



**ANJ**

PT Austindo Nusantara Jaya Tbk.



**SAPADUA**

**Sago as a  
Functional  
Staple Food**

## Sago starch nutritional content

Sago contains of mostly starch, a complex carbohydrate. Modern processed sago starch contains about 85% starch.

Nutritional content per 100 gram

	Sago Starch	Tapioca Starch	Wheat Flour	Rice Flour
<b>Calories</b>	350 kCal	349 kCal	332 kCal	359 kCal
<b>Fat</b>	0.04 gram	0.6 gram	1.5 gram	0.7 gram
<b>Protein</b>	1.15 gram	0.6 gram	11.4 gram	7.5 gram
<b>Carbohydrate</b>	86.58 gram	85.0 gram	62.2 gram	78.5 gram
<b>Dietary Fiber</b>	2.05 gram	0.0 gram	11.0 gram	0.2 gram

\*ANJ internal research

[\\*http://www.foodnutritiontable.com/nutrition/nutrient/](http://www.foodnutritiontable.com/nutrition/nutrient/)

### Sago is naturally gluten free

Sago starch has been analyzed to be free of gluten\*\*. Gluten is a general name for proteins found mainly in wheat, barley, and rye. It is an allergen for people with Celiac disease or gluten intolerance. Avoidance or reduction of gluten has also been suggested for people with auto-immune condition or autism spectrum.



\*\*ANJ internal research 2017  
<https://www.healthline.com/nutrition/sago>

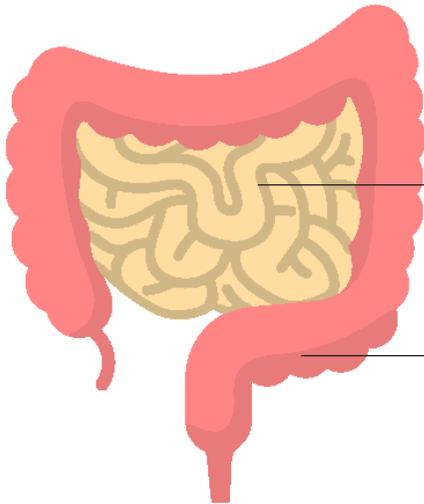
## Sago as prebiotic and source of resistant starch

Prebiotics are substance in food that induce the growth or activity of beneficial gastrointestinal microorganism.

Prebiotics, like dietary fibers found in many fruits and vegetables, feed the friendly bacteria in your gut. This helps the gut bacteria produce nutrients for your colon cells and leads to **a healthier digestive system.**



Resistant starch support growth of introduced probiotic (beneficial live bacteria) in foods, such as in yogurt, tempe, miso or kimchi.



Resistant starch is starch that **escape digestion and absorption in the small intestine**, similar to dietary fiber, and go straight to the large intestine

Indigenous **colonic microorganism in large intestine ferments resistant starch** and create SCFA (short chain fatty acids).

## Sago for colorectal cancer prevention

These specific **SCFA inhibit growth and cause cell death to human colorectal cancer cells.**

### SCFA:

Butyric Acid  
Propionic Acid  
Acetic Acid

## Low Glycemic Index

The Glycemic Index (GI) is a value assigned to foods based on how quickly those foods cause increases and cause fluctuations of blood sugar (glucose) levels.

Low GI foods can reduce the risk of type 2 diabetes and heart disease, reduce total and LDL cholesterol, as well as one of the keys to maintaining weight loss.

Cooking sago starch create types of resistant starch that lead to the slow release of glucose into the bloodstream, lowering the glycemic index of sago based foods.

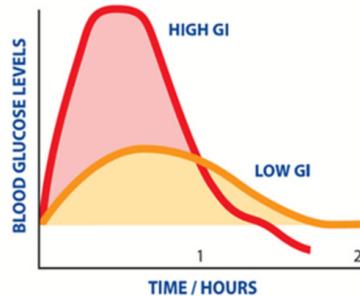
### GLYCEMIC INDEX

Low  $\leq 55$

Medium 56-69

High  $\geq 70$

\*glucose = 100



<https://www.health.harvard.edu/diseases-and-conditions/glycemic-index-and-glycemic-load-for-100-foods>

Food	Glycemic Index	GI Category
Native sago starch	65	Medium
Sago noodle	28	Low
White rice, medium grain, cooked	75	High
Brown rice, cooked	68	Medium
White bread (from wheat flour)	75	High

Haliza et al 2006

8. Raben et al, 1995

<http://www.glycemicindex.com/index.php>

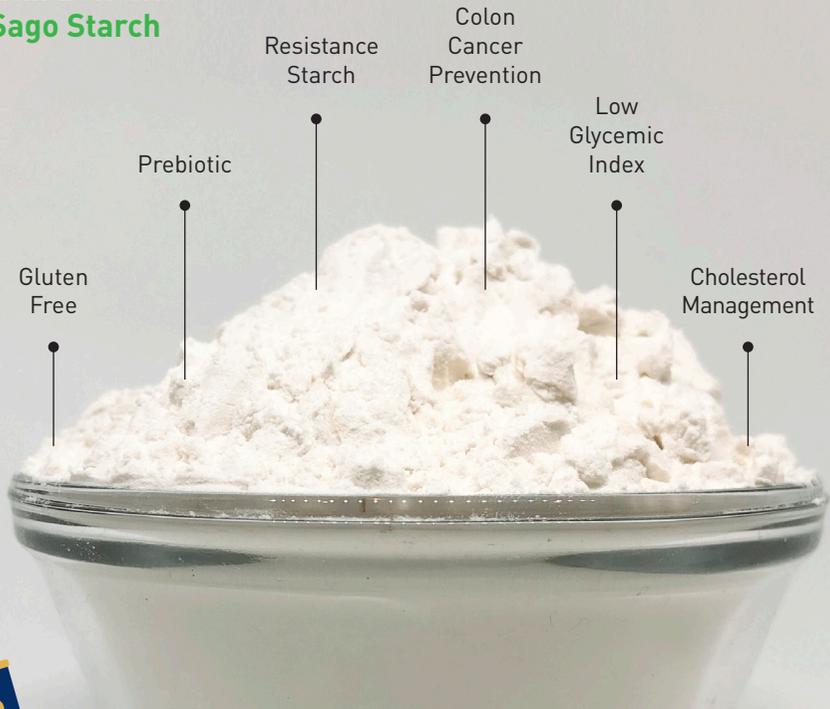
<https://www.health.harvard.edu/diseases-and-conditions/glycemic-index-and-glycemic-load-for-100-foods>

## Sago for Cholesterol Management

Diabetes can lead to high cholesterol because diabetic patients can't be metabolize fat (lipid) properly. Diabetic rats fed with sago analog rice showed an increase in HDL (good cholesterol), decrease of total cholesterol, LDL (bad cholesterol), triglycerides, and Atherogenic Index.



## Health Benefits of Sago Starch



### Research Shows



- Pure sago starch (no chemical added) has higher resistant starch than chemically treated sago starch and tapioca starch.
- Rats fed with raw and gelatinized sago starch showed statistically significant decrease of total blood cholesterol, as compared to those fed with raw and gelatinized tapioca starch.
- These early research shows potential of sago staple products, such as sago noodles or sago rice analog, in blood cholesterol management.
- Sago noodles contain 4 x more resistant starch than wheat flour noodles.
- Cooked sago (retrograded starch), such as in sago noodle, has higher resistant starch content than raw sago starch
- Sago starch when cooked with fat source, such as coconut milk or vegetable oil, can create a specific kind of resistant starch, which has been shown to resist digestion in small intestine. Furthermore, it has been shown to reduce about 50% of blood glucose level when compared to white bread.

# References

- A.A. Karim, 2007, Studies on sago (Metroxylon sago) starch at Univesiti Sains, Malaysia. Sago: Its Potential in Food and Industry, Proceedings of the 9th Sago Symposium.
- Arshad, N.H., Zaman, S.A., Rawi, M.H. and S.R. Sarbini, 2018, Resistant Starch Evaluation and in vitro fermentation of lematak (native sago starch), for prebiotic assessment. Intl Food Res. J. 25(3): 951-957.
- Haliza W., Purwani E.Y., dan S. Yuliani, 2006, Evaluasi Kadar Pati Tahan Cerna dan Nilai Indeks Glikemik Sagu. J. Teknol dan Industri Pangan Vol XVII No. 2.
- Hasjim, J., Lee, S.O., Hendrich, S., Setiawan, S., Ai, Y., and J.L. Jane. 2010. Characterization of novel resistant starch and its effects on post-prandial plasma glucose and insulin response. Cereal. Chem., 87, 257-262.
- Hirao K., Igarashi, K., Fukuda, H., and Y. Endo. 2000. Comparisons of effects of raw and gelatinized sago and tapioca starches on serum and liver lipid concentrations in rats. J. Nutr. Sci. Vitaminol (Tokyo) 46(1):7-14.
- Mbrio, 2017, Laporan Penelitian Resistant Starch, Indeks Glikemik dan Gluten Free.
- Mortensen, P.B. and M.R. Clausen, 1996, Short-chain fatty acids in the human colon: relation to gastrointestinal health and disease. Scand. J. Gastroentero., 31:32-148.
- Purwani, E.Y., Iskandriati, D., Suhartono, M.T. 2012. Fermentation product of RS3 inhibited proliferation and induced apoptosis in colon cancer cell HCT-116. Advances in Bioscience and Biotechnology. 3. 1189-1198.
- Raben, A., Tagliabue, A., Christensen, N.J., Madsen, J., Holst, J.J. and A. Astrup, 1994, Resistant Starch: the effect on postprandial glycemia, hormonal response, and satiety, Am. J. Clin. Nutr., 60: 544-551.
- Srichuwong, S., Sunarti, T.C., Mishima, T., Isono, N. and M. Hisamatsu., 2005, Starches from different botanical sources I: Contribution of amylopectin fine structure to thermal properties and enzyme digestibility. Carbohydrate Polymers 60(4): 529-538.
- Wahjuningsih, S.B., Haslina, H., Marsono, M. 2018. Hypolipidaemic Effects of High Resistant Starch Sago and Red Bean Flour-based Analog Rice on Diabetic Rats. Mater Sociomed, 30(4): 232-239.



**SAPAPUA®** is our flagship brand of sago starch, produced from sago trees found in the indigenous forest of South Sorong, West Papua by PT ANJ Agri Papua (ANJAP). The sago palms are found growing naturally in the forest without the use of pesticides, fertilizers or any other additives.

**SAPAPUA®** is available at:

**Tokopedia** <https://www.tokopedia.com/sagupapua>

**Shopee** <https://www.shopee.co.id/sagusapapua>

**Instagram:** @sapapua.sagu and @bueno.nasio

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