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Investigation of Thai Plants as Potential Sources of Fructan and Inulin Main Fractions

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1

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What is fructan?

Fructan - one of carbohydrates substance

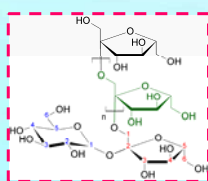

- fructose polymer - linked with $\beta(1-2)$ glycosidic bonds

▶ **Inulin** - a mixture of fructose polymers with a chain length from 2 to 60 units (DP 2-60) usually with a terminal unit of glucose.

▶ **Fructo-oligosaccharide (FOS) or Oligofructose** - is a partial enzymatic hydrolysis of inulin which has a chain oligomers with $DP < 10$.

Inulin $\xrightarrow[\text{inulinase}]{\text{hydrolysis}}$ **FOS**

Sources: Jerusalem artichoke, chicory, banana, onion, garlic

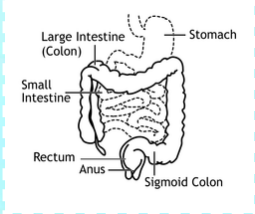
2

Health benefit effects

- **as soluble dietary fiber** - cannot be digested by the enzymes of the human small intestine
 - Low calorie carbohydrate - ~ 1.5 Kcal/g
 - Produced by fermentation- SCFA and lactate
- **as prebiotic** - promote the growth of bifidobacteria and suppress pathogens

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- Relieving constipation*
- Low glycemic index and improve glucose regulation*
- Improvement of the bioavailability of calcium*
- Reduction of serum cholesterol concentrations and triglycerides*



3

Why method of fructan analysis is developed?

- ⇒ **AOAC method 985.29** for total dietary fiber analysis - can not detected inulin or oligofructose (soluble in the alcohol of the precipitation step)
- ⇒ **AOAC method 997.08** for fructan analysis - determination of the released fructose and glucose before and after hydrolysis with enzyme

4

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Sources of fructan in Thai Foods

No information of fructan content in Thai foods

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Objective

To investigate potential sources of fructan and inulin main fractions in selected Thai plant foods.

5

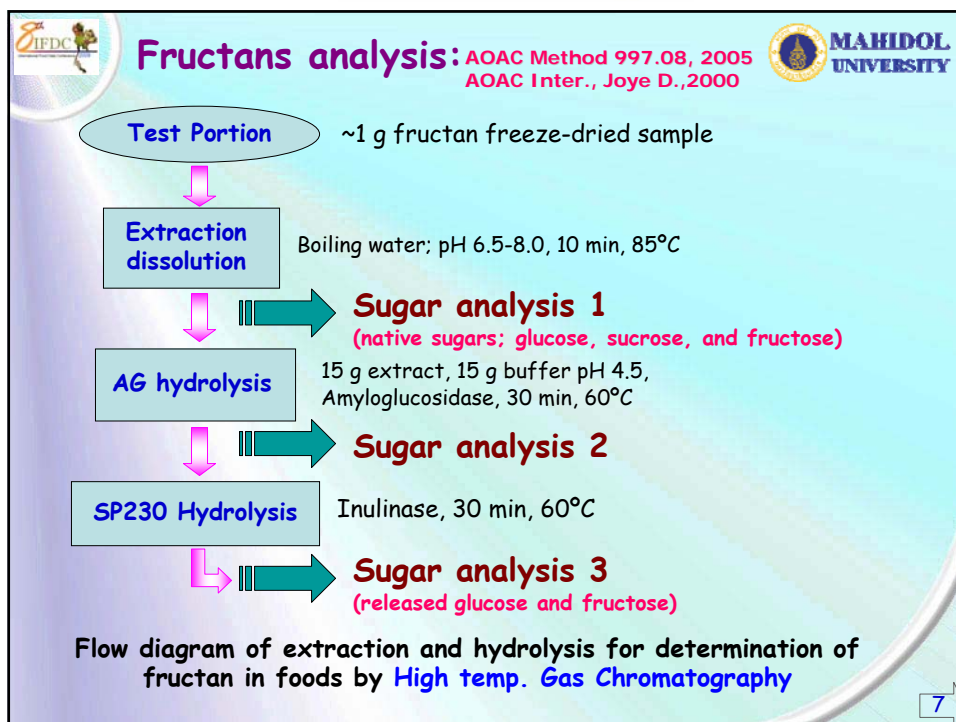
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Materials and Methods

Samples: Forty-eight commonly consumed Thai plants from 5 food groups:

• Starchy roots and tubers	12 samples
• Vegetables	13 samples
• Fruits	7 samples
• Spices	11 samples
• Seeds and nuts	5 samples

6



Results

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- ⇒ Method validation
- ⇒ The fructans and fructooligosaccharide* content of selected Thai plants (screening from 48 varieties, n=1)
- ⇒ The fructans and fructooligosaccharide* content of selected 8 food items Thai plants (n=3 each)

* FOS = Sum of Fructo-oligosaccharide (GF2, GF2 and GF4)
where; GF2 is 1-kestose (1-kestotriose), GF3 is nystose, and GF4 is 1F-β-fructofuranosylnystose

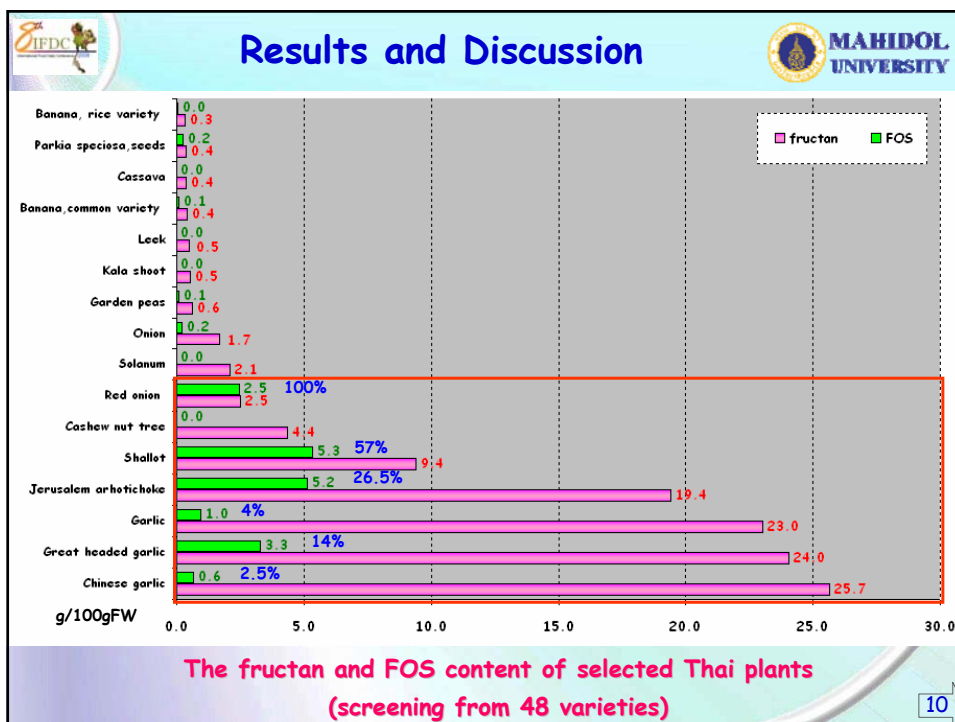
Method validation

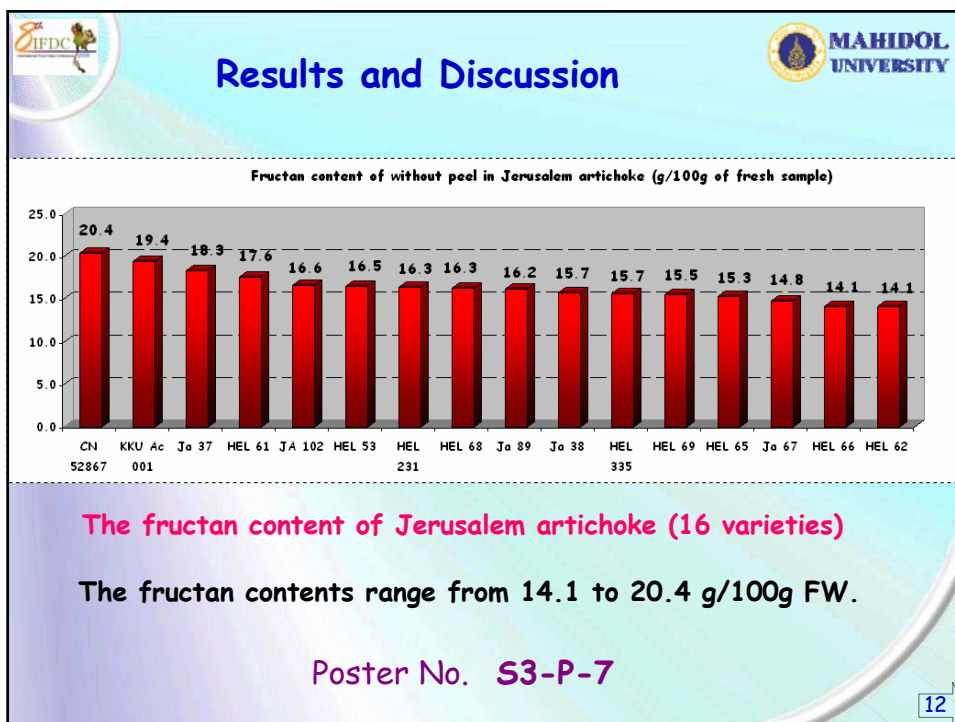
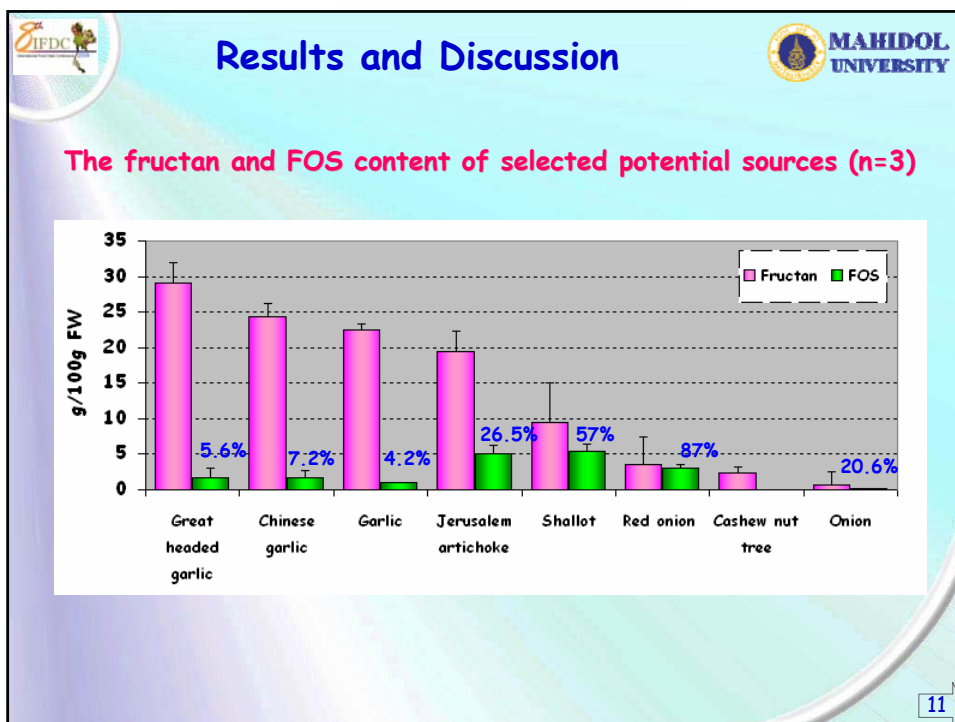
Accuracy:
% Recovery of standard inulin powder (Beneo™, Belgium) = 98.5 ± 3.4%

Precision:
Repeatability: < 2%RSD
Reproducibility: 4.4%RSD

QC sample (in-house quality control material):
fortified fructan milk powder (Nestle™), analysed along with each set of analysis, mean±SD = 2.74±0.12 g/100g

9





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Conclusion

High fructan content:	High FOS content:
<ul style="list-style-type: none">• Great headed garlic• Chinese garlic• Garlic• Jerusalem artichoke (Kaentawan)• Shallot	<ul style="list-style-type: none">• Jerusalem artichoke (Kaentawan)• Shallot• Red onion

13

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Further activities

- ✚ Promote consumption of recipes containing good sources of fructan
- ✚ Artichoke: promote consumption as fresh or as recipes use as fructan fortificants in low calories food products.

14

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15