

2018 Green Crab Working Summit
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Potential Health Benefits of Green Crab Peptides Produced with Commercial Enzymes

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Green crab (*Carcinus maenas*)

- Voracious predator
- Large population
- Destruction of marine habitats and ecosystems
- Negatively affecting fisheries and aquaculture
- **Small size** → they are **not commercially utilized** by food industry



Mar Biol. 2014. 161:3-15
Pictures: Google images

Current utilization of various crab species

Shell

- **Calcium carbonate**
Pharmaceutical, agricultural, construction and paper industries, and soil treatments
- **Chitin**
Nitrogen-rich chemicals for pharmaceutical, cosmetics, textiles, and water treatment
- **Protein**
Fertilizer in agricultural industry

React. Funct. Polym.46(1).1-27

Meat

- **Typical food products**
 - Pasteurized crab meat
 - Canned crab meat
 - Blue crab, Rock crab, Jonah crab

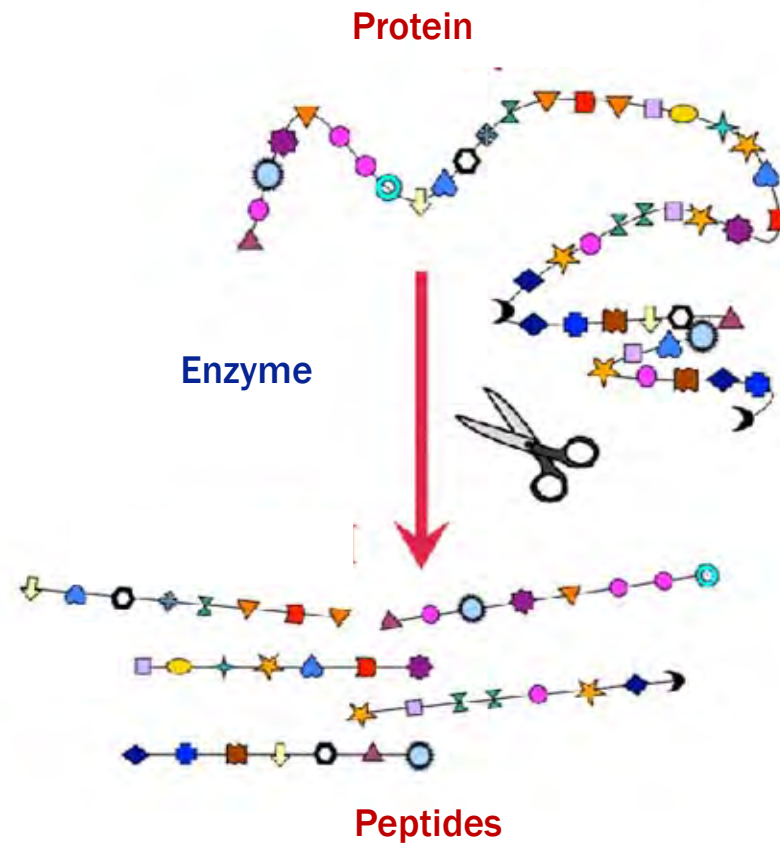


Pictures: Google images

**How can we derive high value products from
green crab meat?**

Enzymatic digestion

Enzymatic digestion



Modified from Google images

Functions of peptides

Green crab meat?

Enzymatic digestion

Peptides

Food preservation

- Anti-oxidant activity
- Anti-microbial activity

Health benefits

- Anti-diabetes
- Antioxidant
- Anti-inflammation
- Anti-hypertension
- Anti-cancer

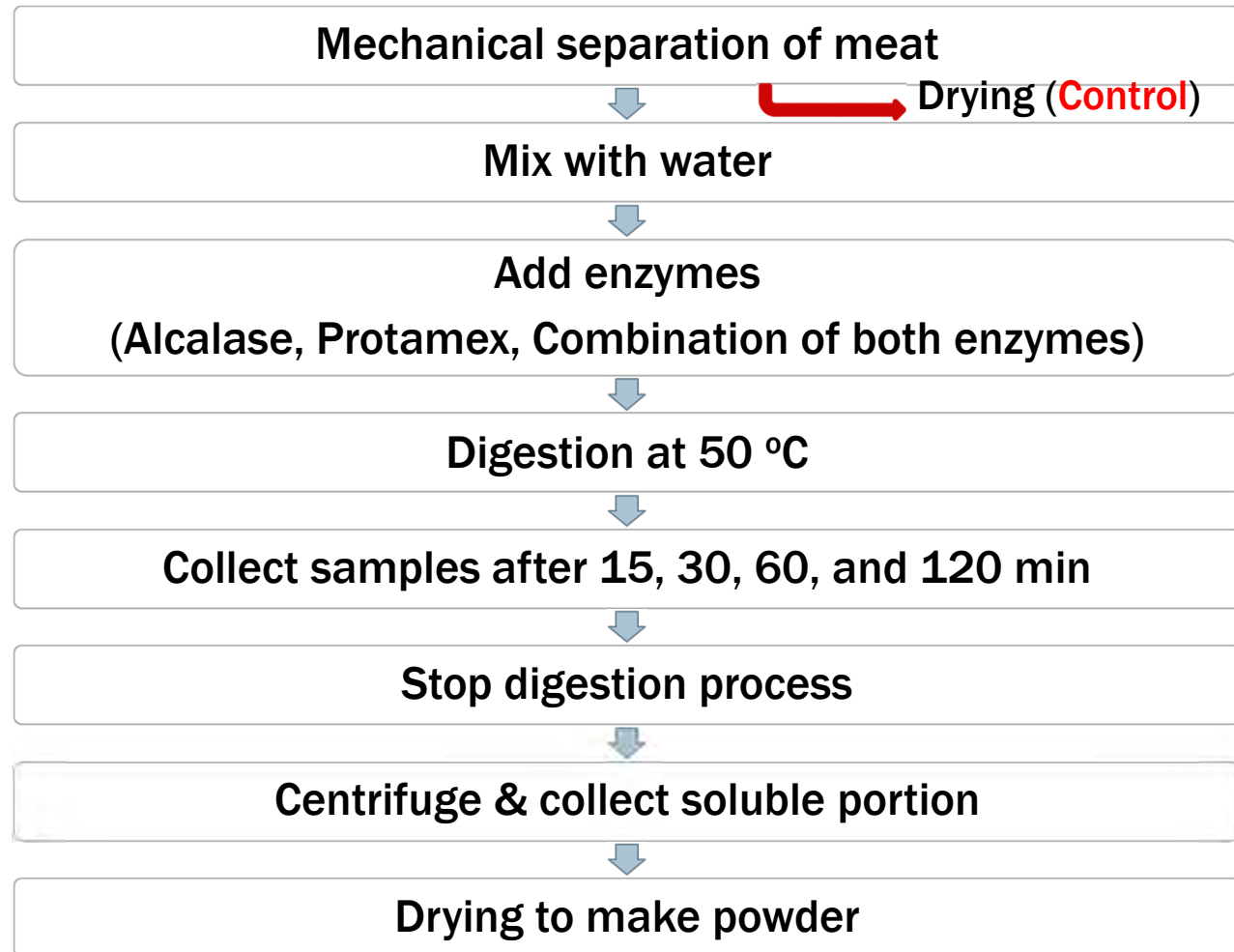
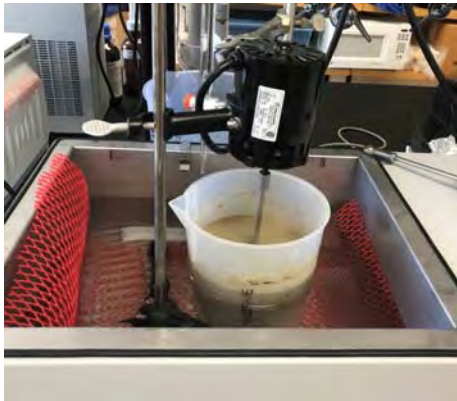
Food ingredient

Umami flavor

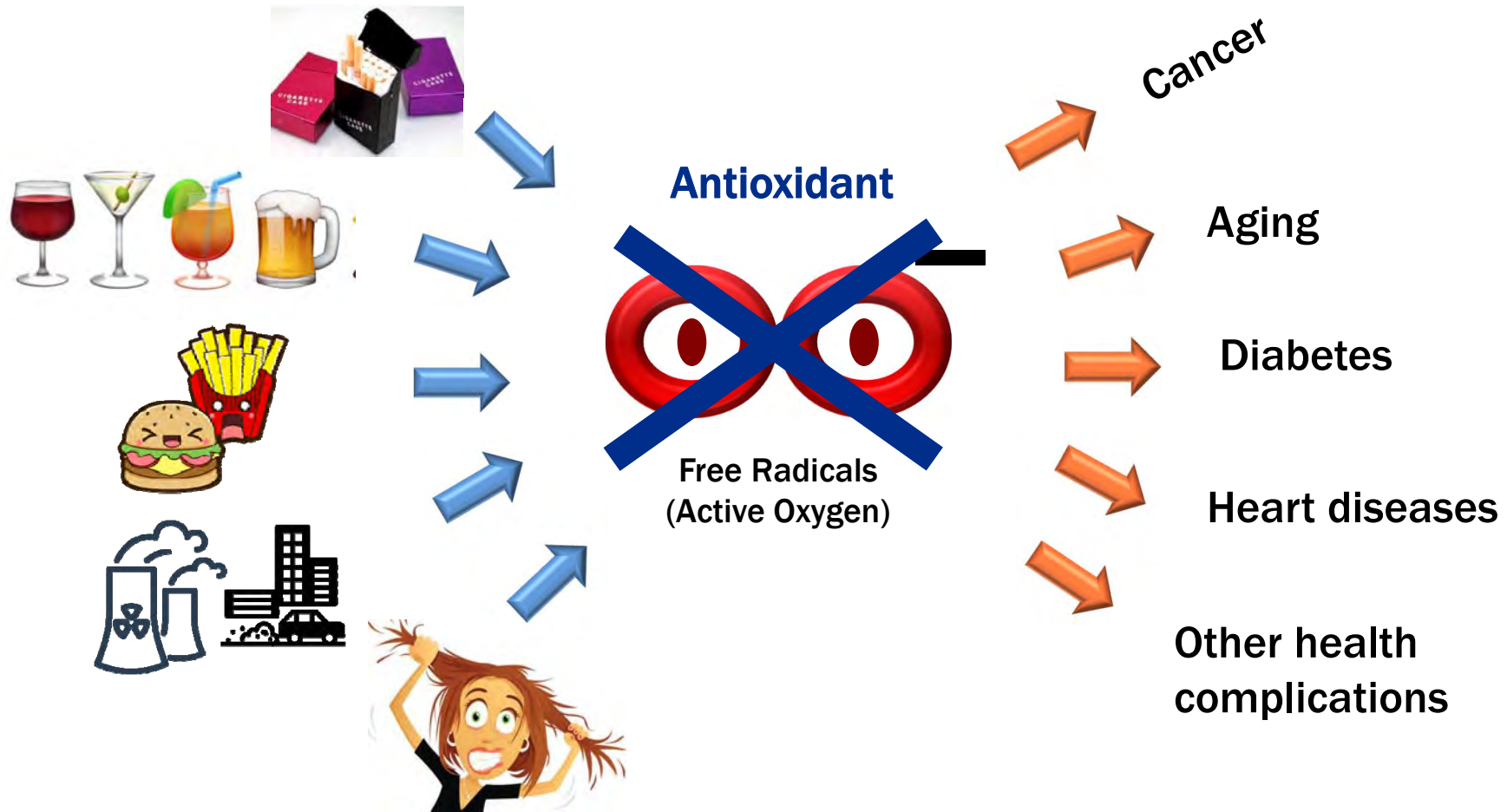
Overall goals

- To create commercial value from green crab meat using enzymatic digestion
- To obtain health-promoting peptides from green crab meat

Methods for digestion

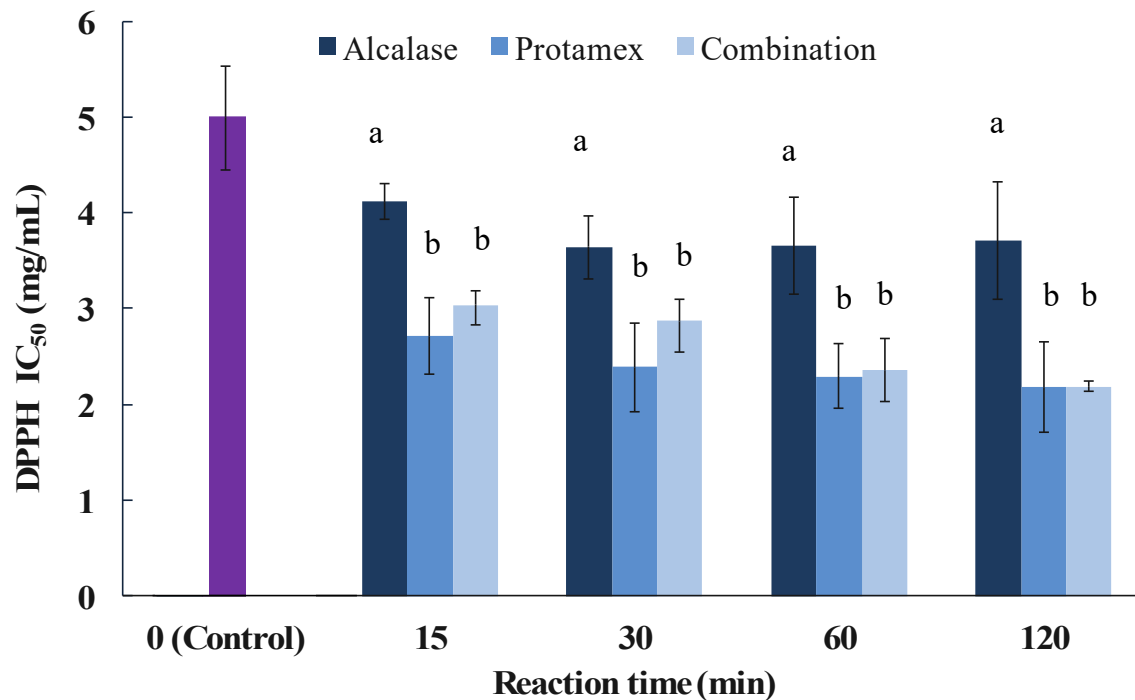


Free radical and antioxidant



Antioxidant activity

■ Free radical inhibitory activity

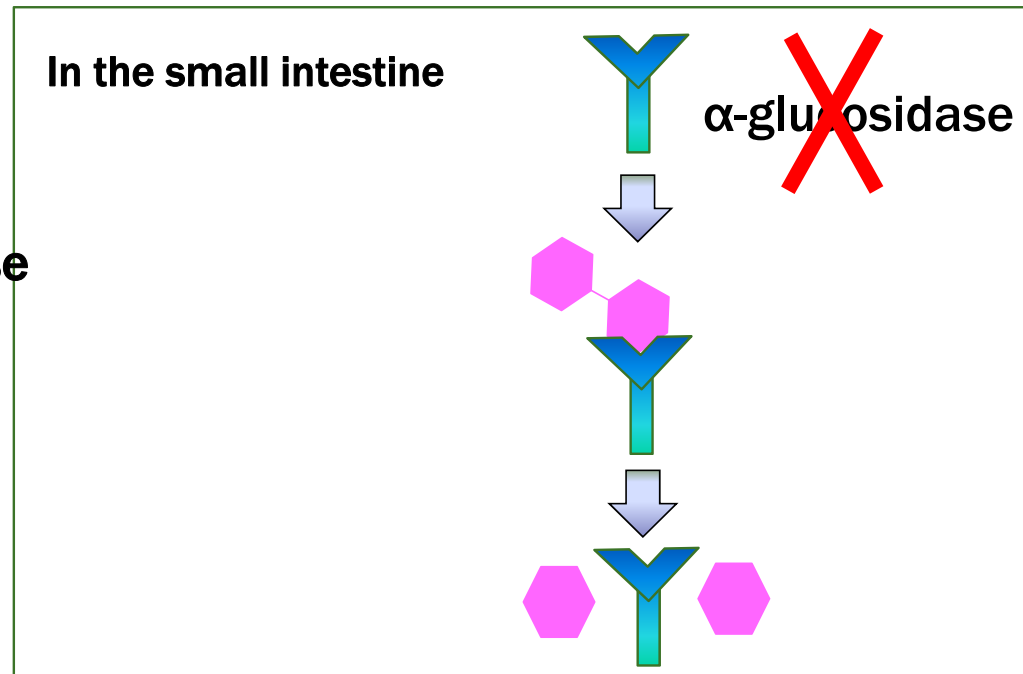
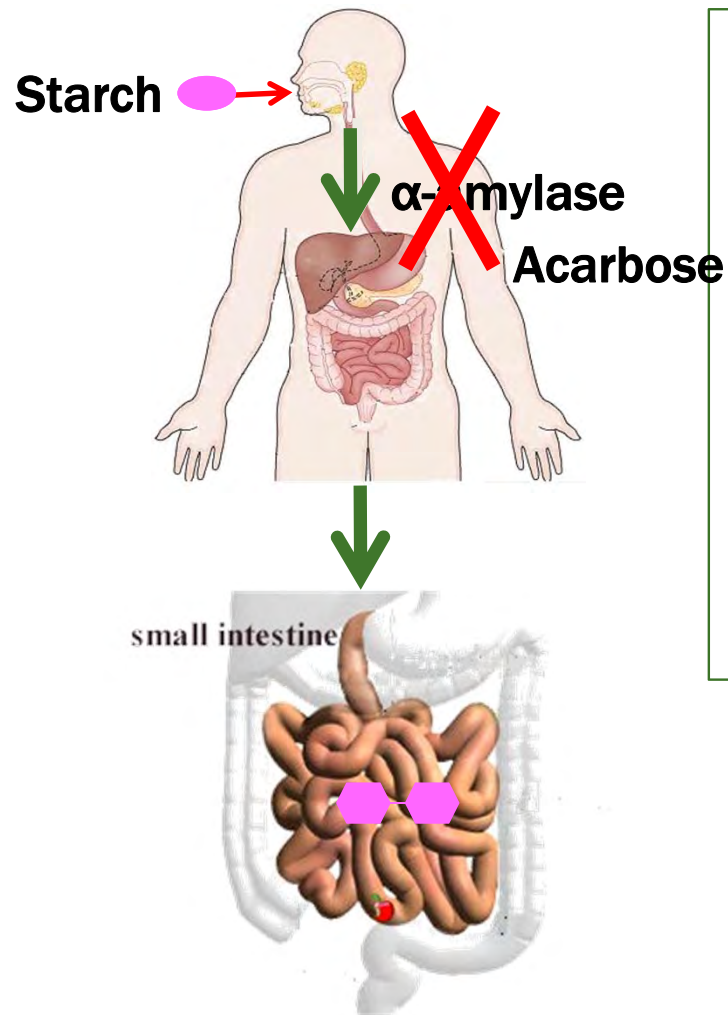






- Lower IC₅₀ → better antioxidant

- Improved antioxidant activity of green crab meat

- Protamex > Combination > Alcalase > Control

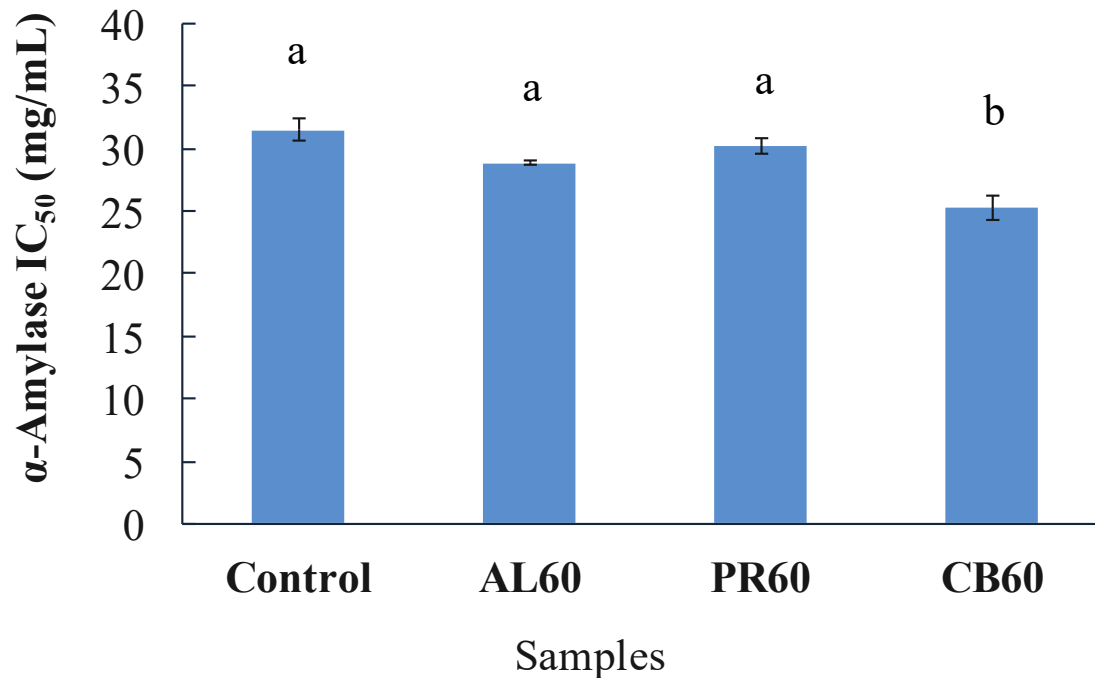
Carbohydrate hydrolyzing enzymes



	α -glucosidase
	Starch
	Disaccharide (sugar)
	Glucose

Anti-diabetic activity

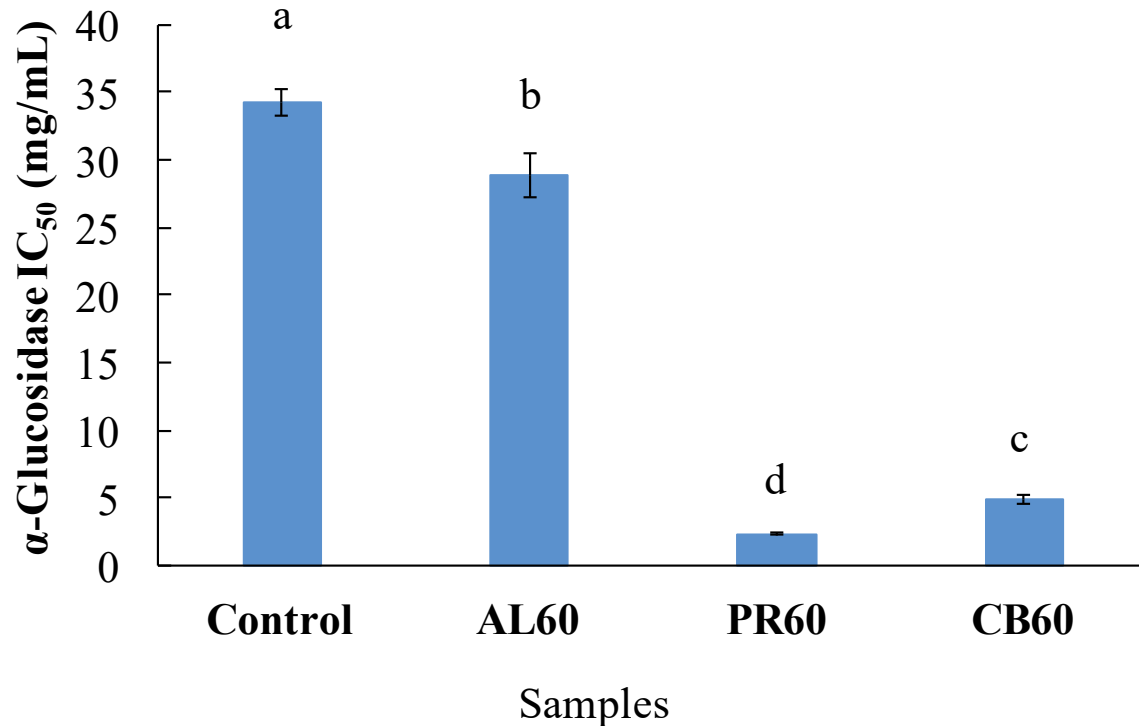
- α – Amylase inhibitory activity



- Lower IC_{50} \rightarrow better inhibition
- Combination of both enzymes
 - Best anti-diabetic activity

Anti-diabetic activity

■ α – Glucosidase inhibitory activity



- Lower IC_{50} → better inhibition
- Improved α -Glucosidase inhibitory activity of green crab meat
- Protamex > Combination > Alcalase > Control
- α -Glucosidase inhibition higher than α -Amylase inhibition
→ **Low potential for side effects**

Conclusions

- Enzymatic digestion → improves antioxidant & anti-diabetic effects
→ **Protamex**: best enzyme
- Potential as a health promoting ingredient for diabetics with lower chance for side effects
 - Dietary supplement
 - Health promoting food product
- Antioxidant activity → to prevent rancidity of fat in food



Picture: Google images

Acknowledgements

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Thank you!

