PERGIZI PANGAN WEBINAR SERIES

Ketahanan Pangan dan Gizi Indonesia & Global :
Inovasi untuk Pembangunan Berkelanjutan

GRATIS

E-SERTIFIKAT UNTUK 300 PESERTA HADIR DAN MENGISI FORMULIR

Rabu 26 Mei 2021

14.00 - 16.00 WIB

Seri 46 : Peralatan Industri Pangan untuk Pengembangan Pangan Lokal

Narasumber I

Dr Helmizar SKM MBiomed

Dosen Jurusan Gizi & Koord Prodi S2 Gizi FKM Universitas Andalas

"Pangan Lokal Sumber Probiotik Dadih untuk Kesehatan Ibu Hamil dan Anak "

Narasumber II

Prof Dr Sri Anna Marliyati MSi

Ketua Dep GM FEMA IPB University & PERGIZI PANGAN Indonesia

"Pengembangan Produk Pangan bagi Perbaikan Gizi Ibu Hamil"

Narasumber III

Prof Dr Bernatal Saragih SP MSi

Wakil Dekan Fakultas Pertanian, Universitas Mulawarman & Ketua DPD PERGIZI PANGAN Kalimantan Timur

"Pangan Lokal Fungsional dengan Indeks Glikemik Rendah"

Sambutan

Prof Dr Hardinsyah MS

Ketua Umum PERGIZI PANGAN Indonesia

Moderator

Prof Dr Ir Retno Murwani MSc

Guru Besar Universitas Diponegoro & Ketua DPD PERGIZI PANGAN Jawa Tengah

Koordinator

Dr Siti Muslimatun MSc

Indonesia International Institute for Life-Sciences (i3L) & PERGIZI PANGAN Indonesia

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Pangan Lokal Fungsional dengan Index Glikemik Rendah

Bernatal Saragih

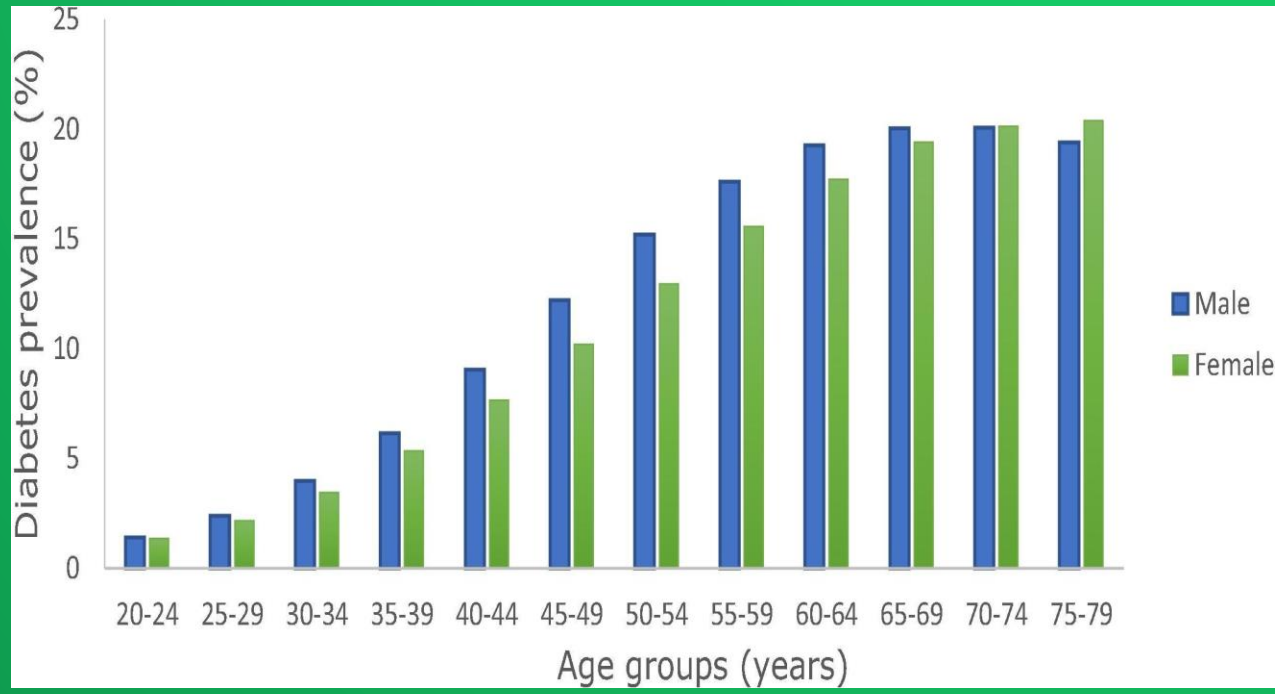
PERGIZI PANGAN WEBINAR SERIES
26 MEI 2021

OUT LINE

- PENDAHULUAN
- INDEKS GLIKEMIK
- GLUKOSA DARAH DAN KESEHATAN
- PANGAN LOKAL FUNGSIONAL
- PENUTUP

PENDAHULUAN

- Jumlah serangan diabetes di Indonesia mencapai 18 juta pada tahun 2020. Ini artinya prevalensi kasus tersebut meningkat 6,2 persen dibandingkan tahun 2019 lalu.



Sumber : IDF , 2019

PENDAHULUAN

Pangan Lokal:makanan yang dikonsumsi oleh masyarakat setempat sesuai dengan potensi dan kearifan lokal

Diversifikasi pangan adalah program dimana masyarakat tidak terpaku pada satu jenis makanan pokok saja dan terdorong untuk juga mengonsumsi bahan **pangan** lainnya sebagai pengganti makanan pokok yang selama ini dikonsumsinya, seperti beras.

Pemanfaatan pangan lokal secara masif dinilai mampu memberikan kontribusi positif untuk **memperkuat kedaulatan pangan nasional**, mengingat Indonesia kaya akan pangan lokal, seperti ubi kayu, ubi jalar, jagung, sagu, dll.

Inovasi teknologi maupun formula rekayasa sosial dapat diterapkan pada wilayah yang disasar sehingga dapat terbentuk kawasan Diversifikasi pangan yang ideal sesuai budaya setempat.

INDEKS GLIKEMIK

What is the Glycemic Index?

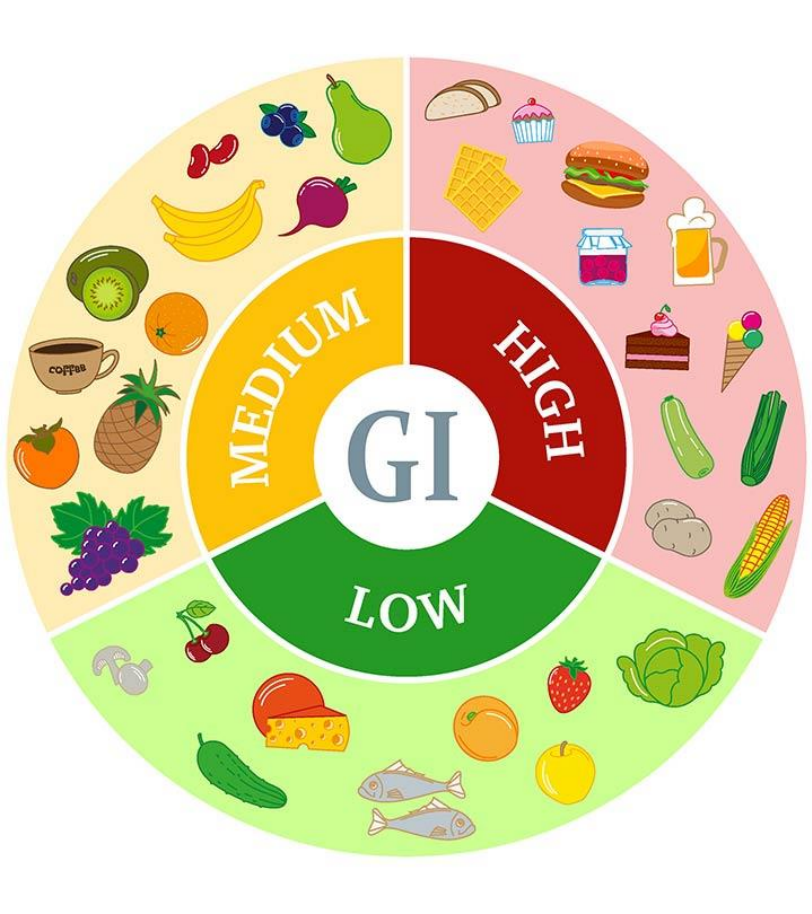
Ranking karbohidrat dari 0-100 , menurut efeknya terhadap kadar glukosa darah setelah makan

INDEKS GLIKEMIK

Faktor -Faktor yang mempengaruhi IG:

- Jenis pangan/varietas
- Proses Pengolahan
- Ukuran partikel
- Tingkat gelatinisasi pati
- Kadar amilosa amilopektin
- kadar lemak dan protein pangan
- Kadar anti zat gizi pangan

INDEKS GLIKEMIK

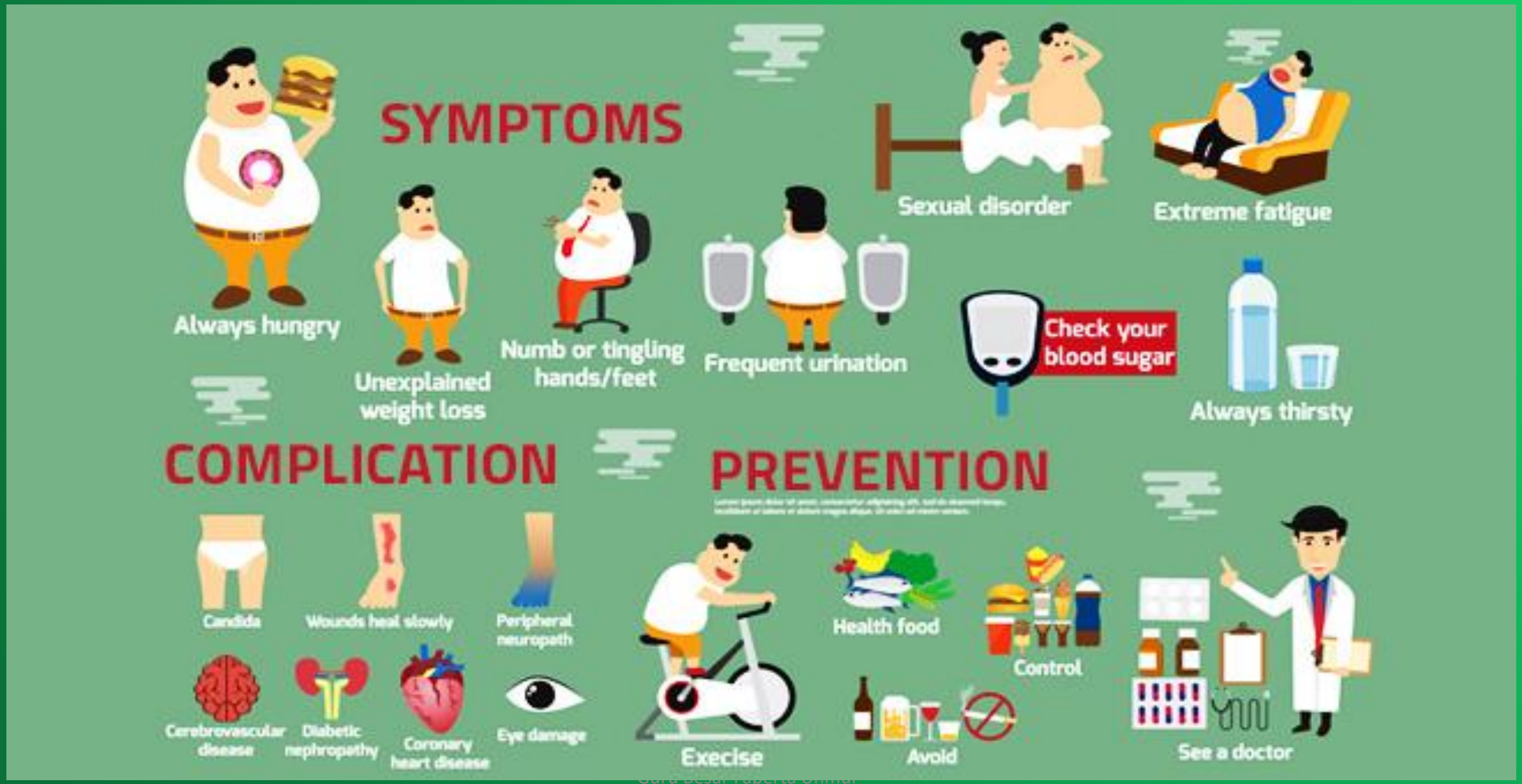


Glycemic Index

Low GI (<55), Medium GI (56-69) and High GI (70>)

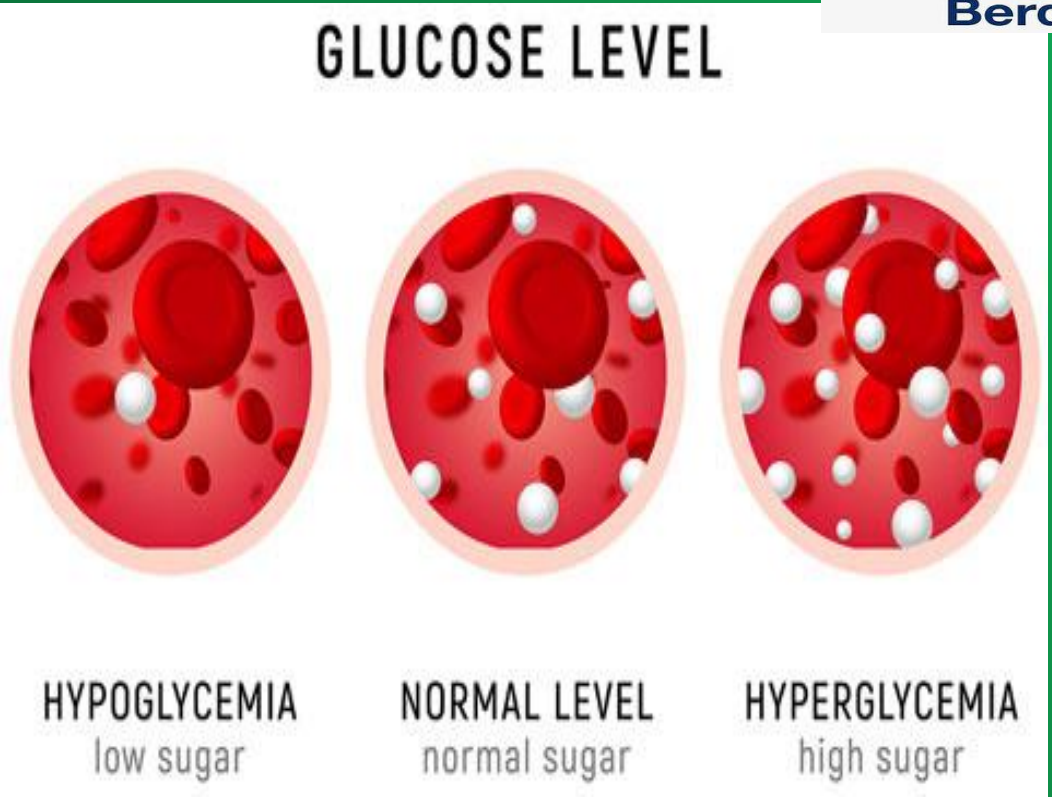
Grains / Starchs		Vegetables		Fruits		Dairy		Proteins	
Rice Bran	27	Asparagus	15	Grapefruit	25	Low-Fat Yogurt	14	Peanuts	21
Bran Cereal	42	Broccoli	15	Apple	38	Plain Yogurt	14	Beans, Dried	40
Spaghetti	42	Celery	15	Peach	42	Whole Milk	27	Lentils	41
Corn, sweet	54	Cucumber	15	Orange	44	Soy Milk	30	Kidney Beans	41
Wild Rice	57	Lettuce	15	Grape	46	Fat-Free Milk	32	Split Peas	45
Sweet Potatoes	61	Peppers	15	Banana	54	Skim Milk	32	Lima Beans	46
White Rice	64	Spinach	15	Mango	56	Chocolate Milk	35	Chickpeas	47
Cous Cous	65	Tomatoes	15	Pineapple	66	Fruit Yogurt	36	Pinto Beans	55
Whole Wheat Bread	71	Chickpeas	33	Watermelon	72	Ice Cream	61	Black-Eyed Beans	59
Muesli	80	Cooked Carrots	39						
Baked Potatoes	85								
Oatmeal	87								
Taco Shells	97								
White Bread	100								

Glukosa Darah dan Kesehatan



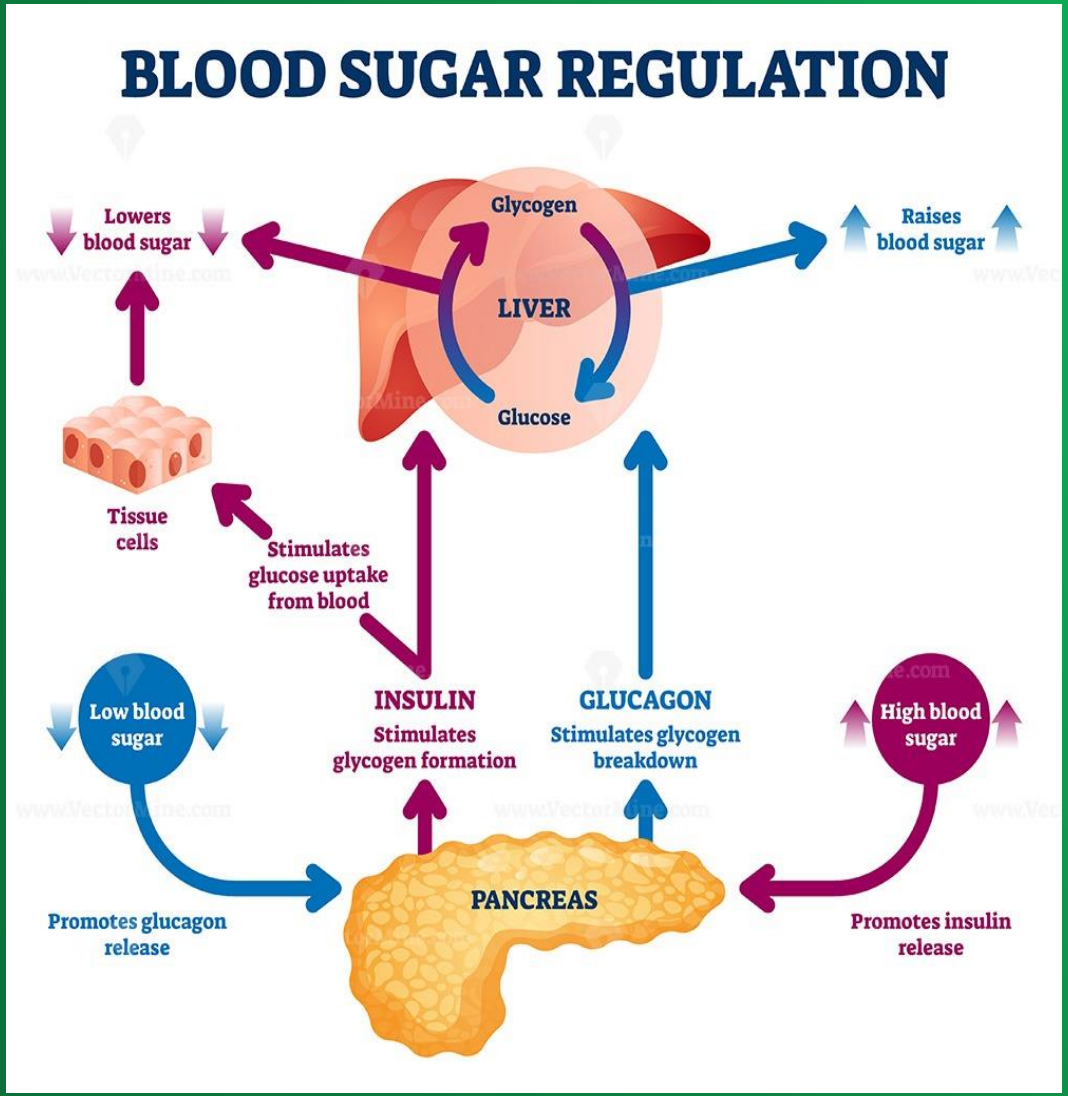
Glukosa Darah dan Kesehatan

Kadar Gula Darah Normal Berdasarkan Usia



Usia	Gula Darah Normal	Gula Darah Puasa	Gula Darah Setelah Makan dan Sebelum Tidur
< 6 tahun	100-200 mg/dL	± 100 mg/dL	± 200 mg/dL
6-12 tahun	70-150 mg/dL	± 70 mg/dL	± 150 mg/dL
>12 tahun	< 100mg/dL	70-130 mg/dL	< 180 mg/dL (setelah makan) 100-140 mg/dL (sebelum tidur)

Glukosa Darah dan Kesehatan



Faktor-faktor mempertahankan glukosa darah

I. Faktor pengaturan glukosa masuk dalam darah

- Penyerapan dalam usus halus
- Glikogenolisis
- Glukoneogenesis

II. Faktor pengaturan penurunan glukosa dalam darah

- Sumber energi
- Glikogen sistesis
- Konvesi ke lemak(lipogenesis)

III. Stress Hormon : Corticoid

- Pemecahan protein menjadi asam amino dan pembetukan glukosa

PANGAN LOKAL

The several kinds of Dayak ethnic food in Kutai Barat District:

Source: Saragih *et al*, 2017

- Namit Jabau Penyek (Rice mixed with crushed Cassava)
- Cassava Rice in Grated, Nasi sobot (Rice mixed Cassava)
- Bubur Jagaq (Jagag Porridge)
- Bubur Jagonkg (Corn Porridge)
- Pusok Jabau Topak Sampur Toyuk Tekayo (Cassava leaves mashed mix eggplant sparrow)
- Uur Lajak (Galangal boiled)
- Cucumber korut onions meaq (Cucumber grated mixed sliced onions)

- Basuq Tolakng/Rebukng (Vegetable Bamboo shoots)
- Ocok Jabau Sampur Teniq (cassava leaves mashed mixed umbut tree teniq)
- Tread Kinas lepet Jabau (Fish Smoke /Salai Kuah cassava cassava)
- Fish Smoke/Kinas tapaq
- Lusat Kinas (Fish Cooked In Bamboo)
- Pojot Kinas Nete Dawent Jeloq (Fish of wrapped in banana leaves)
- Tinting pulut / Tara (rice sticky rice cooked in Bamboo)

The several kinds of Dayak ethnic food in Kutai Barat District:

Source: Saragih *et al*, 2017

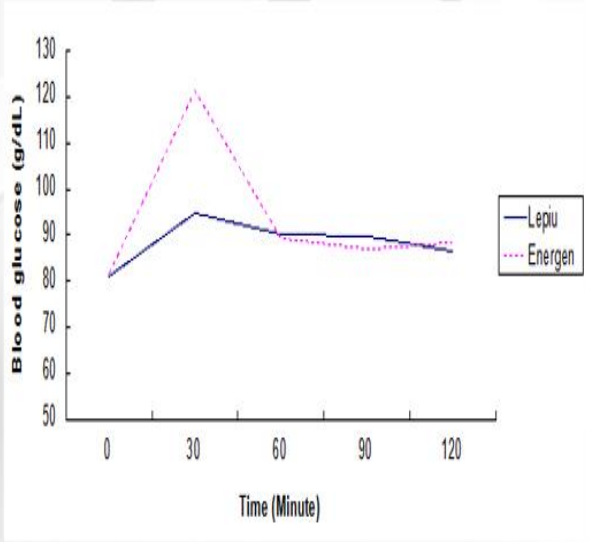
- Gula Nyui/Gula Tapoq (palm sugar blended grated coconut)
- Lepton (snacks made from glutinous rice in depth There is a brown sugar)
- Tumpiq (snacks made of glutinous rice, mixed brown sugar or salt)
- Dongkoq (Sticky glutinous rice, then pounded, with the aim of being fused and wrapped in leaves)
- Bahapm (Rice glutinous young pounded until the plate is then mixed with grated coconut and brown sugar)

- Sagotng (Roasted rice flour is then mixed with coconut and brown sugar)
- Pais Ketan (Kelopaq Pulut), Wajik Ketan (Wajik Pulut)
- Ketoq durian / ketoq kalank.
- Tempoyak durian (durian fermented)
- Sambal Tempoyak Durian (sauce tempoyak)
- Gula gait, etc.

PANGAN LOKAL FUNGSIONAL

- **Lepiu**

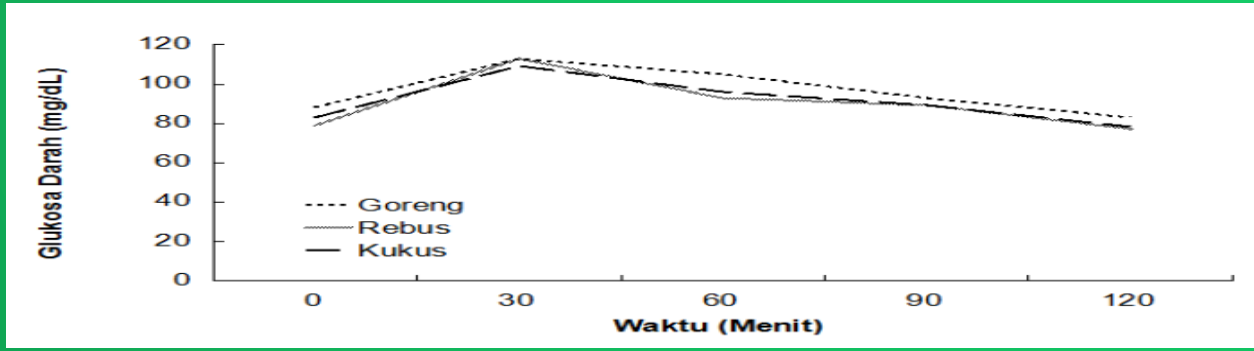
- Lepiu flour has saponins, flavonoids, phenols and alkaloids.



Comparison of response of the average blood glucose in subjects after consumption of cereal Lepiu and Energen (Saragih, et al, 2014)

- **IG Lepiu /Biji : 32**

Pengaruh Metode Pengolahan Lepiu terhadap respon glukosa darah (Saragih, et al, 2014)



The comparison Flour Lepiu, Lai (Durio kutejensis), tuber Banana, Haruan Fish and Sweet Potato (Saragih et al 2017)

Flour	Nutrition components (%)					
	Charbohydrate	Protein	Fats	Water content	Ash conten	Fiber content
Lepiu	65.80	4.26	7.05	19.15	1.40	0.30
Lai seed	66.65	13.17	8.49	7.60	0.57	3.52
Banana Tuber	79.65	3.42	1.27	9.65	1.15	5.28
Haruan fish	54.06	26.45	7.28	10.25	1.56	0.40
Sweet Potato	77.86	4.42	0.89	6.77	4.61	5.45

Flour	Phytochemicals				
	Steroids	Saponins	Flavonoids	Phenol	Alkaloids
Lepiu	-	++	++	++	++
Lai Seed	-	++	++	+	+++
Banana tuber	-	+	+++	+++	+
Haruan fish	-	-	-	-	-
Sweet potato	-	-	+	+	-

• Tiwai

- Saragih *et al*. (2014) twice consumption daily of tiwai herbal drink in 7 days, it could reduce total cholesterol of 5.33 mg/dL.

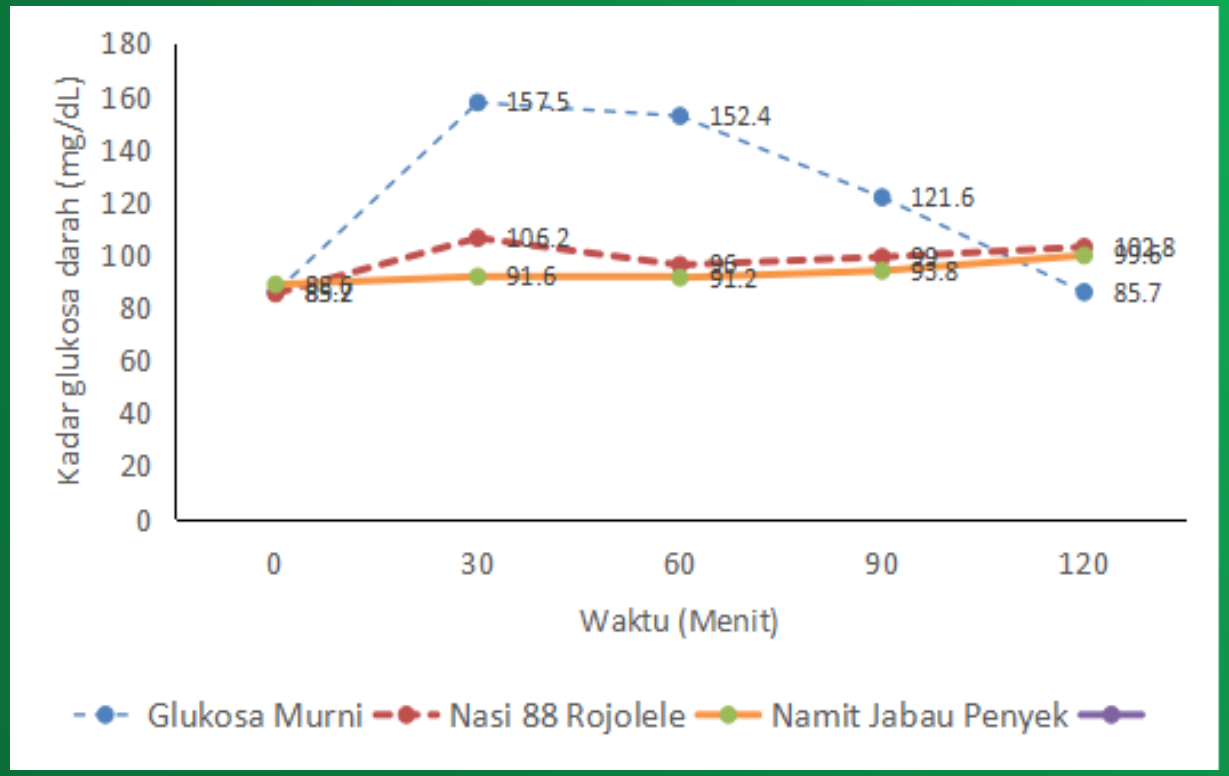




- Tiwai can also be used as food additives as food coloring (Saragih *et al*., 2013

Flour	Phytochemicals				
	Steroids	Saponins	Flavonoids	Phenol	Alkaloids
Tiwai	-	-	+++	+++	++

• Singkong/Ubi Kayu: Beras Singkong



Sumber : Saragih, 2017

- Namit jabau penyek/cassava granules has water content 13.40%, ash 0.45%, fat content 0.88%, crude fiber content 4.53%, protein content 0.79%, carbohydrate levels 84.50% and energy 349kcal (Saragih et al, 2017)
- Glycemic index namit jabau penyek with low criterion that is 23,64 (Saragih et al, 2017)

• Daun Singkong:Cookies

Table 1. Effect of addition of cassava leave (CL) flour on nutrition content (% w/w) of CL cookies.

Nutrition	(Wheat flour: cassava puree: cassava leaf flour) (g)				
	50 : 50 : 0	49 : 49 : 2	48 : 48 : 4	47 : 47 : 6	46 : 46 : 8
Water Content (%)	3.39±0.81	2.58±0.53	4.07±0.15	4.83±0.09	5.12±0.16
Ash content (%)	1.73±0.12	1.80±0.26	1.56±0.19	1.46±0.15	1.63±0.25
Fat content (%)	20.76±0.25	12.60±0.20	12.13±0.15	11.50±0.20	10.67±0.15
Protein content (%)	9.13±0.41[c]	9.15±1.29[b]	9.35±0.45[b]	9.74±0.55[ab]	10.94±0.88[a]
Fiber content (%)	1.20±0.10[e]	2.10±0.10[d]	2.43±0.15[c]	3.27±0.15[b]	3.75±0.15[a]
Carbohydrate (%)	64.75±1.14[c]	73.86±1.87[a]	73.09±1.46[a]	72.28±0.66[ab]	71.64±1.07[b]
Energy (kcal)	480.30±7.49[a]	445.47±2.08[b]	438.07±0.52[c]	431.60±1.57[cd]	426.31±181[d]

CL cookies were prepared in 100 g composite flour basis. Data ($\bar{x}$±SD) were calculated from 3 replications. Data were analysed by ANOVA continued by Tukey test (p=0.05). Data within the same row followed by different letter are significantly different (p<0.05).

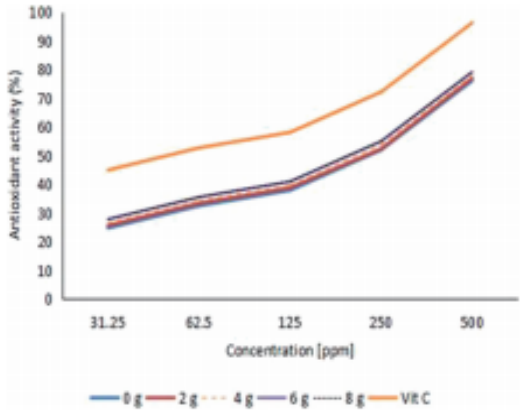


Fig. 1. Antioxidant activity of CL cookies with formula (46 : 46 : 2).

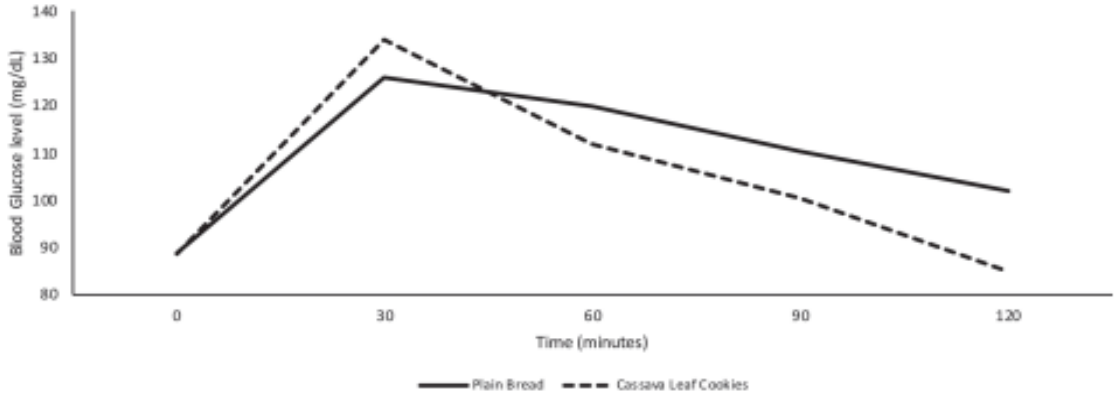


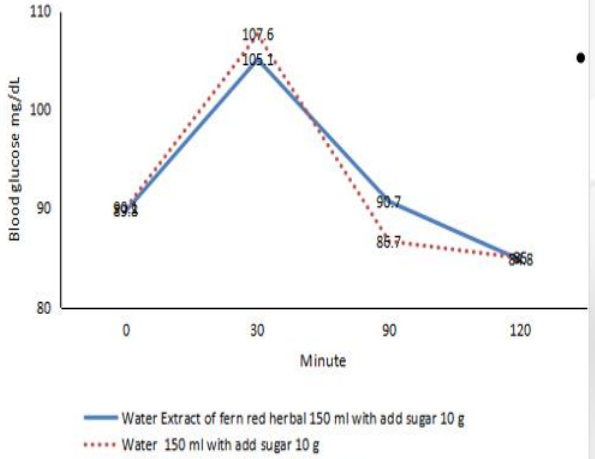
Fig. 2. Respondent's blood sugar response after consumption of of CL cookies with formula (46 : 46 : 2) and plain bread.

- Cookies daun singkong IG : 77

Sumber : Saragih et al, 2020

- **Pakis**

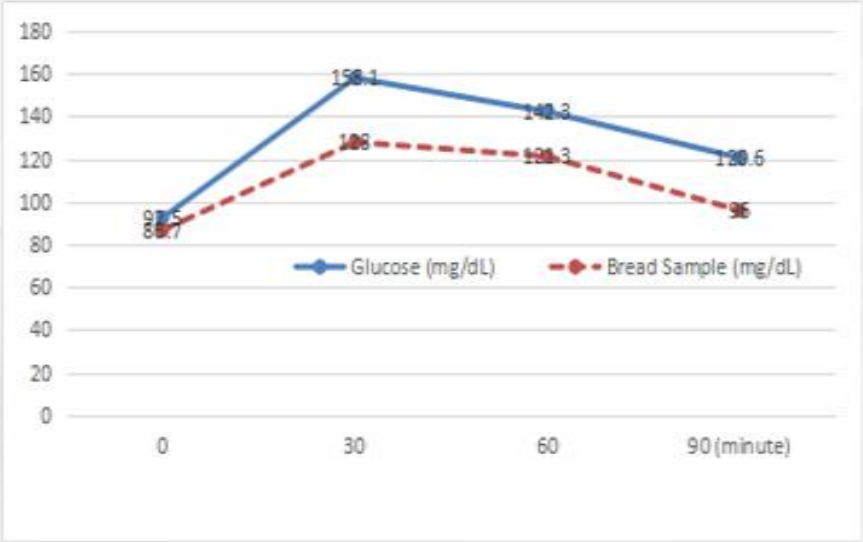
Sumber : Saragih, 2017



- Average fasting blood glucose volunteers 0 minutes before consuming red fern herbs with a sugar concentration of 10 g is 89.8 ± 10.3 mg / dL, then at minute 30 after drinking herbal fern red blood sugar volunteers have an increase of about 105, 1 ± 12.3 mg / dL with a difference in blood sugar increase of 14.4 mg / dL (Saragih et al, 2017).

Phytochemicals, Quality and Glycemic Response Fern Red Herbal (Stenochlaena palustris) (Saragih, et al, 2017)

• Labu Kuning



- Glycemic response after and before consumption bread formulations. Resulting bread has a score of 65, the glycemic index of food with moderate criteria (Saragih et al, 2016)

Effect comparison pumpkin flour and wheat flour on the quality of bread and the glycemic index (Saragih et al, 2016)

• Beras Lokal : Adan Hitam

- IG= 54

Local Rice

Nutritional Value and Functional Properties of Rice Adan Black (Saragih *et al*, 2013)

Nutrition Content	Unit	Value
Water	%	12,60
Ash	%	0,8
Fat	%	1,4
Protein	%	8,10
Carbohydrate	%	74,47
Calories	kcal/100g	342,88
Fe(iron)	mg/1000g	3.61
Vitamin B1(Thiamin)	mg/100g	0.23
Soluble dietary fiber	g/100g	2.42
Insoluble dietary fiber	g/100g	0.91
Fiber total	g/100g	3.33
Amylose	g/100g	10.81
Starch total	g/100g	76.28
Amylopectin	g/100g	65.47

• Bonggol Pisang

- Starchy tubers after harvest banana fruit kepok provide the best quality with a lower water content is 0.98 % , and the absorption capacity of water is higher by 253.33 %. 0.99 to 1.41 % , ash content 0.48 to 0.67 % , rendemen 9.56 to 12.30 %, water absorption 166-260 % , fiber 23.9 to 39.4 %, and the banana tubers flour can be used for making cookies (Saragih, 2013).

Tabel 1. Hasil rata-rata karakteristik tepung bonggol pisang dari berbagai varietas

Karakteristik	Varietas Bonggol Pisang				
	Kepok	Raja	Mahuli	Susu	Ambon
Kadar serat (%)	29,62±1,5a	19,11±1,3e	26,36±1,4b	22,05±1.1d	24,06±2,1c
Kadar air (%)	1,09±0,02c	1,41±0,09a	1,25±0,1b	1,39±0,2a	1,41±0,2a
Kadar abu(%)	0,67±0,1a	0,44±0,1b	0,54±0,2b	0,47±0,1b	0,48±0,2b
Rendemen (%)	12,56±0,8e	12,30±0,9a	10,20±0,8d	10,70±0,7c	11,63±0,9b
Daya serap air (%)	260,0±11,0a	173,0±8,9cd	223,0±9,7b	183,0±8,8c	166,0±8.4d

Keterangan: huruf yang sama pada baris yang sama menunjukkan berbeda tidak nyata (0,05)

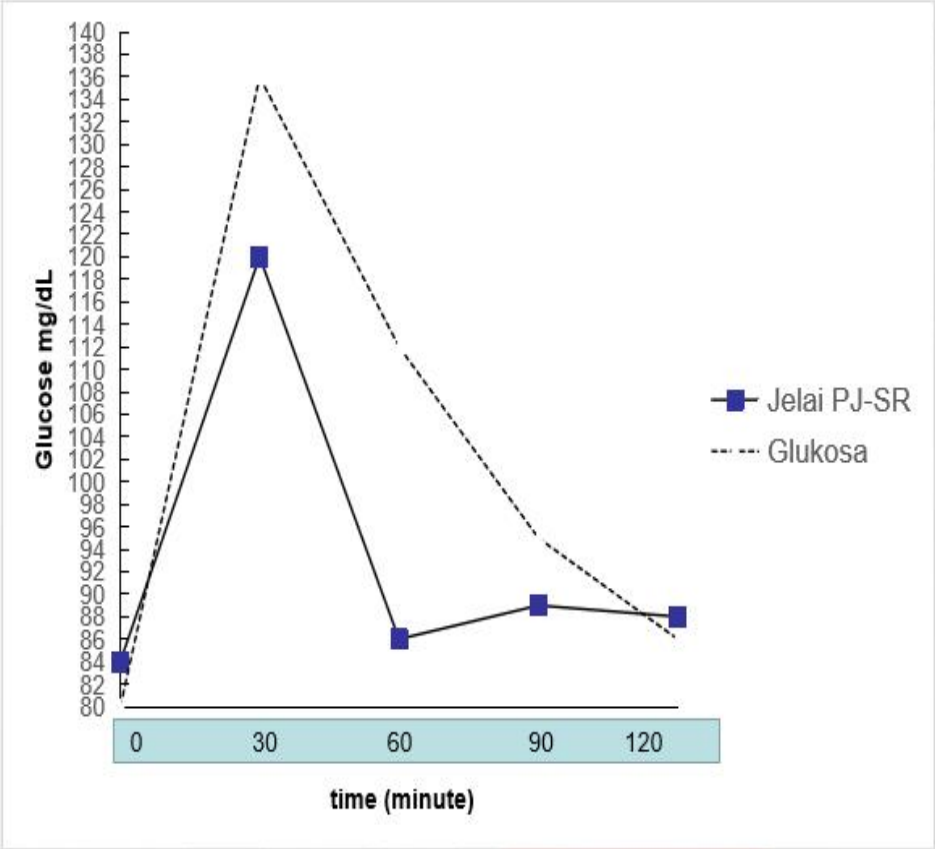
- 40 % tepung terigu : 60% tepung bonggol pisang dapat diterima dengan baik oleh panelis, Kadar air 16,94±1,30%, kadar abu 0,35±0,06%, kadar serat kasar 13,56±0,24%, protein 2,10±0,31%, lemak 17,28±0,05%, karbohidrat 63,30±1,62% dan energi 417,20±5,4 kal/100g brownies , IG: 56 (Saragih et al, 2018)

Kepok Raja Mahuli Susu Ambon

Gambar 1. Tepung Bonggol pisang pada pembesaran 100 kali

Sumber : Saragih, 2013

•Jelai

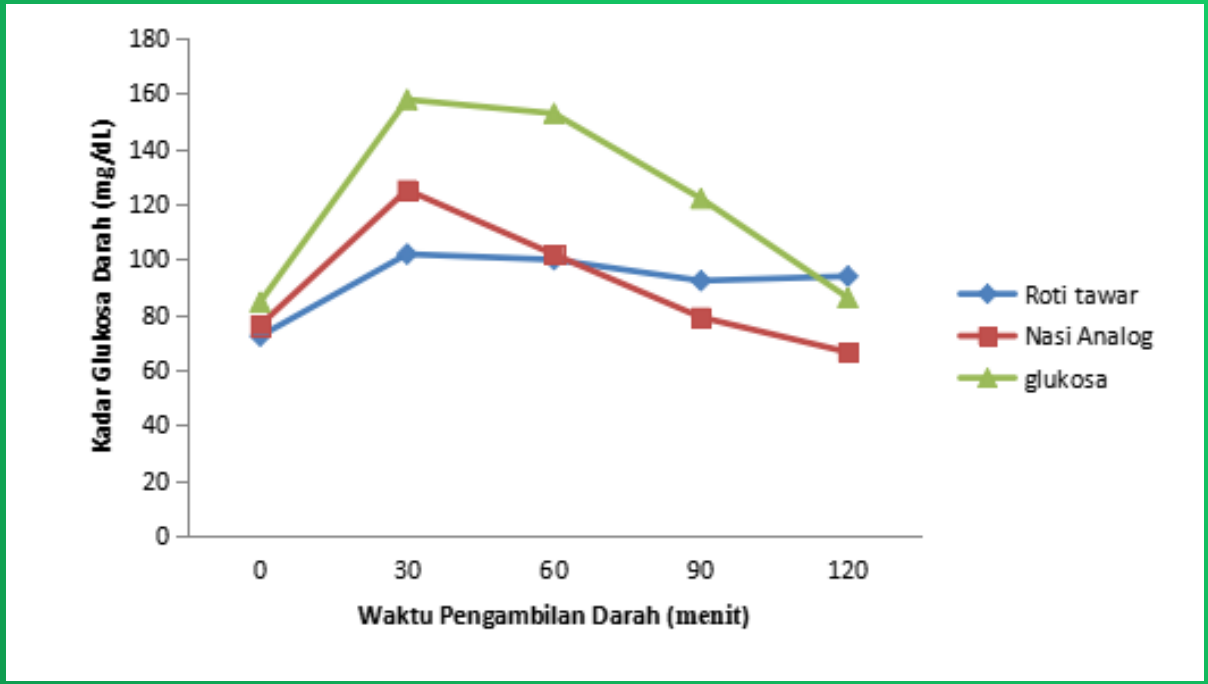


- IG Jelai : 54,69 (Saragih, 2017)

•Formulasi

- Formulasi Tepung Ubi Jalar Ungu (Ipomoea batatas L. Poir) dan Tepung Jelai (Coix lachryma-Jobi L.) Terhadap sifat fisikokimia, sensoris, indeks dan glikemik Load Beras Analog Mocaf

- Formulasi 50 gr tepung mocaf + 40 gr tepung ubi ungu + 10 gr tepung jelai, IG= 33,15



Sumber : Saragih, et al, 2019

PENUTUP

- ✓Proses persiapan dan pemasakan akan mempengaruhi IG pangan yang disajikan dalam rumah tangga
- ✓Memanfaatkan pangan lokal fungsional sangat baik dalam membantu mengontrol glukosa
- ✓Menjaga glukosa darah dengan:
  - Olah raga teratur
  - Atur pola makan (Eat Smart)
  - Menjaga berat badan ideal
  - Jangan merokok