

Innovative pulse and cereal-based food fermentations for human health and sustainable diets

From Soaking to Fermentation: Soluble Fiber and β -Glucan Changes in Oat and Faba Bean Foods

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ETH zürich



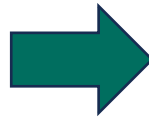
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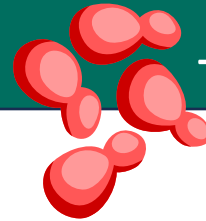
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Sequential Bioprocessing: Oat Kernels and Faba Beans

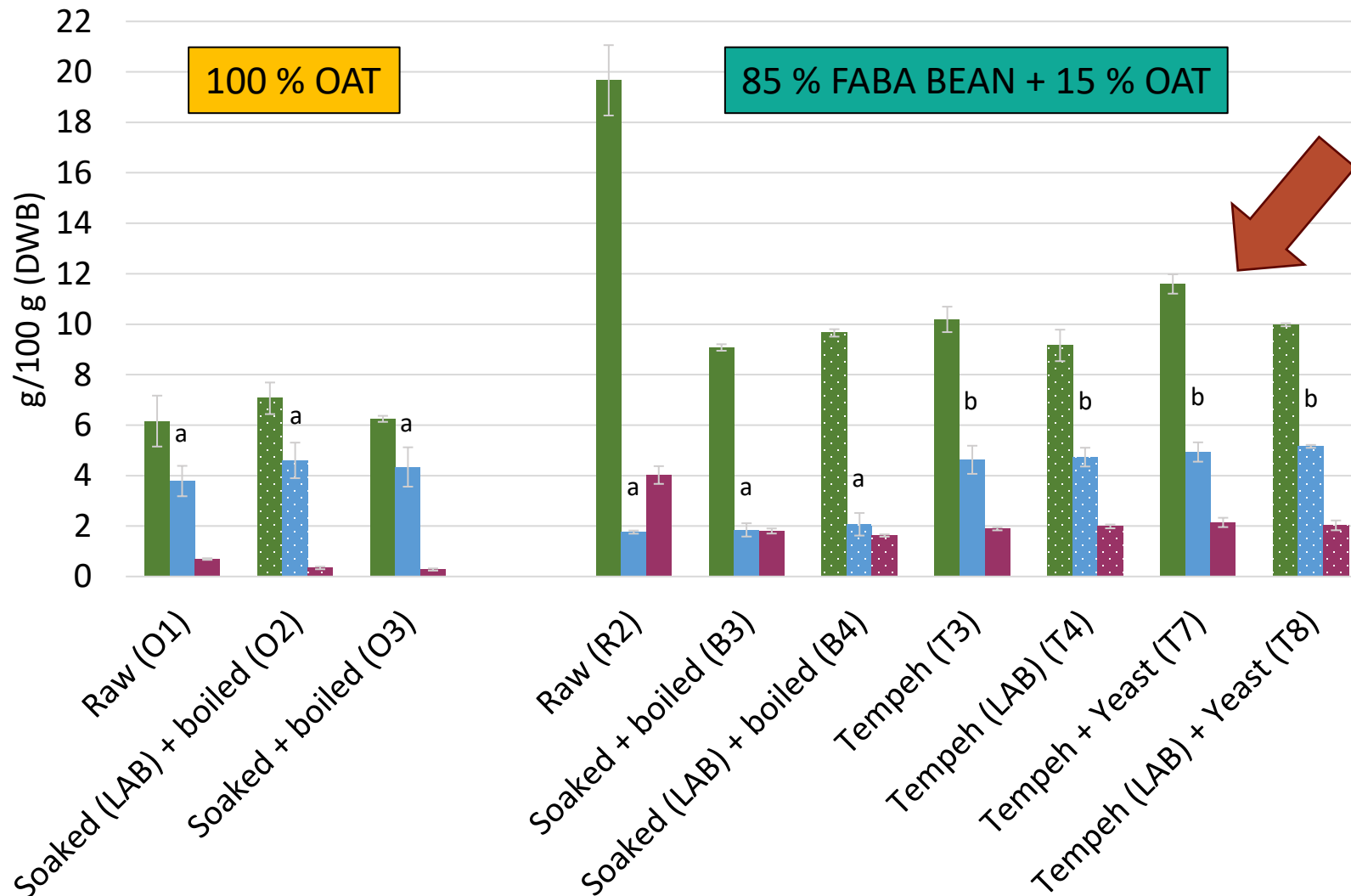
Soaking +/- *L. plantarum*
(12 h, 25 °C) and Boiling
(8 min), draining



Solid-State Fermentation (40 h, 30 °C)
with *Rhizopus oryzae*
+/- yeast *Rhodotorula babjevae*



Fiber Analysis: Oat Kernels and Faba Beans



Insoluble Dietary Fibers

Soluble Dietary Fibers
Precipitating in 78% EtOH

Soluble Dietary Fibers that
remain soluble in 78% EtOH

Solid-state fermentation
increases content of SDFP, no
additional effect of yeast.

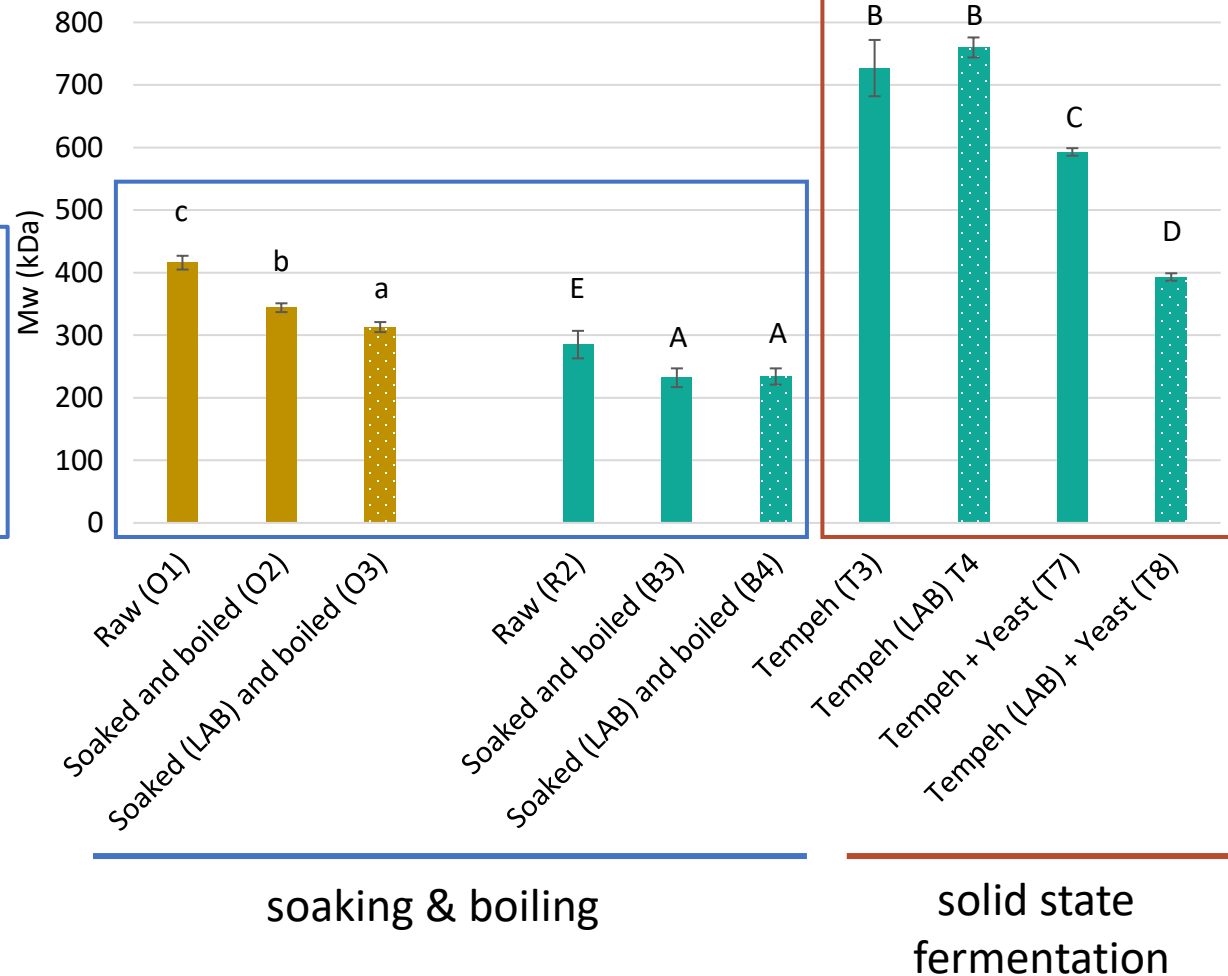
No difference in SDFP due to
soaking and boiling.

→ Size-Exclusion
Chromatography (SEC)
Analysis

Molecular weight (M_w) of Oat and Faba Soluble Fibers (SDFP)

100 % OAT

85 % FABIA BEAN + 15 % OAT



Solid-State Fermentation

Rhizopus

- Solubilization of cell wall polysaccharides
- Additionally, those newly solubilized fibers are of higher Mw

Rhizopus + Yeast (R. babjevae)

- Decrease in Mw
- Downstream pectinolytic activity of yeast
- Substrate competition

Pre-treatment (soaking and boiling)

- Reduces Mw
- Small additional effect of LAB

Oat and Faba Bean (Yo)Gurt

High Protein High Fiber (HPHF):

Wholegrain oat flour, oat bran concentrate,
faba bean protein isolate, faba bean flour

Two versions:

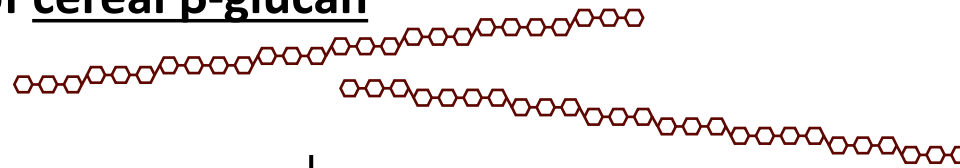
- Different enzymes
- Different strains

Low Protein Low Fiber (LPLF):

Wholegrain oat flour



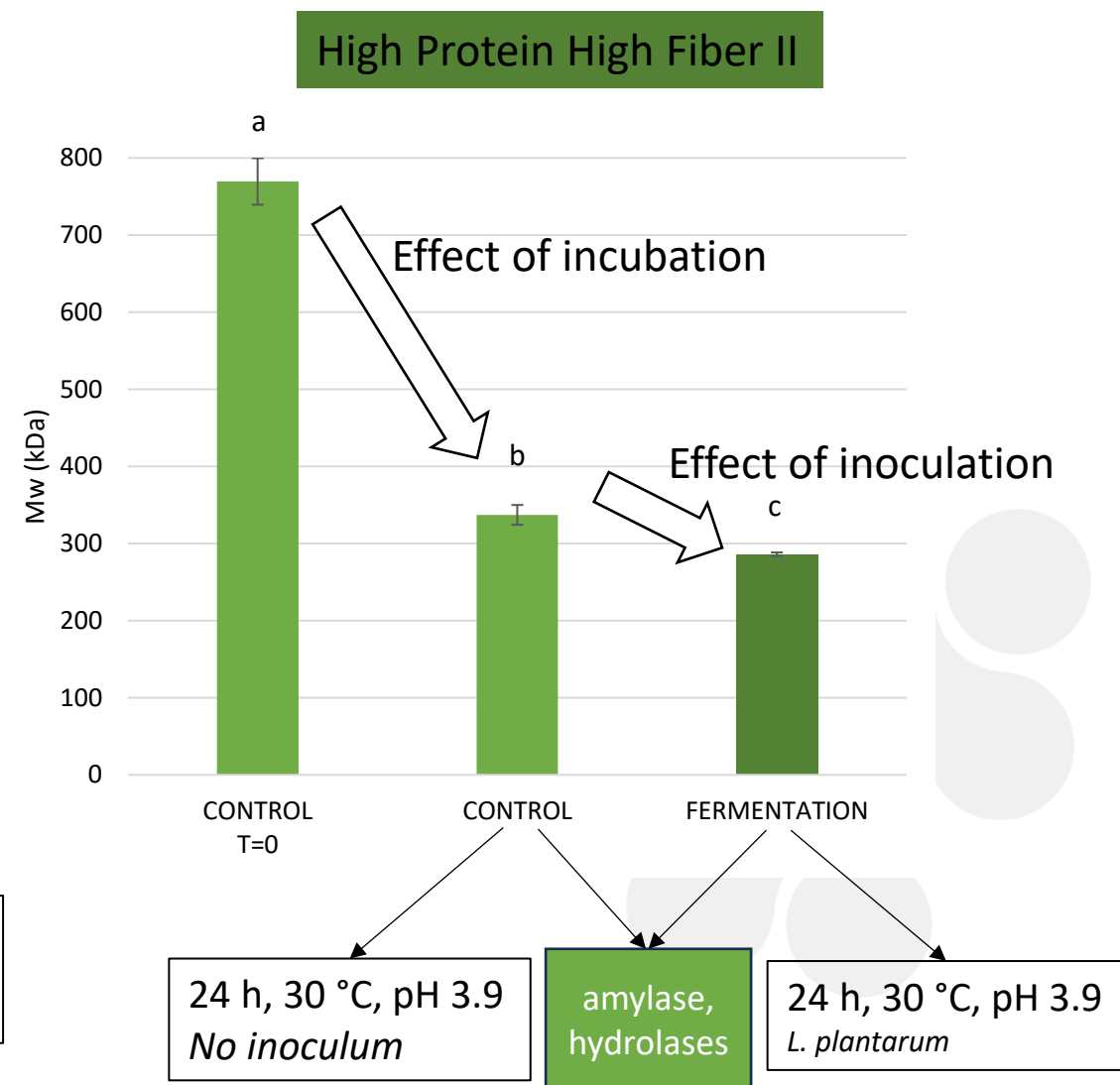
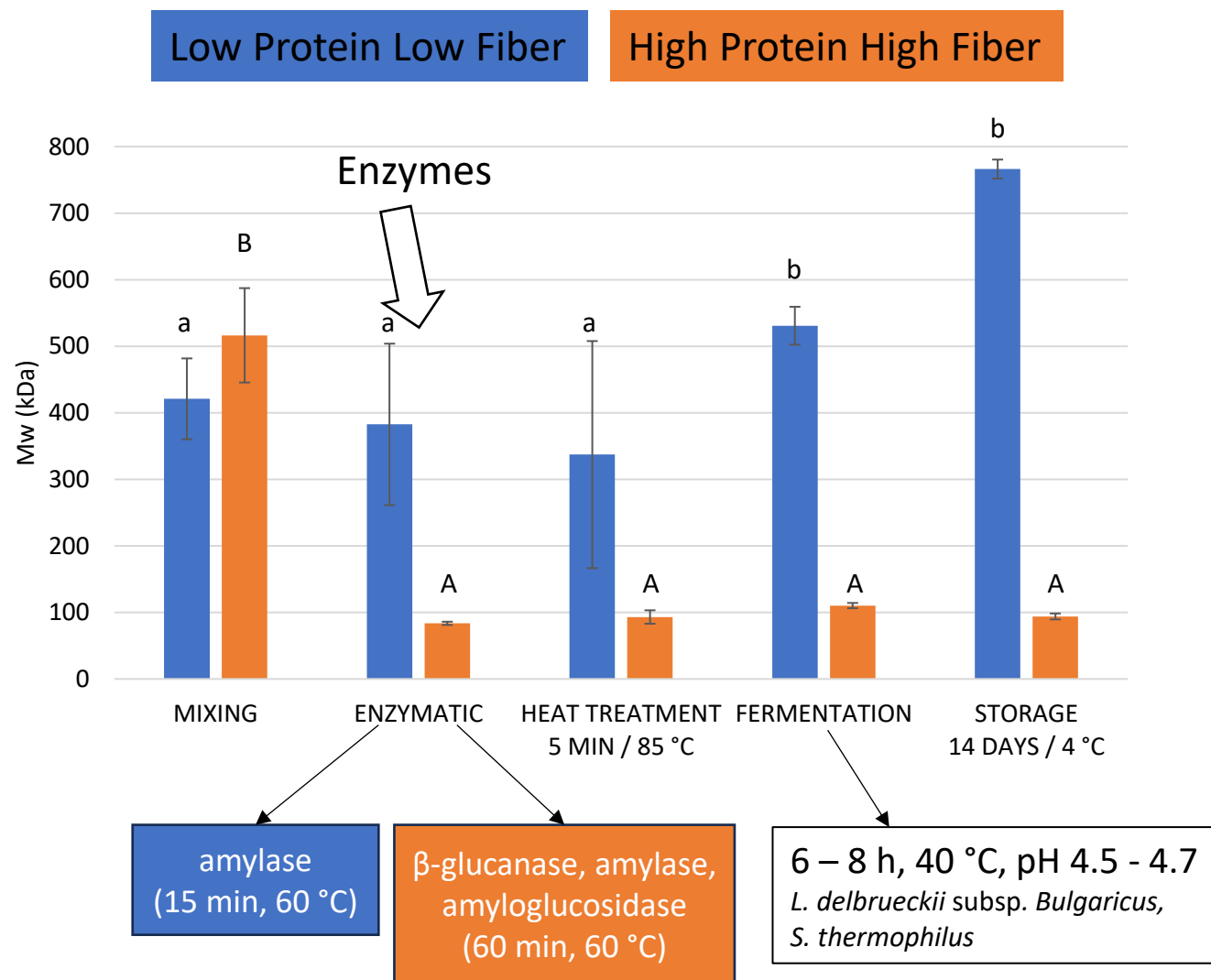
Isolation of cereal β -glucan



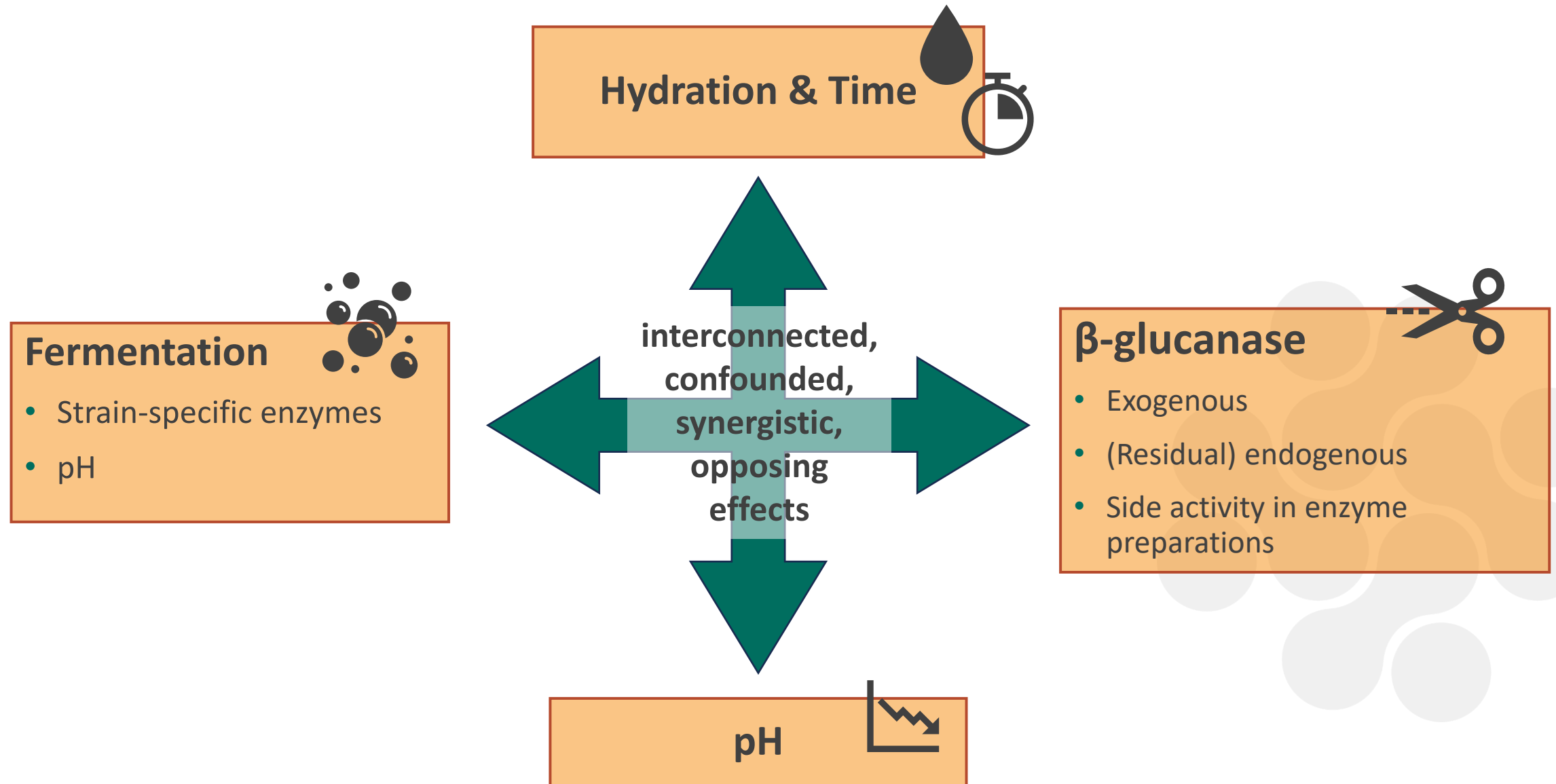
Size-Exclusion Chromatography:
Determination of weight average
molecular weight (M_w)



Molecular Weight (M_w): Oat and Faba Bean (Yo)Gurt β -glucan



What Impacts Oat & Faba Bean Soluble Fiber M_w ?





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Thank you



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