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THE INFLUENCE OF CONSUMPTING *RHYNCOPHORUS BILINEATUS VAR PAPUA* AGAINST RAISING NUTRITIONAL STATUS FOR CD4 BLOOD OF PATIENTS WITH HIV/ AIDS IN PAPUA PROVINCE YEAR 2016.

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ABSTRACT

HIV/AIDS is an infection desease that as pandemic has been spreading increasingly around the world. HIV virus worked to destroyed human immune system, that the patients lost their immune, easy to get infected and then die because of deseases complication. Protein as the part of antibody system, those molecules consist of amino acids sequences that important to protect body towards infections.

This research aim is to observe the influence of consumpting Rhyncophorus bilineatus var Papua with Rich-chain amino acids would be enough to raising the CD4 blood as the standart of human immunity to HIV patients in Jayapura year 2016.

This type of research is based on true experiment with the design of a randomized control group pretest-posttest. Techniques of data collection includes several stages. First; election sago and sago extraction process are packed into capsules, the second stage; the intervention on 14 of object research. A total of 14 people infected by HIV aged between 17-49 years who voluntarily recruited for this study. Before participating in the study, all subjects will be made to the medical examination to obtain preliminary data about the health condition of the data subject and CD4 in the blood. Preliminary data before the intervention and after intervention includes data: weight, height, arm circumference (MUAC). Data analyzed using Shapiro Wilk normality to determine if the data is spread normally followed by t test.

The results showed that silkworm sago extraction contains eight (8) essential amino acids compounds: Phenylalanine, Isoleucine, Lysine, Leucine, Threonin, Valine, Methionine and Tryptophan and contains three (3) essential fatty acids, their compunds are: Omega 3, Omega 6 and Omega 9. Results of ANOVA test revealed no significant effect of extract preparations sago with improved nutritional status of people living with HIV while Anova test results of the CD4 is known that there is a significant effect of extract sago with an increase in CD4 blood of people with HIV (p = 0.025 < 0:05).

K***ey words: Rhyncophorus bilineatus var papua, CD4, Human Immunoimuno deficiency Virus.***

INTRODUCTION

1. *Background*

The purpose of national development in the food sector, among others, the achievement of a strong national food security. In Act No.7 on Food (1996) stated in Chapter VII, Article 45 (no.1) that, "The government has the responsibility to achieve food security". Food Security itself stated in Chapter I (general provisions) Article 1 point 17, which reads, "Food security is the fulfillment of the conditions of food for households which is reflected in the

availability of adequate food, both in quantity and quality, safe, equitable and affordable". Furthermore, the provisions of the Chapter VII (Food Security) elaborated on the role of diversification of food as one of the strategic pillars achievement of food security; including: Article 46, which states that in order to achieve these objectives, the government set and held a national food quality policy and diversification of food. (Hariyadi, P., *et al.,* 2004).

Seen that effort diversification of food is one of the basic prerequisites sufficient in food consumption and nutritional quality. Efforts to diversify people's food is actually not new. Some important milestone in the effort diversification of food, in the 1950s has made efforts through the People's Food Improvement Committee; 1963 developed Effort Nutrition Improvement through People's Food Improvement Committee; 1974 issued Presidential Decree 14/1972 concerning Business Family Nutrition Improvement and Repairs Food Society Menus (PMMR) which is then refined in the Presidential Decree 20/1979, continue the process earlier on Pelita VI has been developed also Diversified Food and Nutrition Program (DPG). , (Hariyadi, P., *et al.,* 2004)

Based on the ideas developed in the Food Simposium Food Diversity 2003, the diversification of food of the future is the business diversification of food to the status of better nutrition and healthier, avoid food dependence, and develop on community participation. This occurs when; (1) from the aspects of food consumption, diversification of sources of carbohydrates from rice domination becomes more diverse, as well as on the composition of the dominant carbohydrate diet becomes more balanced diet (carbohydrates, protein, vitamins, fiber and so on). (2) from the aspects of basic production, food diversity will be based on local resources and local, as well as by increasing the role of private sector and government.. (Hariyadi, P., *et al.,* 2004)

Sago role in people's lives, especially those living in Eastern Indonesia should not be ignored. Sago has a very high social value. Louw (2001) in Lakuy and Limbongan (2003) states that sekurangkurangnya there are three main roles sago for indigenous people of Papua, especially the region of Lake Sentani namely: (1) as a staple food, (2) a source of household income, and (3) binding togetherness for owners who donate additional acreage sago sago stands to fellow citizens who do not have.

Bintoro (2003) reported that in Malaysia sago starch utilization has grown wider, namely for the manufacture of liquid sugar, flavoring food (monosodium glutamate), noodles, caramel, sago pearls, cake cracker, household, industrial adhesives and other industries. With the development of technology turns raw sago starch can dijadikanbahan for the manufacturing of plastic (biodegradable plastic) (Pranamuda *et al*, 1996), and as filler (extender) plywood adhesives. In addition, sago starch has potential and good prospects as a fermentation substrate acetone-butanol-ethanol (Gumbira *et al*, 1996).

Sago is a clump of plants and reproduce by forming tillers. Sago starch (carbohydrate), and is usually harvested after the age of many years. But if the plant is cultivated properly, sago can be harvested at many years (Flach 1980). Potential sago tree ready for harvest in Maluku estimated at 86 trees / ha / year (Alfonso *et al.* 2004).

Waste of harvest sago trees vary and generally untapped. One of these wastes are shoots sago). These wastes can be a place for red palm beetle *(Rhynchophorus ferrugineus)* to lay eggs. Sago plantation in Maluku generally adjacent to the coconut plants, so that when the eggs hatch in the sago waste and become beetles feared could become a pest in coconut plantations. Red beetle larvae known as sago palm.

Sago sago beetle larvae *(Rhynchophorus* sp.) Is actually a plant pest sago (Harsanto, 1990; Rumawas, 1990). But when seen from the content of nutrients, it can serve as a source of protein (Rumawas, 1990; Sediaoetomo, 1993). Most communities in Papua besides taking sago starch, remnants of plant stems are used to cultivate sago sago.

Sago's Papuan and Moluccan generally consumed as a complementary sago *(papeda)* (Haryanto & Pangloli, 1992). Utilization remains of sago palms that have been in tokok (taken the starch) large enough role in reducing waste generated. The people generally utilize and take sago from the rest of the processed directly in the forest.

In Indonesia, the spread of sago quite extensive, ranging from Aceh, West Sumatra, Riau, Kalimantan, West Java, Bali, North Sulawesi, South Sulawesi, Maluku and Papua. According to Flach *et al.*, (1977), from all areas of the world sago estimated 2.2 million to 1.2 million hectares or 55% are in Indonesia. While Papua has an area with the highest sago forests in Indonesia. True sago plants by Heyne (Notohadiprawiro & Louhenapessy, 1992) were divided into two groups according to the presence or absence of spines on the petiole. These groupings are used in Papua, because traditionally people differentiate based on the existence of the bur.

In Jayapura, which is one of sago production center found 16 species were classified according to indigenous knowledge thnic Moy. Moy ethnic divide sago types based on the presence or absence of thorns on the stem, stem and petiole, leaf number, leaf length and width, as well as color and flavor sagunya (Renyaan *et al.*, 1996). Sago is not prickly found 10 species, namely *Debit Manangra, Debit embian bahley, Debit colorful, Debit embian, Debit demisba, Debit Kluyo, Debit yeblum, Debit daysiabu, Debit Banu and Debit srom.*, While sago thorny consists of 6 types , namely: *yokali Fleas, Ticks menggeng, mamakutu Fleas, Ticks dundu, swaplen Fleas and Ticks blup.* This diversity will be a wealth of germplasm resources as well as the media source development sago.

Several studies have already shown the nutritional value of sago in a raw state (Table 1).

Table 1. Nutritional Value Silkworm Sagu

NO	CONTENT	RESULTS OBTAINED	DM BASIS
1.	Crude Protein (%) Average	7.0 4.8 3.2 5.0	20.1 13.6 9.2 14.3
2.	Crude Fat (%)	19.2 15.8 32.0 22.3	54.8 45.2 91.2 63.7

Source: Moniaga (1980).

Aside from being a pest of coconut, beetle is also a pest on plants other palms, such as sago, palm, palm, and NYPA. Beetles usually only interested to lay eggs on plants that have died, the injured parts of palm trees, and the rest of the harvesting sago shoots.

Oil plants were attacked by beetles is characterized by drooping leaves as the base of leaves eaten by the larvae. Unlike the rhinoceros beetle, beetle also attacks red palm oil plants. Thus, the potential development of sago and prospects for utilization as a source of protein is quite good in Papua.

Sentani people in the region in particular and Papua in general very fond of sago as foods that have cultural value and an important source of protein. This is in line with the government's program in nutrition improvement and development of new local food products including diversification of sources of both animal and vegetable protein. No exact data on the production of sago from Sentani area, but it is known that many common sago and guaranteed availability every day for consumers who want to buy it. The number of consumers who are very fond of sago worm proves that the taste, aroma and taste preference level in accordance with the public both Papuan and non-Papuan.

Sago cooking process is quite simple, usually just grilled or roasted together with sago and wrapped in banana leaves or made satay. At the time of roasting or combustion, it turns sago spend a lot of fat or oil. From the observation of the oil produced emit a distinctive odor and continuously out of the roasting

process, making the baked sago increasingly tempting consumers to consume. Based on the reasons noted above, the researcher is interested to explore beyond the "Quality Oil Extract preparation and Silkworm Sagu *(Rhyncophorus bilineatus)* in the region Sentani Jayapura District", to obtain basic data of new product development of local raw materials in Papua.

2. LITERATURE REVIEW

2.1. Scope of Plant Sago

Sago (sago Metroxylon rottb) is one of the oldest plants used by the people in Southeast Asia and Oceania. Sago plantation area in the world about 2 million hectares, with a production capacity of 2.5 to 5.5 tons per hectare of dry corn starch (Flach, 1983). Potential sago in Indonesia in terms of a very large extent. About 60% of world corn acreage in Indonesia. The available data indicate that the total area of sago Indonesia according to Professor Flach reach 1.2 million hectares with production ranging from 8.4 to 13.6 million tonnes per year, and approximately 90% are in Papua. Sago is one of the major food source for some people in some parts of the country in the world.

Deployment of sago palm in Indonesia, especially in the area of Papua, West Papua, Maluku, North Sulawesi, Central Sulawesi, Southeast Sulawesi, South Sulawesi, South Kalimantan, West Kalimantan, Jambi, West Sumatra (Mentawai), and Riau. The Directorate General of Estate reported that corn acreage and production concession in 2011 according to a row just 100 616 ha and 95 162 tonnes (Directorate General of Plantation, 2011). If seen from this data is very small, do not be surprised if the development sago government received less attention. The area of sago should be seen as cultivated plants / semibudidaya and sago in forest areas. Sago forest exploitation without the correct rehabilitation appeared to have a lot of damage sago forests and ecosystems over the years.

Sago role in people's lives, especially those living in Eastern Indonesia should not be ignored. Sago has a very high social value. Louw (2001) Lakuy and Limbongan (2003) states that there are at least three main roles sago for indigenous people of Papua, especially the region of Lake Sentani namely: (1) as a staple food, (2) a source of household income, and (3) binder togetherness for acreage owners who donate sago sago stands to fellow citizens who do not have.

Bintoro (2003) reported that in Malaysia sago starch utilization has grown wider, namely for the manufacture of liquid sugar, flavoring food (1), noodles, caramel, sago pearls, cake cracker, household, industrial adhesives and other industries. With the development of technology turns sago starch can be used as raw material for the manufacture of plastics (2) (Pranamuda., 1996), and as a filler material (3) plywood adhesives. In addition, sago starch has potential and good prospects as a fermentation substrate acetone-butanol-ethanol (Gumbira, 1996).

2. *Sago Genetic Diversity in Indonesia*

Sago plantation area in Papua reached 90% of the total area in Indonesia. Sago palms allegedly came from Papua. This opinion is based on the results of studies and reports from some researchers sago. It turned out that species diversity is greatest sago in Papua than in some other sago areas such as Maluku, Sulawesi, Riau and Riau Islands. Based on the research the types of sago in Indonesia that has been done by a number of researchers is Pangkali (1994) in Papua, Allorerung and Apex (1995) in Jayapura, Miftahorrachman and Novarianto (1996) in Maluku, Widjono. (2000) in Papua, Tent. (2003) in Southeast Sulawesi, and Novarianto (2012) in Riau showed that the number of accessions or types of sago with the highest level of morphological diversity found in Papua. Exploration results the types of sago is reinforced by the research based on molecular markers that do Barahima. (2001) which concluded that the Phylogenetic analyzes proved that sago population in Papua has a very high diversity. These results reinforce the notion that the sago plants came from Papua, and then spread to other regions in Indonesia.

3. Exploration And Germplasm Collection Sagu

Germplasm is the substance of nature is a source of genetic ancestry in the assembly of superior cultivars. To get the necessary genetic resources

superior germplasm collections are quite a lot and have a broad genetic diversity. A crop germplasm collections obtained through exploration and genetic diversity can be identified through the evaluation of the characteristics of germplasm. Exploration germplasm sago was started by researchers Crops Research Institute for Oil and Palma Other Village Kehiran, District Sentani, Papua in 1993, followed by the identification of the types of sago based morphological diversity of vegetative and generative (Allorerung., 1994; Novarianto., 1996). Malia and Novarianto (1994) reported that in the village of Tamilouw, District Amahai, District

Central Maluku found sago population by land rather dry and stagnant water in the long term, with Tuni sago starch production reached 500 kg / tree. The evaluation results Allorerung and Apex (1995) in Jayapura shows that there are 6 types of sago and of which there is a potentially high yields (150-200 kg wet starch / tree). Meanwhile, a survey in the village of Piru, Eti and Neniari, District of West Seram, Maluku Tengah four species, namely sago sago Tuni, Ihur, Makanaru and Molat (Miftahorrahman and Novarianto, 1996).

Sago plantation area in Papua reached 90% of the total area in Indonesia. Thus the genetic diversity found in Papua largest sago. Pangkali (1994) divides the 20 types of sago origin Sentani, Jayapura in two types: (1) sago thorns or Mart (consisting of the Huphon, The Hondsay, Rondo, Munggin, Puy, Manno, Epesum, Ruruna and Yakhalope), (2) sago, spineless or Rottb (consisting of: Yepha Hongsay, Yepha Hongleu, Yepha Ebung, Osokhulu, Follo, Pane, Wani, Ninggih, Yukulam, Hapolo, Yakhe, Hili, Fikhela and Hanumbo). From the results of a survey conducted by Widjono. (2000) note there are 61 kinds of corn are scattered throughout the territory of Papua with details of 35 species in Jayapura, 14 types in Manokwari, 3 types in Merauke, and 9 types of sago in Sorong either spiked or not spiked. BPTP Papua observation results show that in Sorong there are eight types of sago ahead with production potential of over 250 kg of starch / tree. In 2002 obtained the information that there is a kind of sago origin Sangihe Talaud, North Sulawesi, which grows well in soil without stagnant water and is known as sago baruk *(Arenga microcarpa)*. Furthermore, a survey conducted by the tent. (2003) in the village of Lakomea, District Kendari, Southeast Sulawesi and obtained three types of sago types

, Among these are the types of sago sago unique is the type that has unique Rondo where the pith can be eaten after baked or fried like yams. This type of spiny sago short and smooth, meeting growing spread on the surface of the base of the frond and growth leads to the base of the frond spines.

According to information from farmers, commonly used is a kind of sago Yebha for the production of high aci, white, tastes good, more durable once made food (2-3 days), skin thick trunk and well made floors of the house, while the leaves are used as roof. Sago sago Yaghalobe including potential but on the pitch was a bit hard to find. According Miftahorrahman and Novarianto (1996) in West Seram, MalukuTengah found saguTuni, sago and sago Makanaru Molat.

The results of the identification done by Tenda. (2003) there are three types of sago consisting of (1) sago is not spiked with the local name Tawaro roe classified or sago Molat, (2) sago large spiked, stem form tall called Tawaro rungga manu classified or sago Tuni, and (3) sago short spiked and had a size small stalk called Tawaro rui classified or sago Ihur. The average results of sago starch obtained adalahTawaro roe 374.5 kg, manu Rungga Rui 186.2 kg and 89.6 kg. Usually, farmers prefer to cultivate the types of sago roe in addition has a high yield, also has a white starch. Some types of sago potential to be used as plant material in the development program sago sago several major producing regions are presented in Table 1. Production of starch greatly depends on the age of the plant and the number of leaves that are formed because of the rapid growth can be formed when the two leaves per month while tomely the formation of starch accumulation, the number of leaves that form only one sheet per month. Results of research Oates (2001) concluded that the starch yield per plant in Jayapura amounted to 250 kg per tree. Some types of potential sago that can be used in the development of sago in Papua is the kind of sago Osoghulu, Ebesung, Yebha, Follo, Wanni and Yagholobe. Sago yield potential varies between 150-200 kg per tree wet sago (Novarianto., 1996).

According to Widjono. (2000) some kind of sago potential that can be used in the development of sago in Papua is Igoto, Mogabarasu, Kumpea, Kao, Mando, Menopo, Munggina, Osokulu, Hungleu, Panne, the haphon, The hongsay, Rondo hungleu, Segago, Warning , Hungku, Wikuarawi, Wimir,

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Wimor, Witar, Witarsomoy, Witune uwai, Wicko wuru, Yepha hungleu and Yepha hungsay. Sago yield potential is varied, ie 150-200 kg per tree wet sago.

Table 2. Characteristics and Potentially Some Sagu type Superior

No.	Type Sago	Place of Origin	Characteristics				
			High rod	Lingk rod	stalk nature	Color Pati	Production of. Starch / tree (kg)
1.	Tuni	Moluccas	12:50	236	Thorny	White	500
2.	Molat	Moluccas	12:00	157	Thorny	White	300
3.	Ihur	Moluccas	16:00	188	Thorny	redness	150
4.	Osoghulu	Papuan	10:32	156	spineless	cream	208
5.	Ebesung	Papuan	8:52	113	Thorny	Grayish white	207
6.	Yebha	Papuan	12.60	128	spineless	red-brown	192
7.	Follo	Papuan	9:25	140	spineless	Grayish white	176
8.	Wanni	Papuan	9:30	153	spineless	cream	160
9.	Yagholobe	Papuan	10:22	134	Thorny	Grayish white	156
10.	Roe	Sultra	10:40	163	spineless	White	186
11.	Rungga manu	Sultra	8:30	163	Thorny	White	186
12.	baruk	Flammable	8:00	60	spineless	White	25

(Source: Tent, 2003)

The identification and characterization of various types of indigenous plants of Papua including sago concluded that the varieties of Para, Pane, Yepha, Osohulu, Rondo, Wane, Happolo is a type of corn that has the potential production of sago starch is high (Lakuy and Limbongan, 2003). Furthermore, the results of research Miyazaki (2004) on some kind of sago around Lake Sentani in Jayapura showed the production of starch produced from the type of the tallest followed Yepha types, Follo, and Osukul. From these studies also identified the type of corn that produce starch as red as Manno, Mongging, The Hongsay, Puy, Yakhalobe, Osuhulu, Hongsay danYepha Hongsay.

3.Ulat Sagu (Rhyncophorus bilineatus)

Sago worms are the larvae of the red palm beetle *(Rhynchophorus ferruginenus)* and great potential as a source of protein. Can be used as a nutritious side dish (without cholesterol) or ingredient substitution of animal feed. As for the content of nutrient composition contained in sago worms can be seen in Table 1 below.

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Table 3. Chemical Composition of Silkworm Sagu (dried at 70 ^{0} C)

NO	COMPOSITION	CONTENT
1.	Protein	34.79
2.	Fat	54.03
3.	Water	8:42
4.	Ash	2.70
5.	Fiber	1.60

(Source: Purnamasari.2010)

The results of the analysis of amino acid content using RP-HPLC and Spectrophotometer acquired 16 amino acids, 8 amino acids of which are equally essential amino. More details can be seen in Table 2.

Table 4. Composition of Essential Amino Acids In Ulat Sagu (dried at suhu70 ^{0} C).

NO	TYPE essential amino acids	CONTENT (Mg / g)
1.	isoleucine	88.53
2.	leucine	130.79
3.	lysine	110.00
4.	methionine	32.44
5.	phenylalanine	74.18
6.	tryptophan	39.45
7.	threonine	70.52
8.	Valin	103.07

(Source: Purnamasari. 2010)

According Soediatama (1991) if the food source of animal protein has more than five kinds of essential amino acids and chemical values between 65-100, the food is a source of animal protein is of good quality, while the value of chemistry sago at 77.53 mg / g.

Sago adult beetles will lay their eggs in holes gerekan *Oryetes sp* or on the shaft of the injured as deep as ± 3 mm. The eggs are laid scattered, amounts to ± 530 grains. Egg stage lasts ± 3 days. (Moniaga, 1980; Harsanto, 1990; Haryanto and Pangloli, 1992 in Purnamasari, 1997) Further development is grub (larvae), which lasts for 3-4 months. Sago beetle larvae are not cutting edge and no legs. Agency larger rear than the front. Gingery head, jointed body is very short. The larvae mature measuring 4-6 cm by 3 cm wide (Suhardiman in Purnamasari, 1997)

Phase larvae will turn into a chrysalis phase and this phase will last for ± 2 weeks. Length of 6.5 cm to 3.5 cm wide, then from the cocoon will appear beetles will stay ± 3 weeks in the trunk (Harsanto, 1990; Suhardiman, 1990 in Purnamasari, 1997)

The adults (imago) trunk-shaped mouth piece, the difference straight male beetles and hairy snout beetles while females slightly bent down and bare. Adult beetles the size of 3-4 cm black. Active

flying at night and sometimes lay eggs at night (Purnamasari, 1997).

5.Harvest time Ulat Sagu

The time of harvest sago closely related to red palm beetle cycle, which starts from the egg, then larval instar 1, 2, 3, 4, 5, 6, followed by a pupal stage until later becomes imago and adult beetles (Figure 3). Sago best harvest time is the larval instar 5 and 6, or the age of 39-45 days from sago logs found no eggs. Instar larvae 5 and 6 to the age of 39-45 days have respective weights from 4.10 to 5 g and 5.10 to 6 g. 6 in star larvae nearing a cocoon, so a growth of more than 45 days is a critical time for harvesting. Therefore, a good harvest is 39-45 days after harvest sago.

3. PURPOSE AND BENEFIT RESEARCH

3.1. Research purposes

The purpose of this research is:

1. Know the profile of essential amino acids and essential fatty acids in the extract preparation / sago flour.
2. Know the profile of essential amino acids and essential fatty acids in the oil extract preparations and sago

3.2. Benefits of research

This research can provide benefits to:

1. The Government through the Ministry of Health of the province of Papua in policy making and programming eradication of malnutrition with the use of local foods to improve nutrition.
2. Papuans, however, to keep the culture of eating sago, as a source of protein, especially for the growth of children of school age and replenish the nutritional needs of pregnant women.
3. Researchers, as reference to find a new breakthrough development of food ingredients made from sago, as a prevention strategy that malnutrition in the community
4. Students, an mendapatk new referents to enrich the thinking and creativity in applying the science of nutrition to be applied to the public. In addition to those who are interested to develop sago as base materials research can improvise to design new research on food raw materials for the benefit of society.
5. The creation of s u atu food products as raw materials of food ready to be a functional food or raw material quality.

4. RESEARCH METHODS

1.Types of research

This research is a quantitative research with laboratory experimental approach.

2.Research sites

The study is in its implementation will be using three locations, namely:

a. Sentani, Jayapura district, for sampling sago
b. Chemistry Laboratory UNCEN, manufacture dosage extract / powder and oil sago.
c. Laboratory of Molecular Biotechnology Saraswanti in B ogor, for the analysis of essential fatty acids and essential amino acids in the extract preparation / sago powder and oil.

3. Research procedure

Sago obtained came from Sentani, Jayapura district as many as 300 fish weighed, washed clean and aerated. After a rather dry inserted in the tool brands Einfacht drier at 65 ^{0} C for ± 2 hours. Once dry, thinly sliced sample was mixed with 96% ethanol at a ratio of 1: 7 and let stand for 3 days, and then enter it in the tool shaker for 1 hour at a speed of 125-130

ppm. Oil solution sago and ethanol evaporated in Rotary evaporator selama1,5 hours remaining until the oil just sago. Then oil caterpillar is placed in a special container, irradiated with UV and stored in a container that is already filled silica gel and are ready to be sent to the laboratory medicinal IPB.

4.Variable definition

a.Sago is red beetle larvae that live on rotting sago after he took the starch. Ber ages 1.5 to 2 months in a fresh state and life. Yellowish white and black mouth parts.

b. Preparations / sago flour in [eroleh from the extraction of sago, after maceration with 96% ethanol, filtered and dried in a food dehydrator for 1 hour.

c. Oil Worm Sago is the oil obtained from the extraction of sago with ethanol at a ratio of 1: 7, and then the solvent is separated from the oil sago using a rotary evaporator.

5.Data collection technique

a. Silkworm Selection Sago

Sago caterpillar that will be used in this research is the sago from Sentani, Jayapura district aged 1.5 - 2 moon, GEMU yellowish white and black mouth, lived on sago trunk rot, still fresh and alive.

b.Making oil sago

c. Analysis of Amino Acids and Fatty Acids

Caterpillars oil sago Biofarmaka taken to the Laboratory for testing the content of essential amino acids and essential fatty acids. The results of laboratory analysis of medicinal IPB will be the basic reference for developing new food products.

6.Analysis and Data Processing

Data content of essential amino acids and essential fatty acids will be presented in a bar chart and described.

5. RESULTS AND DISCUSSION

1.Research result 5.1.1. Silkworm extract preparations Sagu

Analysis of the chemical composition of a food is very important to obtain information about the nutritional content contained in these food ingredients. From the test results the composition of the amino acids in the extract preparation sago (Rhyncophorus bilineatus) obtained the results as follows:

Table 5. Chemical Composition of Amino Acids Silkworm extract preparations Sagu (Rhynchoporus bilineatus)

No.	Amino Acid Type	Results (ppm)
1	Phenylalanine	48389.00
2	Isoleucine	22474.02
3	Lysine	13851.31
4	Leucine	35528.73
5	Threonine	32888.21
6	Valin	25125.62
7	Methionine	7649.71
8.	Tryptophan	4079.73

(source: Ipb, 2015)

Table 5 above shows that in the preparation extract sago (Rhyncophorus bilineatus) identified eight types of essential amino acids required by the body, namely; Phenylalanine, Isoleucine, Lysine, Leucine, Threonin, Valine, Methionine and Tryptophan. Limiting amino acid in the extract sago worms are Tryptophan. Limiting amino acid is an amino acid that is usually much less present in these foods. Cereals (rice, bread, etc.) The limiting amino acid is lysine, while in group legumes (beans) usually is the amino acid methionine. (Winarno, 2002).

According Soediatama (1991) if the food source of animal protein has more than five kinds of

essential amino acids and chemical values between 65-100, the food is a source of animal protein is of good quality, while the value of chemistry sago at 77.53 mg / g.

The result of fatty acid composition contained in the extract preparation sago (Rhyncophorus bilineatus) as follows:

Table 6 Chemical Composition of Fatty Acids Silkworm extract preparations Sagu (Rhynchoporus bilineatus)

No.	Type Fatty Acids	Results (mg / 100 g)
1	Omega 3 (linolenic acid)	269.10
2	Omega 6 (Linoleic Acid)	533.30
3	Omega 9 (Oleic Acid)	14388.40

(source: Ipb, 2015)

Based on Table 6 above shows that in the preparation extract sago (Rhynchoporus bilineatus) there are three types of essential fatty acids, ie fatty acids Omega 3, Omega 6 and Omega 9 essential fatty acids are the types of fatty acids that are needed by the body, while the body is not can be synthesized, so that the needs of the type of fatty acids omega 3, omega 6 and omega 9 should be met through food intake consumed. (Almatsier, S. 2005)

4.1.2. Extract Oil Worm Sago

In addition to producing high-protein preparations sago, sago worm also produce oil which after analysis contains essential fatty acids that the body is in need. The nutrient composition of essential fatty acids that can be seen in Table 3 below.

Table 3 Chemical Composition Fatty Acid Extract Oil Worm Sago (Rhynchoporus bilineatus)

No.	Type Fatty Acids	Results (mg / 100 g)
1	Omega 3 (linolenic acid)	1188.10
2	Omega 6 (Linoleic Acid)	2315.10
3	Omega 9 (Oleic Acid)	43953.70

(source: ipb, 2015)

The protein content in the oil extract sago yet detectable bias for bond fat in fatty acid omega 9 zigzag shape and influence the boiling point of the fatty acids to extract the soluble protein (Brown, D. 2022), so it needs the newest method for oil-soluble detection for protein the sago. Instead preparations sago oil contains many fatty acids linolenic acid (Omega 3) and linoleic acid (Omega 6). Both types of essential fatty acids required by the body for normal growth and function of all tissues.

6. DISCUSSION

1. Amino acids in Extract Stock of Rhizophorus billineatus.

Protein is one macronutrient foodstuffs other than carbohydrates and fats play more important roles in the formation of biomolecules energy sources. Amino acids are the main constituent of the protein component, which was divided into two groups: essential amino acids and non-essential amino acids. Essential amino acids can not be synthesized by the body, in order to Obtain from food consumed. While non-essential fatty acids can be synthesized by the body. Amino acids are generally in powder form and is easily soluble in water. (Harper et al, 2008; Suhartono, 1970; Sutiari, et al., 2010) Essential amino acid is a parameter determining protein quality (Wu, et al., 2010). The higher levels of essential amino acids in a food, the better the quality of the food protein. Protein quality is determined by the type and proportion of amino acids it contains.
Several types of proteins contain all the essential amino acids, but each in a limited amount, but enough for tissue repair, but not enough for growth. If there are simultaneously in the daily diet of some kind of protein can complement each other in amino acids. Research has been carried out by Sutiari, et al (2011) comparing the amino acid content in seredele (traditional food of Bali) with tempe soybean said that if seredele consumed together with tempeh then the lack of amino acids to one another is able to be covered by excess acid amino from other proteins. Two types of proteins are limited in a different amino acid, when eaten together in the body can be a complete protein structure. (Almatsier, S. 2005).

Chemical Composition of Amino Acids Silkworm extract preparations Sagu (Rhynchoporus bilineatus)

In Figure 1 shows the types of amino acids predominantly the result of the extract sago is Phenylalanine. Phenylalanine is one of nine essential amino acid found in all protein foods such as meat, eggs, fish, milk, cheese and a small amount on cereals, vegetables and fruits. Phenylalanine is required by our body to make protein of the body.

In the digestive tract, protein food is digested into amino acids before being absorbed. These amino acids are needed to make the proteins the body or converted into other types of amino acids. Phenylalanine commonly abbreviated to Phe or F, which together with the amino acid tyrosine (Tyr, Y) and tryptophan (Trp, W) are the aromatic amino acids that have a benzene ring. Phenylalanine together with taurine and tryptophan is a compound that serves as a conductor or a messenger (neurotransmitter) in the brain nervous system. (Damar, 2009) Phenylalanine in addition to the raw material body protein also converted into a non essential amino acid called tyrosine, which will also be processed into protein the body. The process of changing from phenylalanine to tyrosine needs an enzyme called phenylalanine enzymes hydroxyprogesterone. Under normal circumstances, phenylalanine is converted to tyrosine and removed from the body. An amino acid needed in the process of protein synthesis, brain chemicals including L-DOPA, adrenalin, noradrenalin, and thyroid hormones. Because the hormone noradrenalin providing psychological effects, some forms of phenylalanine have available in order to cope with the possibility of depression.(Damar,2009).

1. Purpose and function Phenylalanine Generally phenylalanine are compounds added as additives in food and food flavorings. Bergugus aromatic amino acid, L-phenylalanine is an essential building block for the synthesis of aspartame, the artificial sweetener. In addition, fenialanin also has an important role in the adequate intake of essential amino acids can not be manufactured by the human body which means that the amino acids were derived from daily food intake. Phenylalanine is also produced as a raw material for the production of animal feed. Phenylalanine is an essential amino acid required in the central nervous system to function properly. This compound has been successfully used to help control the symptoms of depression and chronic pain, and other pain connected with the central nervous system. Phenylalanine is very effective, especially for treating brain disorders because it can penetrate the blood-brain barrier. The blood-brain barrier is a protective layer formed by red blood cells and glial brain that protects the brain from toxins, bacteria and viruses that circulate through the blood vessels. Only certain chemical compounds which can pass through this barrier and deal directly with the brain. The human body requires phenylalanine to synthesize epinephrine, norepinephrine dopamindan which is a

neurotransmitter (a compound bridges between nerve), which basically controls the way we perceive and interact with their surroundings. Phenylalanine intake can help a person feel happier, less hungry and more alert, to treat chronic pain and improve memory and concentration. Recent research shows that fenilananin, which helps in the synthesis of melatonin, may be effective for the treatment of vitiligo, a condition that causes white patches on the skin.

2. The impact and disruption shortage and excess phenylalanine.

Phenylalanine deficiency can cause symptoms of deficiency as follows:

•Frequently looked confused
• Less passionate
• Depression
• Less alert
• Difficulty remembering and
• Lack of appetite

In addition, there is a very rare metabolic disorder caused by deficiency of enzyme required to convert phenylalanine into tyrosine, called phenylketonuria. Phenylketonuria (Fenilalaninemia, Fenilpiruvat oligofrenia) is a hereditary disease in which the body does not have the processing enzyme amino acid phenylalanine, resulting in high levels of phenylalanine in the blood, which is harmful to the body. (Harli, M. 2008)
In normal circumstances, the altered phenylalanine to tyrosine and removed from the body. Without this enzyme, phenylalanine will accumulate in the blood and is toxic to the brain, causing mental retardation. At the time of the newborn is usually not found symptoms. Some babies seem sleepy or does not want to eat. Babies tend to have skin, hair and eyes of a lighter color than the other family members who do not suffer from this disease. Some babies have skin rash resembling eczema. If left untreated, the baby will be mentally retarded, that are usually heavy. (Edison, T. 2009)

2.Extract Preparations Fatty Acids in Silkworm Sagu.

Results of laboratory tests showed that the extract sago preparations containing essential fatty acids Omega 3, Omega 6 and Omega 9 with varied results. It is known lifestyle of the people in the Mediterranean region are rare patients with coronary heart disease due to the high consumption of Omega 9 and Omega 3, while in the western region (US and Europe) fat intake has a ratio of 10: 1 (Omega 6, Omega 3), which considered unhealthy. (Tadda, A. 2015).

2.Extract Oil Fatty Acids in Silkworm Sagu
Oil extract sago from the results of laboratory tests identified containing omega 3 fatty acids (fatty acids linolenic acid), omega 6 fatty acids (fatty acids linoleic) and omega 9 (fatty acid oleic) in an amount more than the fatty acids in the extract preparations sago.
There are three types of unsaturated fatty acids that are important for the body, namely Omega-3, Omega-6 and Omega-9. Oil meal / oil (CPO) often contain all three in varying composition. The third of the unsaturated fatty acids, unsaturated fatty acids Omega-3 and Omega-9 is very essential for life.

Results of research conducted Grundy (1985) and Mensink (1987) adapted by Tadda (2015) states that Omega 6 in the singular has a negative nature because it is associated with increased production of eicosanoids (stimulant growth of tumors in experimental animals). But with the Omega 9 and Omega 3, in proportion to the product would have the potential to block the eicosanoids compound, so the role of Omega 9 can prevent negative stimulation Omega 6.
Research conducted by Hardiyati, et al (2011) says that supplementation avocado meat containing omega 9 (fatty acid oleic) in rats (Rattus novergitus) for 15 days in a state hiperkolesterolenik a significant impact on the decreased levels of kolestrerol LDL (Low Density Liproprotein) blood serum and increase HDL (High Density Lipoprotein) blood serum.

6. PLAN NEXT STEPS AS PROJECT

The next stage of the plan based on the results of this study are:
1. Before testing with the latest methods to identify the content of essential amino acids in the oil sago.

2. It should be examined further to make preparations and oil extract sago worms have become functional foods or supplements in capsule, tablet or liquid / emulsion tin g protein gi for school children and pregnant women and nursing mothers.
3. Rework preparation sago into foodstuffs ready for consumption, such as instant porridge, instant noodles, or pastries, good as complementary foods for children, adolescents and adults.

7. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusion

Sago (Rhyncophorus bilineatus) has a very good quality and reliable as a high-protein food source for the following reasons:
1. Extract of the preparations sago (Rhyncophorus bilineatus) proved to contain eight essential amino acids are: Phenylalanine, Isoleucine, Lysine, Leucine, Threonin, Valine, Methionine and Tryptofan in sufficient quantities. Also in preparation extract sago worm also contains three types of essential fatty acids, namely; Omega 3 (linolenic fatty acid), Omega 6 (linoleic fatty acid) and Omega 9 (Oleic fatty acids).

1. Extract the oil sago (Rhyncophorus bilineatus) proved to contain fatty acids Omega 3, Omega 6 and Omega 9 which is greater than the fatty acid in the extract preparations.

B. Suggestion
1. Need to do more testing with the latest methods for identifying proteins in oil sago.
2. Further studies are needed to process extracts oil stocks sago and sago into functional food ingredients source of high protein.

BIBLIOGRAPHY

1. Alfons, JB and Bustaman, S. 2005. Prospects and Development Direction of Sago in Maluku. Hall.
2. Agricultural Technology Assessment Maluku,Ambon. 45 p.Allorerung, D., Rembang, JHW, Miftahorrachman. 1994.
3. Rehabilitation of Sago. Set. Pre-Harvest Symposium Papers II Results of Research and Development Plant Industry, 21 to 23 November 1994. Puslibangtri Bogor, Bogor.
4. Allorerung, D., Rembang, JHW 1995. Rehabilitation Pattern Overlay Sago. Bulletin ICOPRI. No, 18. 1-9.
5. Almatsier, S. 2005. Basic Principles of Nutrition. PT Gramedia Pustaka Utama, Jakarta.
6. Jacob, A., Nurjanah., Lingga, A. 2012. Characteristics of Protein and Amino Acids Meat Ranjungan (Portunus pelagicus) As a result of the steaming. PHPI Journal, Volume 15 Number 2.
7. Barahima, J., warin, LN, Mawikere, and Sudarsono. 2001. Diversity of Sago Palm from Irian Jaya Based on morphological Characters. Sago Palm Vol.9, October 2, 2001 Page 48.
8. Bintoro, MH 2003. The Sago Utilization Potential for Industrial and Food. Proceedings of the Seminar National Sago. Manado, 6 Okteber 2003
9. David, B. 2002. Lipid-Soluble Vitamine, Coenzyme Q and Prostaglandins Biochemistry. Wiley, US.
10. Flach, MF 1983. The Sago Palm: Domestication, Exploitation and Product FAO, United Nation: Rome. 85p
11. Gumbira, SE, Mangunwidjaya, D., Darmoko, A., Suprasono. 1996. Production Aseton- Butanol-Ethanol from Starch Hydrolysis Substrate Sago and Tapioca Onggok Results Enzymatic Hydrolysis.
12. Proceedings of the National Symposium III. Pekanbaru, Riau, 27-28 February 1996.
13. Jong, FS 2007. The Commercial Potentials of Sago Palms and Methods of Commercials Sago Palm (Metroxylon sago Rottb).

Palntation Establishment. P.51-62 In: Proceedings of the Workshop Sago development in Indonesia. 25 to 26 July 2007, Batam.

14. Lakuy, H and Limbongan, J. 2003. Some study results and technology necessary to Sago development in Papua Province. Proceedings of the National Seminar Papers on Sago, Manado, October 6, 2003.
15. Lohenapessy, JEA, BA, M., Luhukay, H., Tallahatu, F., Polnaya, H., Salampessy, RB, Riry, A., Ngingi, S., Reliable, I., Nurdin, J., Lattuputih, M., Hursepuny, A and Patimukay. 2011.
16. Proposed Release of Varieties Sago Molat Maluku. Maluku Provincial Agriculture Office and BBP2TP Ambon Directorate General of Plantation of the Ministry of Agriculture, page 52.
17. Mifttahorachman and, Novarianto, H. 1996. The diversity and similarity of origin Sago Types West Seram, Maluku Tengah. Bulletin Germplasm Vol.1 No.1 (16-28). National Commission Germplasm. Agriculture department.
18. Novarianto, H., Miftarrochman, I., Maskromo and Mangindaan, H. 1996. Diversity and Similarities Types of corn from the village of the District Kehiran District Sentani Jayapura, Irian Jaya. Journal Litri (5) 227-239.
19. Pangkali, LB 1994. Estimated Content Type Sago Flour Yepha (Metroxylon sago, Robb) by place to grow in Sentani, Jayapura district. Essay. Faculty of Agriculture UNCEN.
20. Pranamuda, H., Tokiwa, Y., Tanaka, H. 1996. Utilization of sago starch as raw material biodegradable plastic. Proceedings of the National Sago III. Pekanbaru in Riau, 27-28 February 1996.
21. Tents, E., Mangindaan, H and Kumaunan, J. 2003. Exploration of the types of sago potential Southeast Sulawesi. Proceedings of the Seminar Sago for Food Security. Research Institute Coconut Palm plants and others. Manado October 6, 2003.
22. Purnamasari, V. 1997. The characteristics and economic potential of sago. Journal of Mathematics UNCEN edition 1.
23. Purnamasari, V. 2010. Analysis of Protein Content of Ulat Sagu in Jayapura district. MIPS UNCEN 3 edition of the journal. Purnamasari, V. 2010. kulaitas Silkworm Protein Sagu (Rhynchophorus bilinetaus). Papua Biological Journal Vol.2 No.1 April 2010.
24. Istalaksana, P. 1987. Sago Worm from sago plantation: as a good source of food. Unpublish Paper. Agricultural Faculty, Cendrawasih University.
25. Panagan, AT, Yohandini, H., Wulandari, M. Quantitative and Qualitative Analysis of Unsaturated Fatty Acids Omega 3, Omega 6 and Characterization of Oil Catfish (Pangasius pangasius). Science Research Journal, Volume 15, Number 3 (C). July, 2012.
26. Sumartini., Swastawati, F., Agustini, TW Analysis of Fatty Acids Omega 3, 6 and 9 and levels of Phenol milkfish (Chanos Chanos Forsk) Smoke with a combination of distance and Old Furnace Curing. Journal of Fishery Products Processing and Biotechnology, Volume 3, Number 1, 2014, pages 157-166.
27. Diana, FM Omega 3. Journal of Public Health, Volume 5, Number 2, March-sept 2012. Literature.
28. Sutiari, MK, Widarsa, KT, Swandewi, A., Widarini, P. 2010. Amino Acid Profile Seredele and Tempe Soybean Extract, Traditional Food Fermentation. Presented at the National Seminar Faculty Undiksha.

29. Djauhari, M., Sulachman, A., Riyadi, H., Ekayati, I. Development-Based Sports Drinks Tempe Formula for Muscle Damage Restoration. Agritech Journal, Volume 34, Number 3, August, 2014.
30. Harli, M. 2008. Essential Amino Acids. http://livewellnaturally.com, March 3, 2013
31. Edison, T. 2009. Amino Acids: Essential for Our Bodies. http://livewellnaturally.com. March 3, 2013.
32. Tadda, A. Fatty Acids Omega 9 and Benefits for Health. http://www.astaqauliyah.com. 23 April, 2015
33. Hardiyati, Wasikin, H. Potency Omega 9 (Oleic Fatty Acids) On Meat Fruit Avocados In Blood Serum Cholesterol decline. http://e-jurnal.upgrismg.ac