



Manchester Metropolitan
University

Modulate Your Immune Response Using Cereals

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Overview

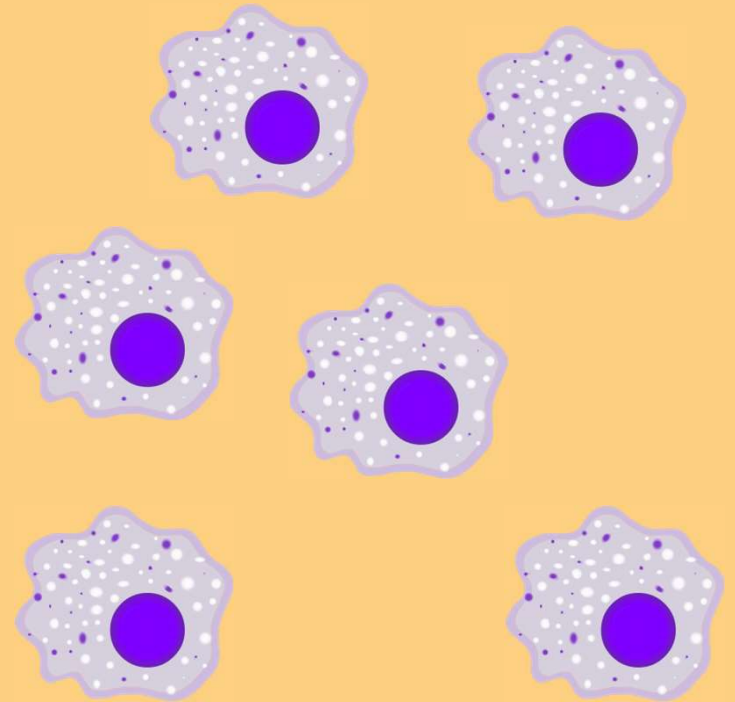
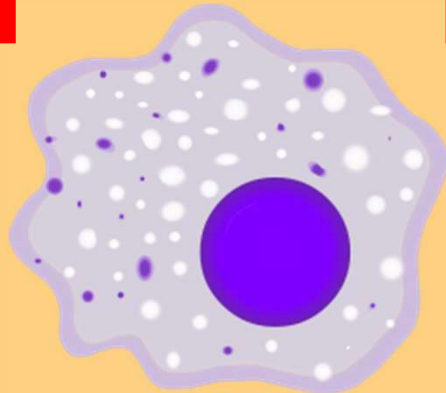
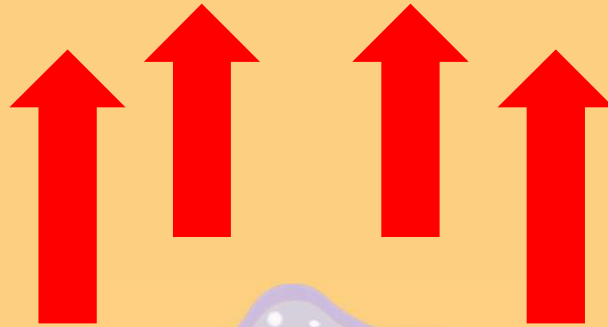
- Introduction
- Background
- Rationale
- Methodology
- Results
- Application

Introduction



Mounting the Immune-response

Inflammatory mediators, such as $\text{TNF}\alpha$ and Nitric Oxide



Food Can Modulate Immune Response



(Wang et al., 2015)



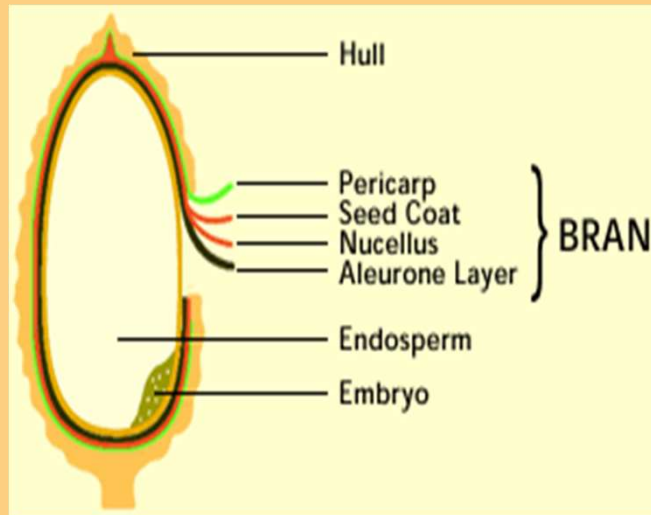
(Fadel et al., 2017a)



(Fadel et al., 2017b)

Rice Bran Bioactive Compounds

- Rice (*Oryza Sativa*) 495.2 million tons (2016, FAO)



However

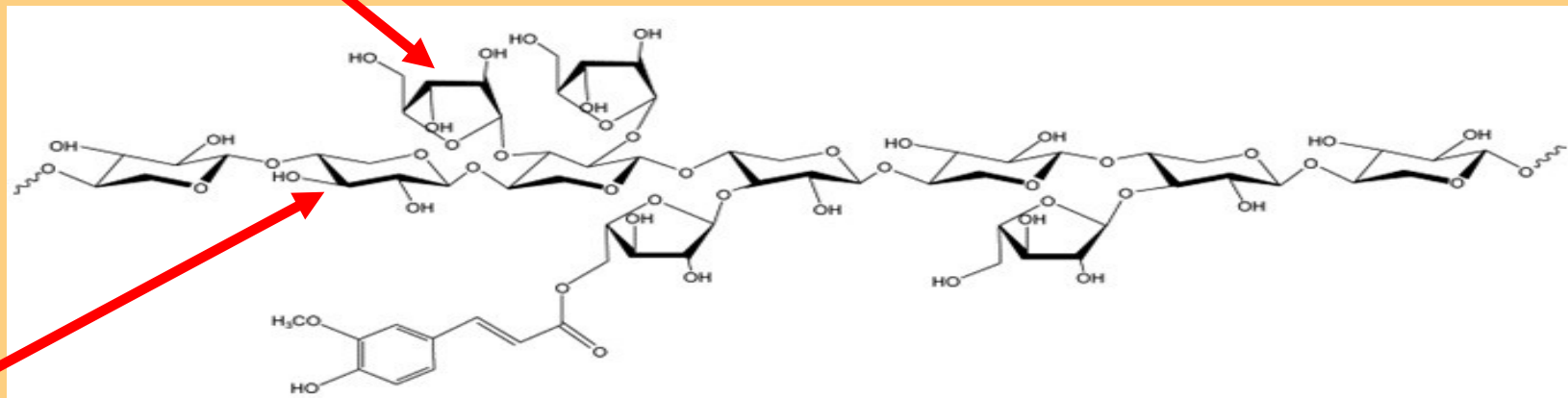


Rice Grain (Champagne, 2004)

Rice Bran Arabinoxylans (AXs)

- AXs are only 10% of rice bran (Fadel et al., 2017c)

Arabinose



Xylose

Arabinoxylans (AXs) structure

Source: (Garófalo et al., 2011)

Rice Bran



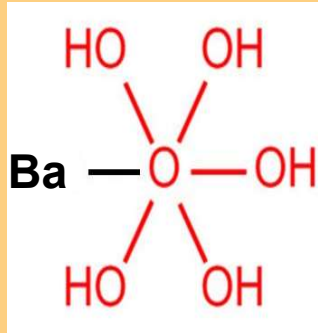
Arabinoxylans Extraction/Treatment

Water



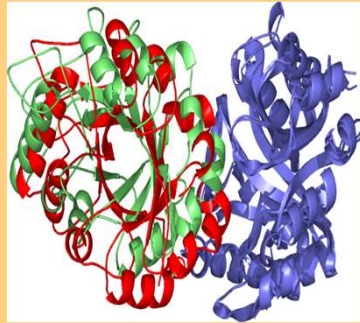
H₂O

Alkaline



Barium Hydroxide

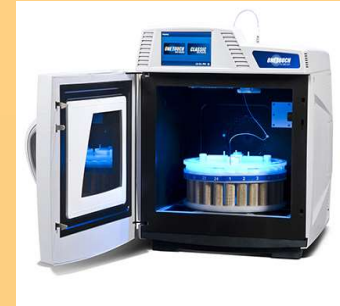
Enzyme



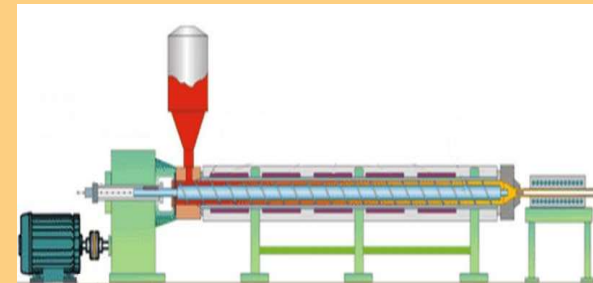
Xylanase

Mechanical Assisted Extraction

Microwave Assisted Extraction



Extrusion Processing



However



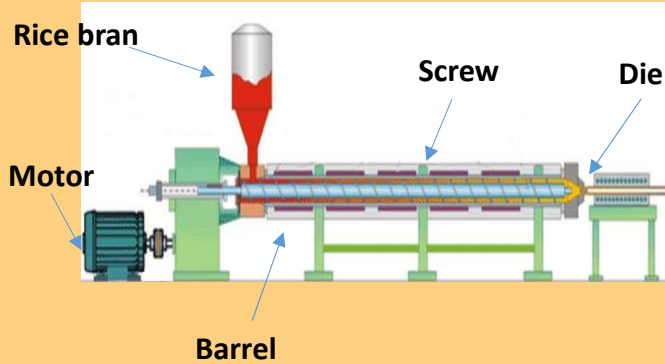
Extrusion as a physical pre-treatment



Rice Bran



Extrusion



Water Extraction



Purification

In Vitro Digestion

Analysis

(Weili et al., 2015)

HPLC



Spectrophotometer

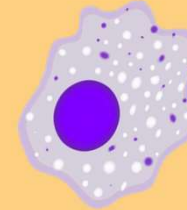


Size Exclusion Chromatography



Cell Biology

Human Macrophages



Treated with AXs

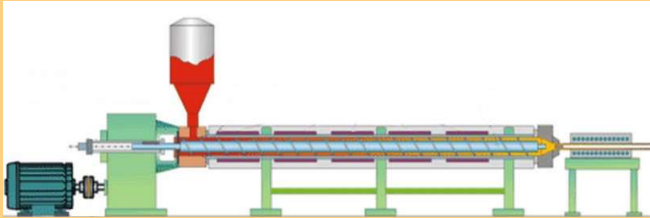
Nitric Oxide production

TNF α production

Enzyme-linked immunosorbent assay

Conclusion

Cereals



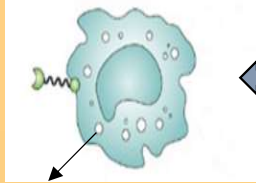
Extruded AXs

Enrichment



AXs

Innate Immunity



Activated Mφ

IL-12 ↑



T Cell

Biological Activities

Adaptive Immunity



Current/future work

- AXs characterisation using NMR, FTIR and Raman spectroscopies
- AXs detection in human bloodstream
- Human inflammatory response modulation

Acknowledgment



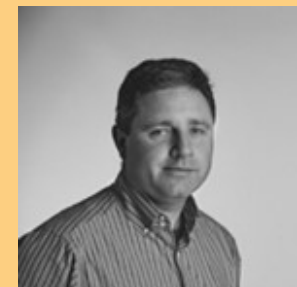
Prof. Weili Li



Dr. Jason Ashworth



Dr. Andrew Plunkett



References

- All images in this presentation are free royalty images
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