

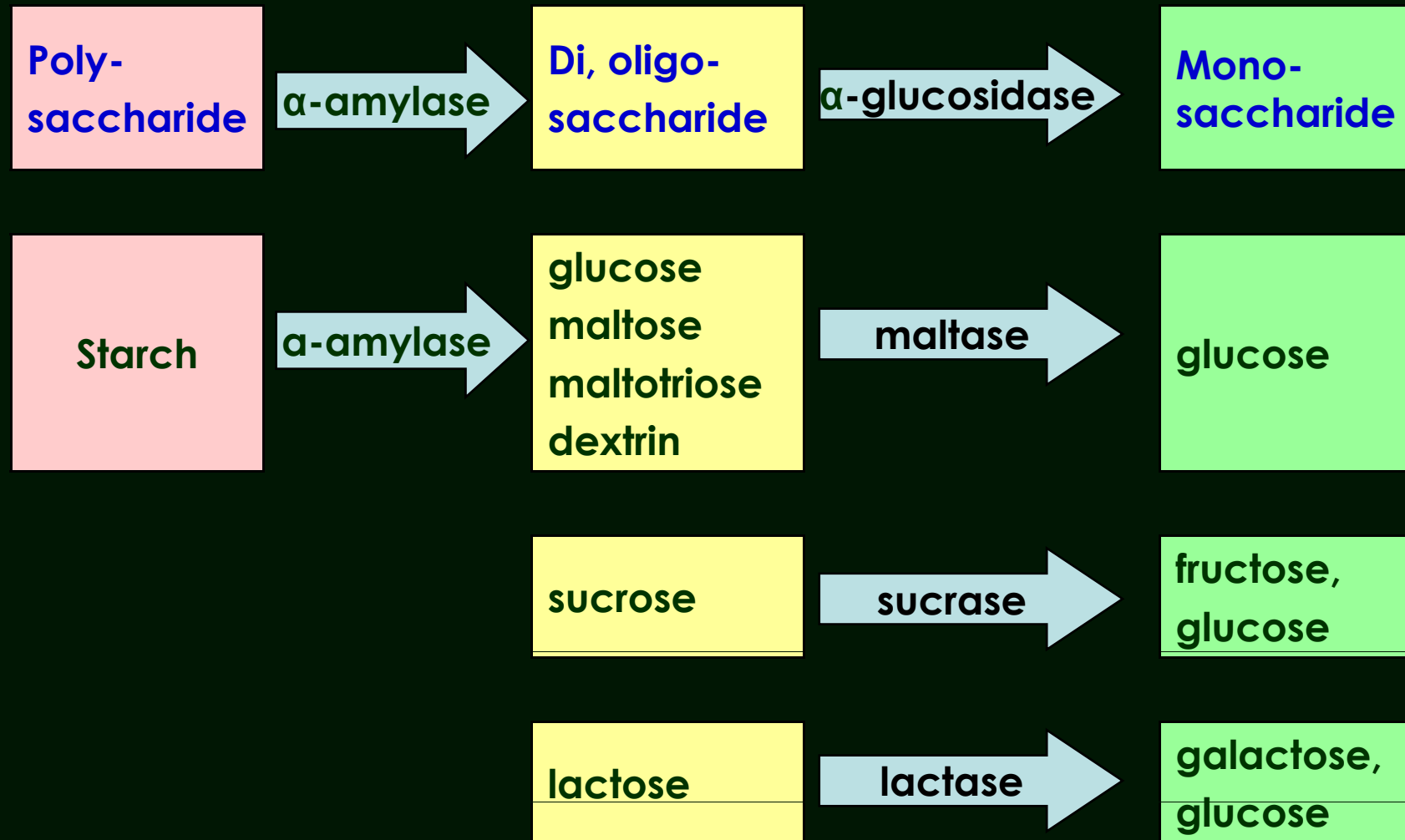
# $\alpha$ -Glucosidase Inhibitor (AGI) from Natto : Production and Application



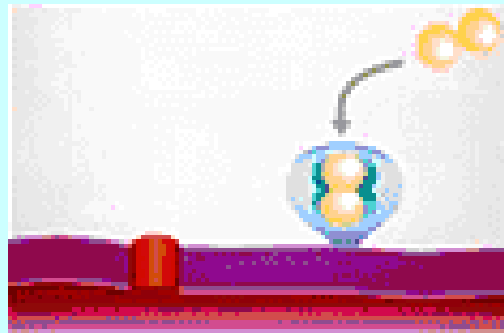
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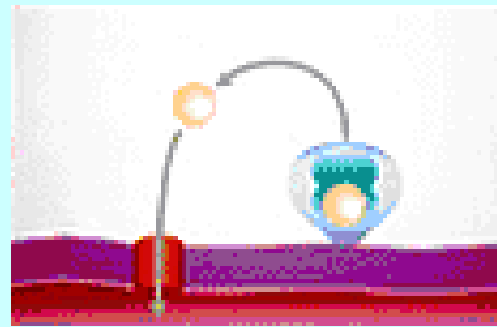
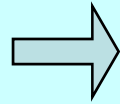
# Digestion of Carbohydrates



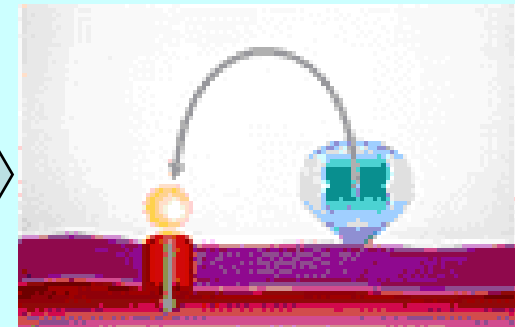
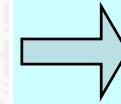
# Normal absorption of disaccharide



disaccharide  
+  
enzyme

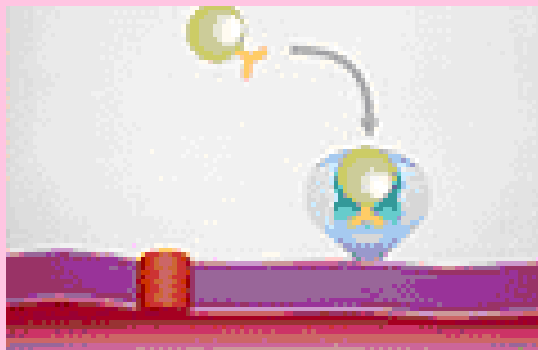


hydrolysis

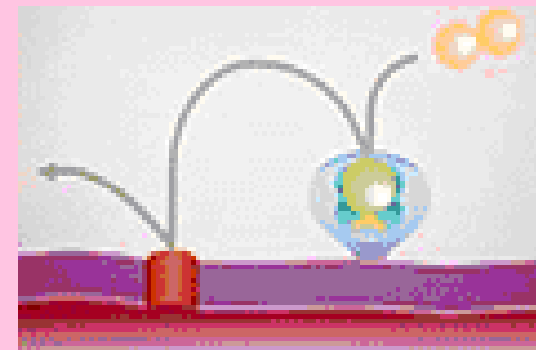
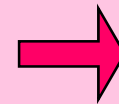


absorption of  
monosaccharide

# Inhibition of $\alpha$ -glucosidase by AGI



inhibitor  
+  
enzyme



inhibition of  
hydrolysis & absorption

# Cheong-guk-chang





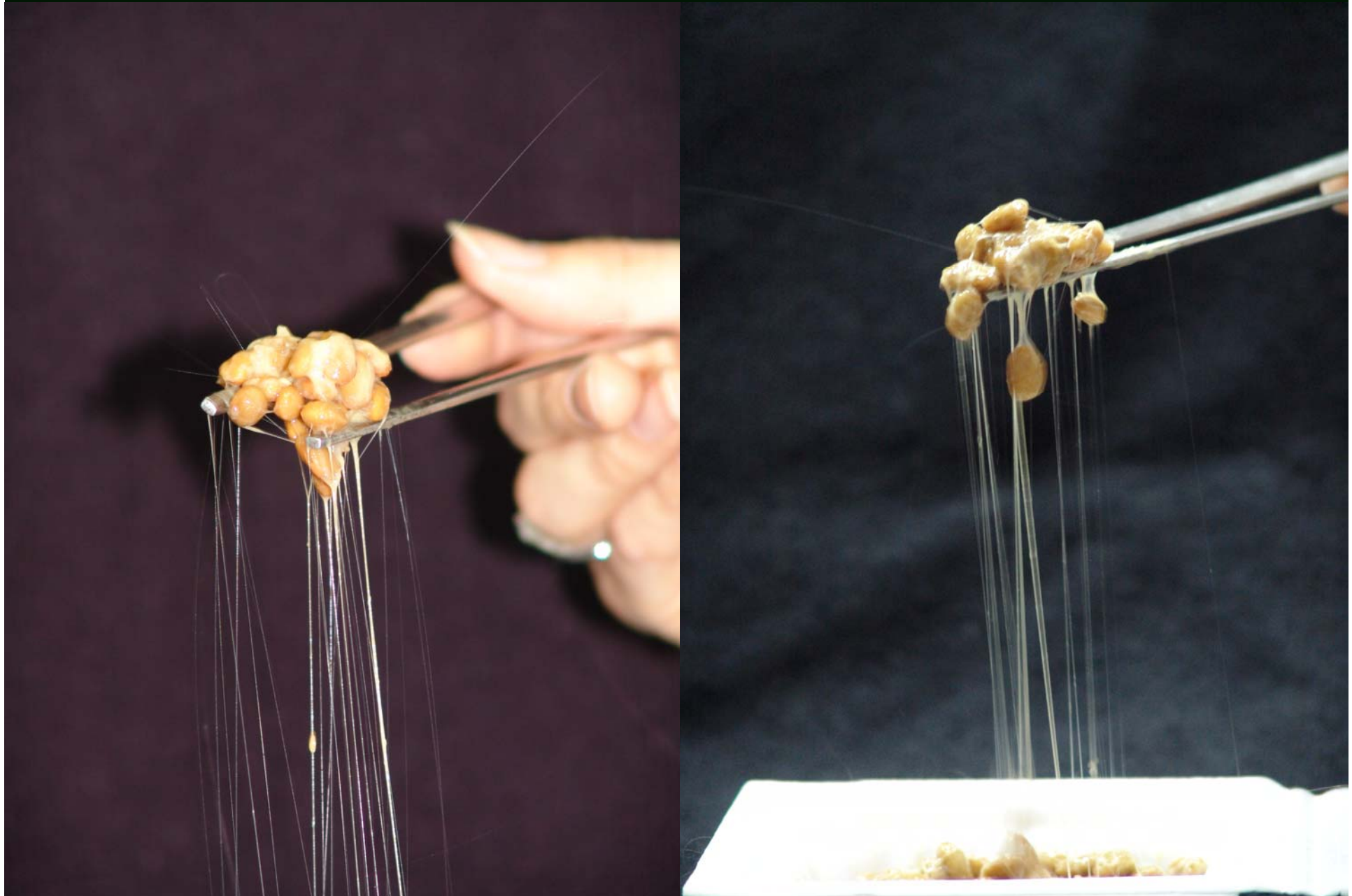
# Characteristics of DC-15

Gram staining	+	Nitrate reduced to nitrite	+
Shape	rod	Formation of Indole	-
Size	0.6 ~ 0.7 × 1.6 ~ 1.9 μm	Catalase	+
Spore	○	Hydrolysis of starch	+
Spores position	endospore	Hydrolysis of casein	+
Motile	+	Utilization of propionate	-
Growth temperature	25 ~ 40°C	Acid production from	
Growth in NaCl 7%	+	Glycerol	+
Aerobic growth	+	L-Arabinose	+
Anaerobic growth	-	D-Xylose	+
Voges-Proskauer test	+	D-Galactose	+
		D-Glucose	+
		D-Mannitol	+
		D-Maltose	+
		D-Sucrose	+
		D-Lactose	+



**Electron microscopy of DC-15**

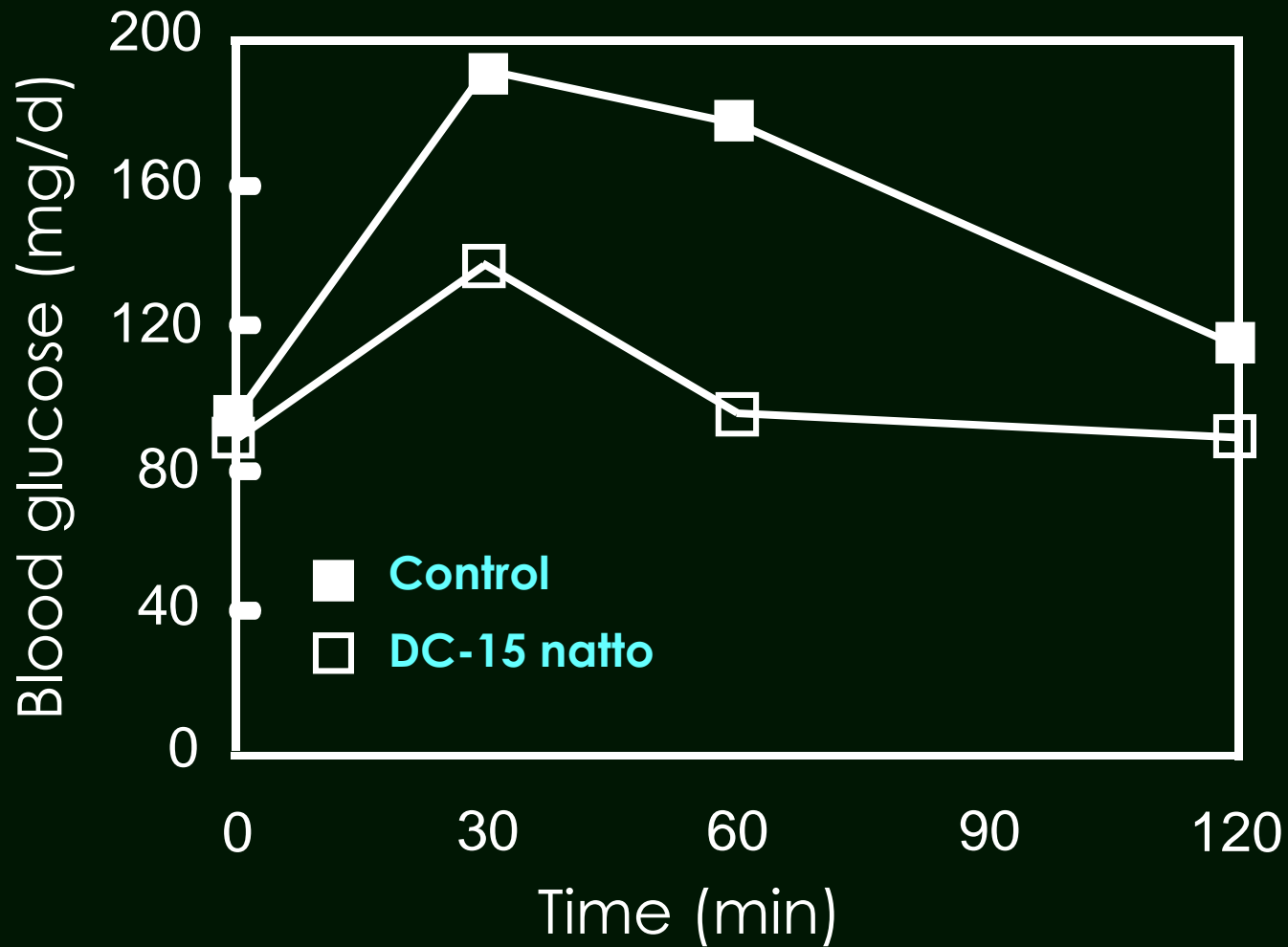
# DC-15 Natto



# Distribution of $\alpha$ – glucosidase inhibitory activities

Sample	UnitX10 <sup>3</sup> /g	
DC-15 natto	Freeze dry	21,000
	Spray dry	23,000
	wet, 24hr	7,400
	wet, 36hr	12,800
	wet, 48hr	17,800
Commercial natto	1	none
	2	none
	3	none
	4	none
	5	none

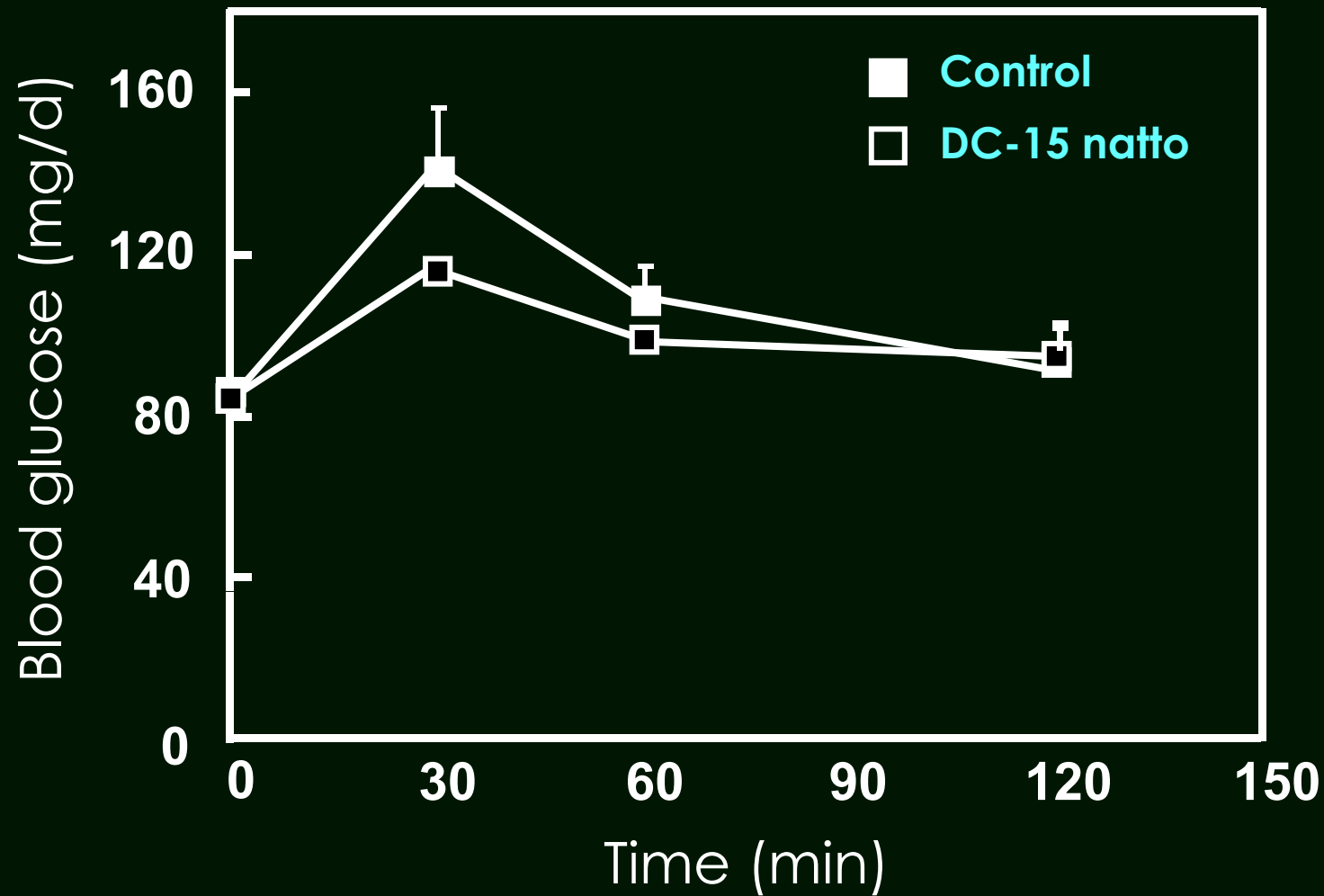




**Effect of DC-15 natto on blood glucose levels**

# AGI activity in DC-15 natto ramen

Sample	Unit x 10 <sup>3</sup> /g	Natto(g)/ Flour 100g	Total activity (unit x 10 <sup>3</sup> )	
			Estimated	Actual
DC-15 natto (Spray Dry)	20,850	0	-	-
Ramen 1		2	41,700	37,000
Ramen 2		3	62,550	60,000



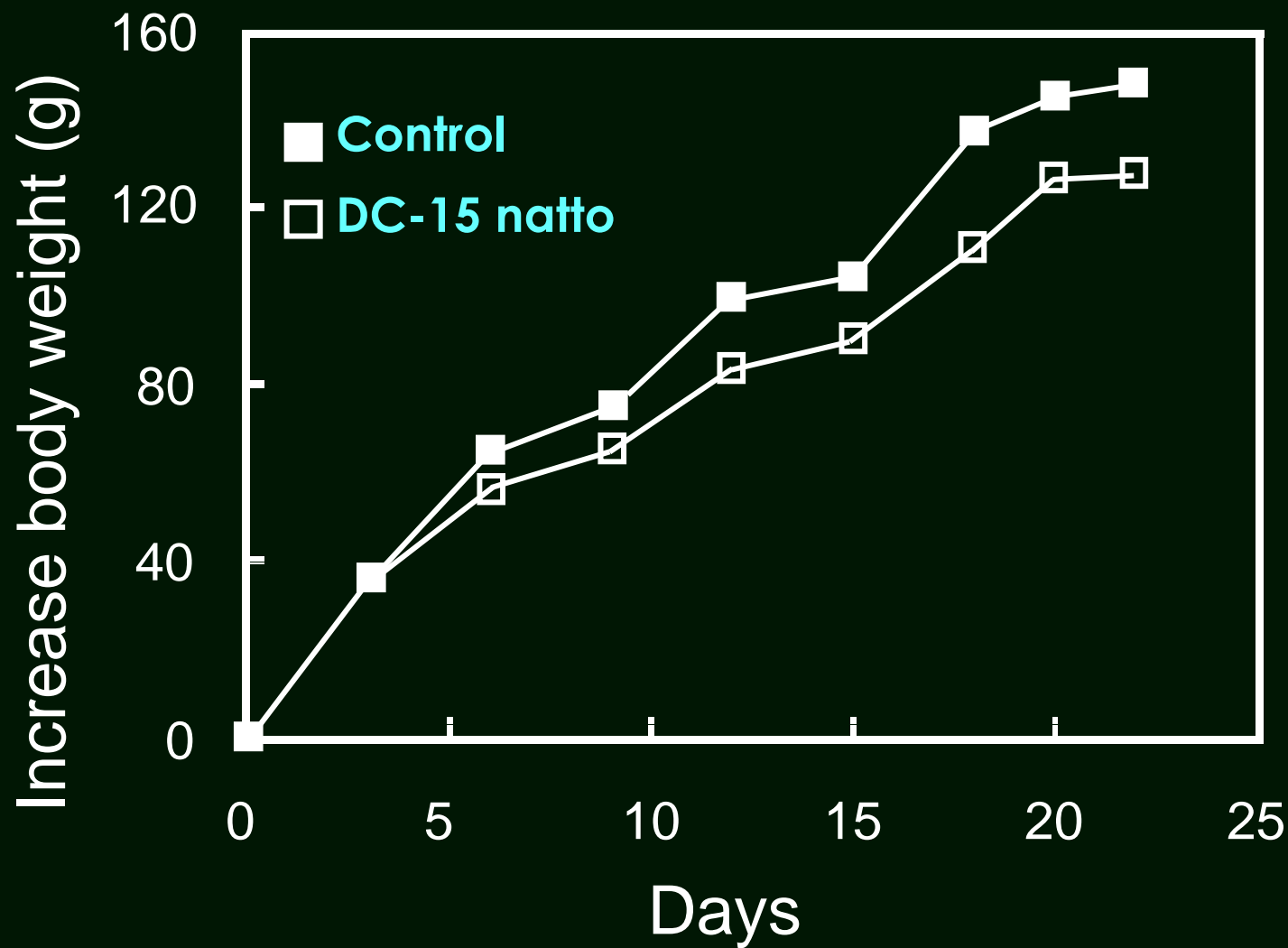
**Effect on blood glucose levels after ingesting ramen containing DC-15 natto**

# Diet composition

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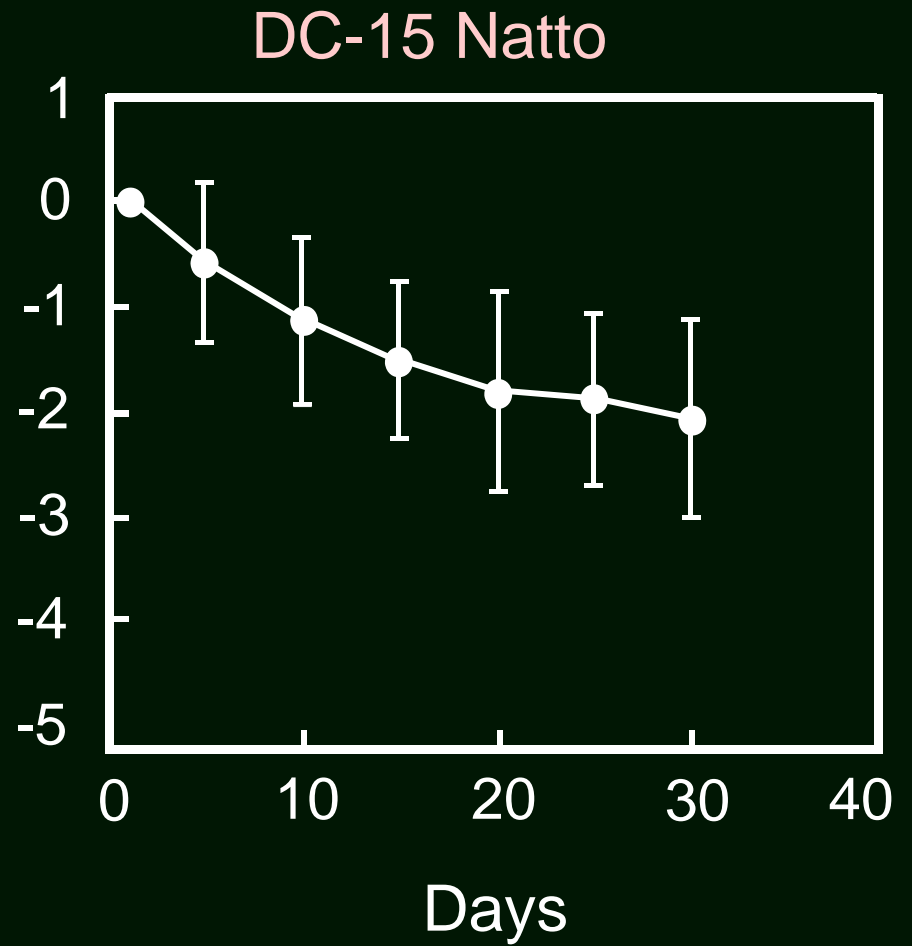
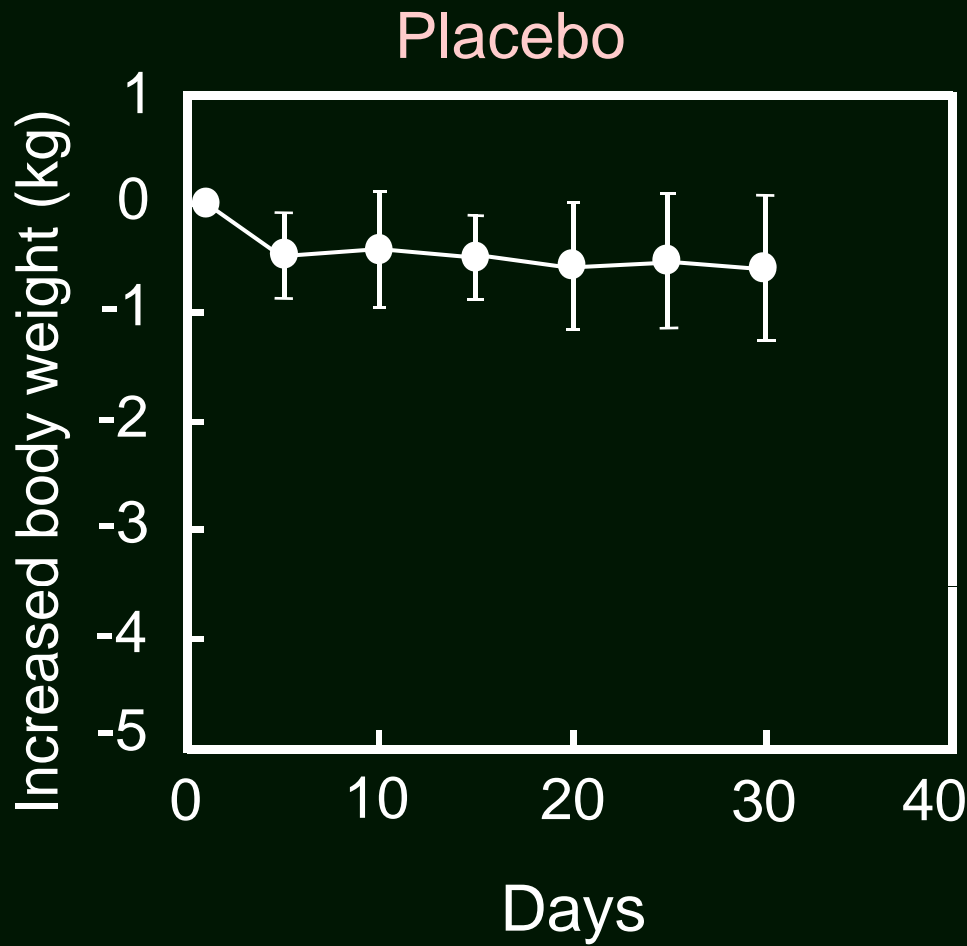
Ingredient (g/kg)	Control	DC-15
Casein	204	204
Sucrose	699	699
Corn oil	50	50
Mineral mix	35	35
Vitamin mix	10	10
Choline chloride	2	2
Commercial natto	15	-
DC-15 natto	-	15

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**Effect of DC-15 natto on body weight of rats**





**Body weight gain in women for 30 days**

## Conclusion

- We isolated microorganism producing  $\alpha$ -glucosidase inhibitor from Cheong-guk-chang which is traditional fermented soybean food in Korea.
- It is identified *Bacillus subtilis* and named DC-15.
- After ingesting DC-15 natto, increase of blood glucose is repressed.
- There is significant body weight decrease after giving DC-15 natto.
- DC-15 natto can be used as a functional food without extraction and concentration.