been investigated for the presence of phytochemicals with antidiabetic potency
Result: From 17 anti-diabetic components, there are 12 antidiabetic components in the banana hump juice sample
Conclusions: Kepok banana hump juice contains antidiabetic components

Background: Among agricultural residues from banana manufacturing are the banana flowers, which stand up upon the bractaxis of the inflorescence

<p>and the complete pseudo-stem, that's left at the floor of the plantation. These by-merchandise were extensively utilized in conventional medicine</p> <p><i>Result and Conclusions:</i> In conclusion, this take a look at affords initial new facts on proximate composition and, especially, phenolic compounds profile, in DBF and DBPS, two byproducts from the banana enterprise presently neglected</p>	<p>Affiliation: Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria</p> <p>Publisher: International Journal of Food Science and Technology</p> <p>Year: 2021</p>	<p>extractable polyphenols (EPP) (in banana flower) that is 3,5-Dihydroxybenzoic acid Gentisic acid, Protocatechuic acid, Hydroxybenzoic acid, 4-Hydroxybenzaldehyde Benzoic acid, Caffeic acid, p-Coumaric acid, Ferulic acid, Quercetin 3,4'-O-diglucoside, and Quercetin 3-O-sophoroside.</p> <p>Phenolic compounds identified by HPLC-ESI-QTOF MS analysis in the hydrolyzable polyphenols (HPP) (flower banana) that is Protocatechuic acid, Gallic acid 3-o-gallate, Ferulic acid, and Isoferulic acid.</p> <p>Phenolic compounds identified by HPLC-ESI-QTOF MS analysis in the hydrolyzable polyphenols (HPP) (flower banana) that is Protocatechuic acid, Gallic acid 3-o-gallate, Ferulic acid, and Isoferulic acid.</p> <p>Phenolic compounds identified by HPLC-ESI-QTOF MS analysis in the hydrolyzable polyphenols (HPP) (banana pseudo-stem) yaitu Protocatechuic acid, p-Coumaric acid, Ferulic acid, and p-Coumaric acid ethyl ester</p>	<p>HPLC-ES-QTOF MS technique</p>
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Component and Benefits of Kepok Banana Pseudostem Flour

Based on the study, it is known that banana pseudostem contains antidiabetic components, namely lupenol, ferulic acid, vanillic acid, trans-cinnamic acid, p-hydroxybenzoic acid, p-coumaric acid, rutin, catechin/epicatechin, chlorogenic acid, gallic acid, and caffeic acid (Sarma, 2014). Based on the results of previous research conducted by (Florent, 2015) and (NUSANTARA, 2018) it is known that the nutritional content per 100 grams of kepok banana hump flour is 79.16% carbohydrates, 0.99% water content, 2.15% fat, 3.58% protein, 1.83% ash content and 29.62% crude fiber while the nutritional content per 100 grams of low protein wheat flour is 77.3%, 12.0% water content, 1.3% fat, and 8.9% protein, while the content of ash and crude fiber was not found in low protein wheat flour. Therefore, from the results of the data above it is known that the kepok banana hump flour contains higher crude fiber when compared to low protein wheat flour. While the kepok banana pseudostem flour contains several macromineral substances including 79.16% carbohydrates, 2.15% fat, 3.58% protein (Florent, 2015) and 29.62% crude fiber, 0.99% water content, and 1.83% ash content (NUSANTARA, 2018).

In addition to containing the macromineral substances, kepok banana pseudostem flour also contains micromineral substances, such as potassium, sodium, calcium, magnesium, and phosphorus. In another explanation, it is known that the use of kepok banana pseudostem flour in the making of biscuit products will increase the nutritional component of these products, namely high protein content, low fat and low sugar (Kartini, 2019) and high fiber (Lindström, 2006) therefore, it is beneficial for diet and health. The high fiber component of 29.62% and the low glycemic index of 25.5 in the kepok banana pseudostem flour can be used as an innovation in the selection of basic ingredients for making bread for diabetics. The glycemic index (GI) is one of the concepts important things to ask in choosing the right food suitable for DM patients. GI is a measure of speed a food increases blood glucose levels after consumed (Ingwersen, 2007). Low GI value is below 55, medium GI between 55 to 69, and GI high above 70 (Atayoğlu, 2016).

Organoleptic of Kepok Banana Pseudostem Flour

The innovation of using kepok banana pseudostem flour in the making of processed products such as bread, can increase the shelf life of these products. This is reinforced by the research conducted by Chakraborty R. et al, (Chakraborty, 2021) in the making of biscuits using kepok banana pseudostem flour where the product shelf life can last longer because kepok banana pseudostem flour has a low viscosity value. As for other characteristics, kepok banana pseudostem flour has a tart and bitter taste due to the sap which contains saponins and tannins. The flavor produced by the kepok banana pseudostem flour is a typical kepok banana pseudostem flavor. The texture of the kepok banana pseudostem flour is rough so it requires a twice sifting process to produce banana pseudostem flour with a smooth texture (Slamet, 2019). The color of the kepok banana pseudostem flour is brownish white color (Saragih, 2019). Thus, to create the whole aspects of taste, flavor, texture, and color that are acceptable to consumers, it is necessary to be concerned about the composition of kepok banana pseudostem flour in bread making.

Previous study conducted by (Asnani, 2019), stated that the addition of 40% kepok banana pseudostem flour to the pukis dough will produce a distinctive flavor of kepok banana pseudostem flour with a strong taste, rough texture, a bit hard, and a dark brown color. This occurs because the addition of excessive kepok banana pseudostem flour will produce a darker color, the dough does not expand, and makes the dough difficult to form. Meanwhile, the addition of 10% and 20% of kepok banana pseudostem flour will produce pukis with an aroma and taste that resembles pukis dough using 100% wheat flour, with a soft texture. Pukis color at the addition of 10% produces a brownish white color and the addition of 20% produce milk chocolate color. Therefore, in making kepok banana pseudostem bread, the best dose is 10% or 20% flour to create an acceptable taste, flavor, texture, and color.

Dosage and Method of Making Kepok Banana Hump Bread

The process of making Kepok banana pseudostem Bread, it starts from making the pseudostem flour which includes selecting the fresh banana pseudostem, cleaning the pseudostem, cutting, soaking, drying the pseudostem slices and refining the dry pseudostem. As for the dosage in its production, it is explained as follows Table 3

Table 3. Dosage and Method of Making Kepok Banana Hump Bread.

Ingredients	Recipe/Dosage
Kepok banana pseudostem flour	300 g
Butter	45 g
Stevia sugar	20 g
Instant yeast	6 g
Warm water	110 ml
Egg	55 g
Milk powder	25 g
Milk	55 ml
Salt	4 g

The steps were taken after the process of making kepok banana pseudostem flour are by mixing flour, warm water, and sugar, then stirring until evenly distributed. Then mix with milk and eggs. Prepare kepok banana pseudostem flour, powdered milk and instant yeast, then mix all ingredients until smooth. After that, mix the ingredients above until half-smooth, then add butter and salt. Knead the dough again until it is smooth and elastic. Grease the container with oil, then add the dough to the container and let sit for 15 minutes or until the dough have doubled size. Roll out the dough with a rolling pin until the bubbles are evenly distributed. Then, roll the dough and put it in a baking dish that has been smeared with margarine. Wait for the dough to expand almost to the surface of the pan, then put it in the oven at 170-180°C for 25-30 minutes or until the dough is evenly cooked.

From the overall discussion, it is known that both in terms of nutritional content and the components of the ingredients used in making kepok banana hump bread indicate that this banana hump bread can support the implementation of a diet in diabetics. This is because the kepok banana hump bread contains a high fiber content of 29.62% and a low glycemic index of 25.5. According to Nadimin (2009), states that if patients with diabetes mellitus perform a high fiber diet regularly and under control, it will reduce HbA1C levels by 2.7% and reduce the average blood sugar level as much as 82 mg/dL. According to Franz (2012), consumption of foods high in fiber and low in glycemic index can improve insulin sensitivity, reduce the rate of glucose absorption, and is beneficial in controlling blood glucose so as to reduce the risk of complications in diabetes mellitus sufferers.

CONCLUSION

Diabetes has become a health problem that causes chronic complications such as heart disease, kidney failure, stroke and the risk of death that can reduce life expectancy, quality of life, and can increase health and mortality rates, so interventions are needed, especially in food intake. Discipline in the process of treating Diabetes Mellitus is very important to note, such as in terms of food consumption. The recommended food intake for diabetics is low on the glycemic index and high in fiber. Diabetics are advised to eat foods that contain a low glycemic index. The Innovation of Kepok Banana Hump Bread can be used as an alternative for diabetics in controlling and lowering blood sugar levels (below 55). The Kepok Banana Hump Bread contains 25.5 glycemic index and 29.62% crude fiber. The low glycemic index and high crude fiber make banana kepok buns highly recommended

for diabetics. Kepok Banana Hump Bread contains flavonoids, saponins, tannins, triterpenoids, lupenol, ferulic acid, vanillic acid, trans-cinnamic acid, p-hydroxybenzoic acid, p-coumaric acid, rutin, catechin/epicatechin, chlorogenic acid, gallic acid, and caffeic acid. In creating aspects of taste, aroma, texture, and color that are acceptable to consumers, 10% or 20% of the composition of banana kepok hump flour can be added.

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