



**CASEE**  
**University of Life Sciences**  
**Warsaw, Poland**

***In vitro* determination of  
prebiotic properties of *Moringa*  
*Oleifera* leaf and seeds**

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14-16 May, 2017



# CONTENT

- Aims and objectives
- Generalities
  - *Moringa oleifera* seeds and leaves
  - Probiotics & prebiotic effect
- *M. oleifera* seeds and leaf – FTIR
- *M. oleifera* seeds and leaf – prebiotic
- Conclusions



# AIM and OBJECTIVES

Investigate the prebiotic effect of *Moringa oleifera* seeds and leaves.

- ✓ FTIR characterization
- ✓ Cultivation assay
- ✓ Prebiotic index





# MORINGA OLEIFERA

- Tree from Asia
- Used to fight malnutrition





# MORINGA OLEIFERA



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

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Food Science  
and Human Wellness

[www.elsevier.com/locate/fshw](http://www.elsevier.com/locate/fshw)

## *Moringa oleifera*: A review on nutritive importance and its medicinal application

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### Abstract

*Moringa oleifera*, native to India, grows in the tropical and subtropical regions of the "horseradish tree". Moringa can withstand both severe drought and mild frost conditions and



Dirty Water + Moringa Seeds Powder = Clean Water

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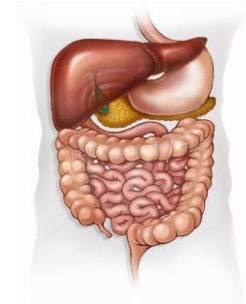




# Probiotics and PREBIOTICS

## Probiotics: + bacteria for human

- *Lactobacillus*
- *Bifidobacterium*
- *Saccharomyces*



## Prebiotics: sustain the growth and activity of

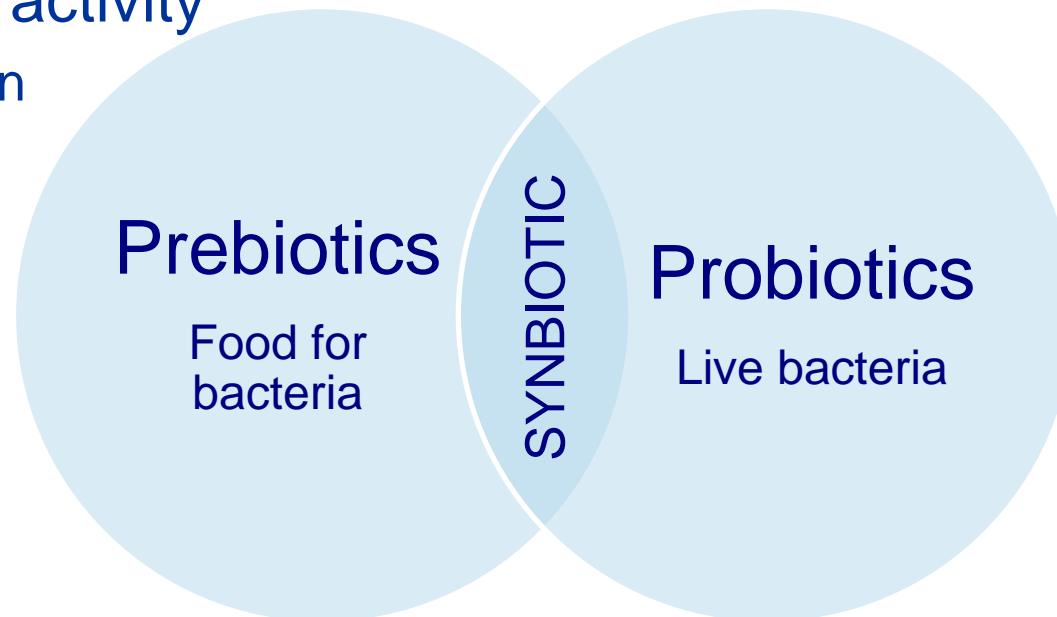
- *Inulin*
- *Pectin*
- *Fructo-oligozaharide*





# PREBIOTIC ACTIVITY

- Microflora modulation
  - Addition of living microorganisms
  - Stimulation of the microorganisms - **prebiotics**
  - Symbiotics
- PREBIOTIC activity
  - cocultivation
  - CFU count





???

- *Moringa oleifera* seeds and leaf

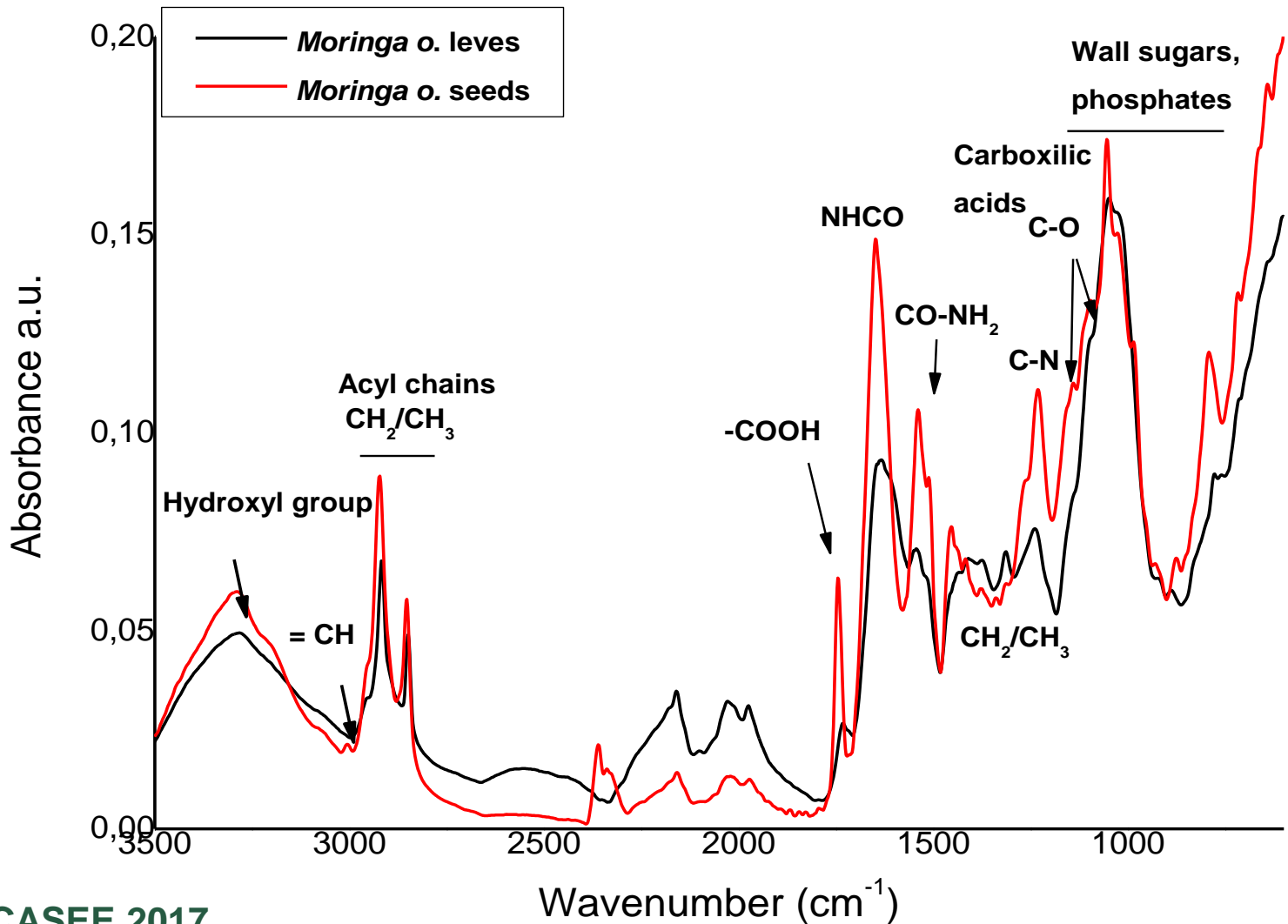


- *Stimulate probiotic growth and activity*



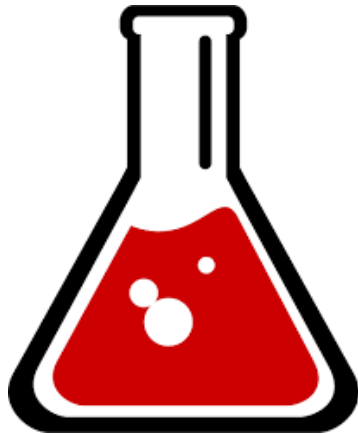


# FTIR characterisation





# PREBIOTIC ACTIVITY



- MRS broth
- *Lactobacillus: casei, rhamnosus, plantarum*
- +/- *M. oleifera* seeds and leaf powder

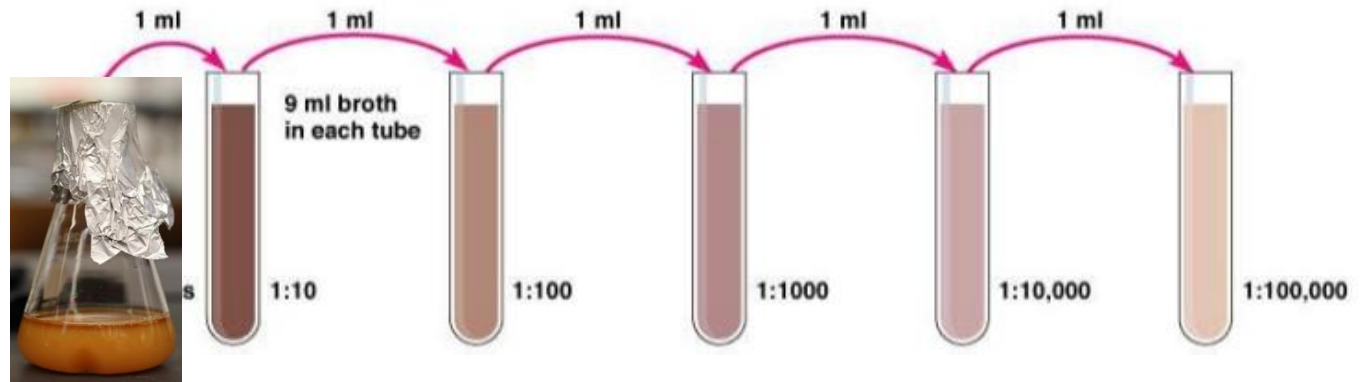
## Incubation conditions

- 37 °C
- *Aerobic incubation*
- 24 h



# PREBIOTIC ACTIVITY

## Serial Dilution



### FLOODING

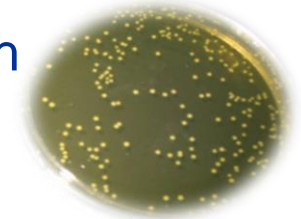


### EMBEEDING



### Incubation conditions

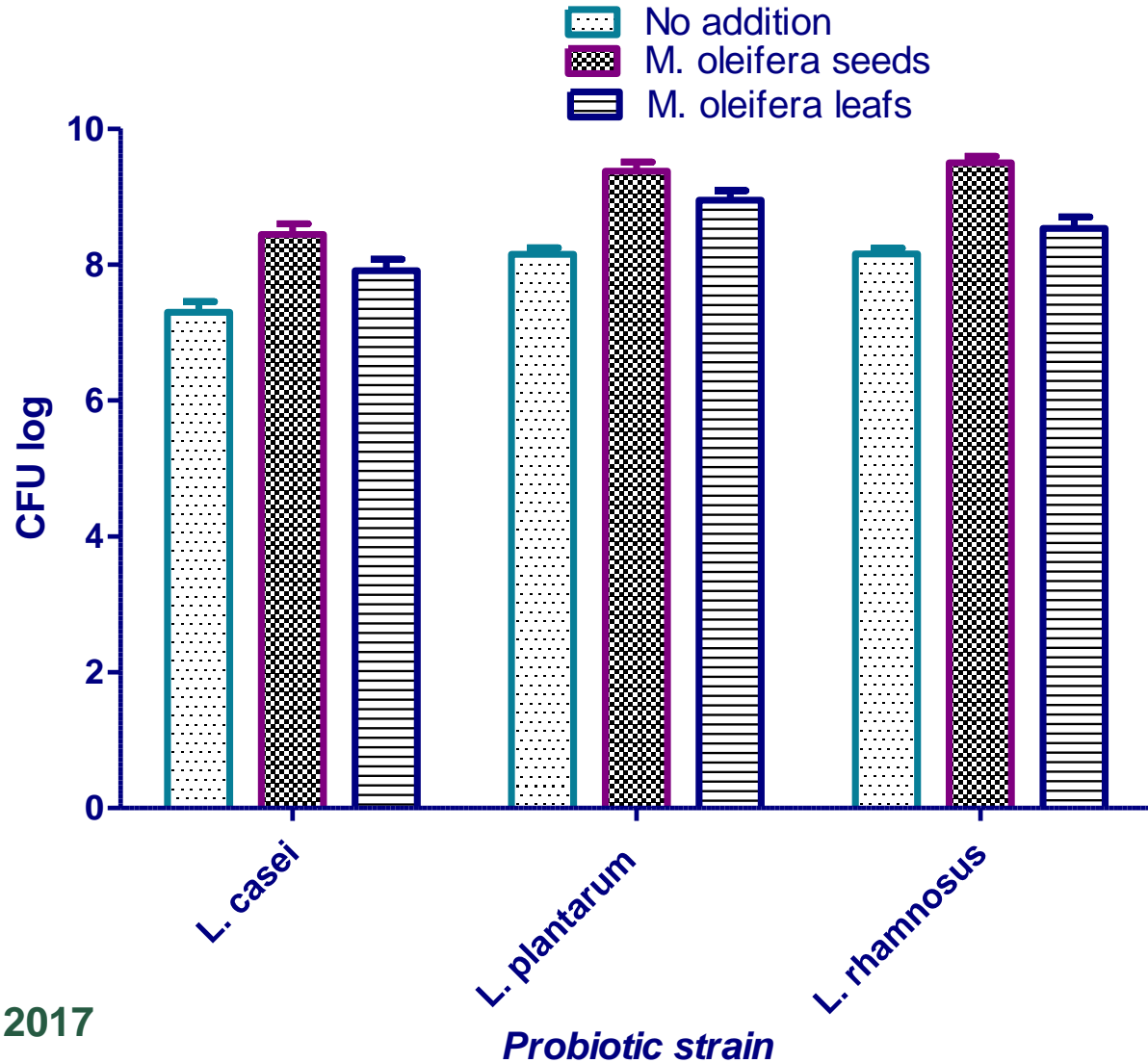
- 37 °C
- *Aerobic incubation*
- 24-48 h

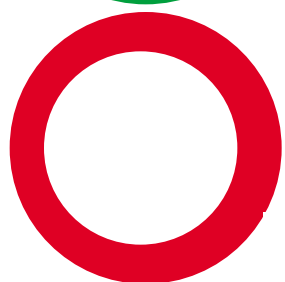
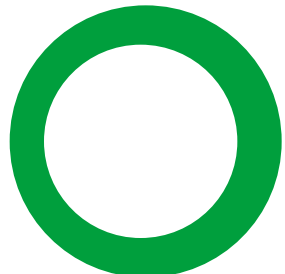
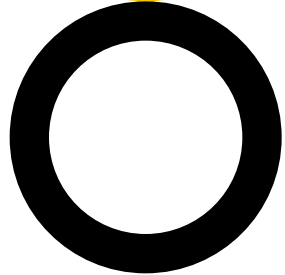
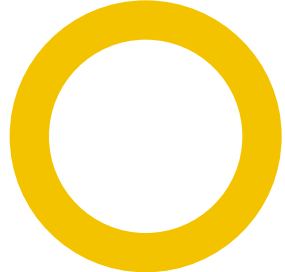




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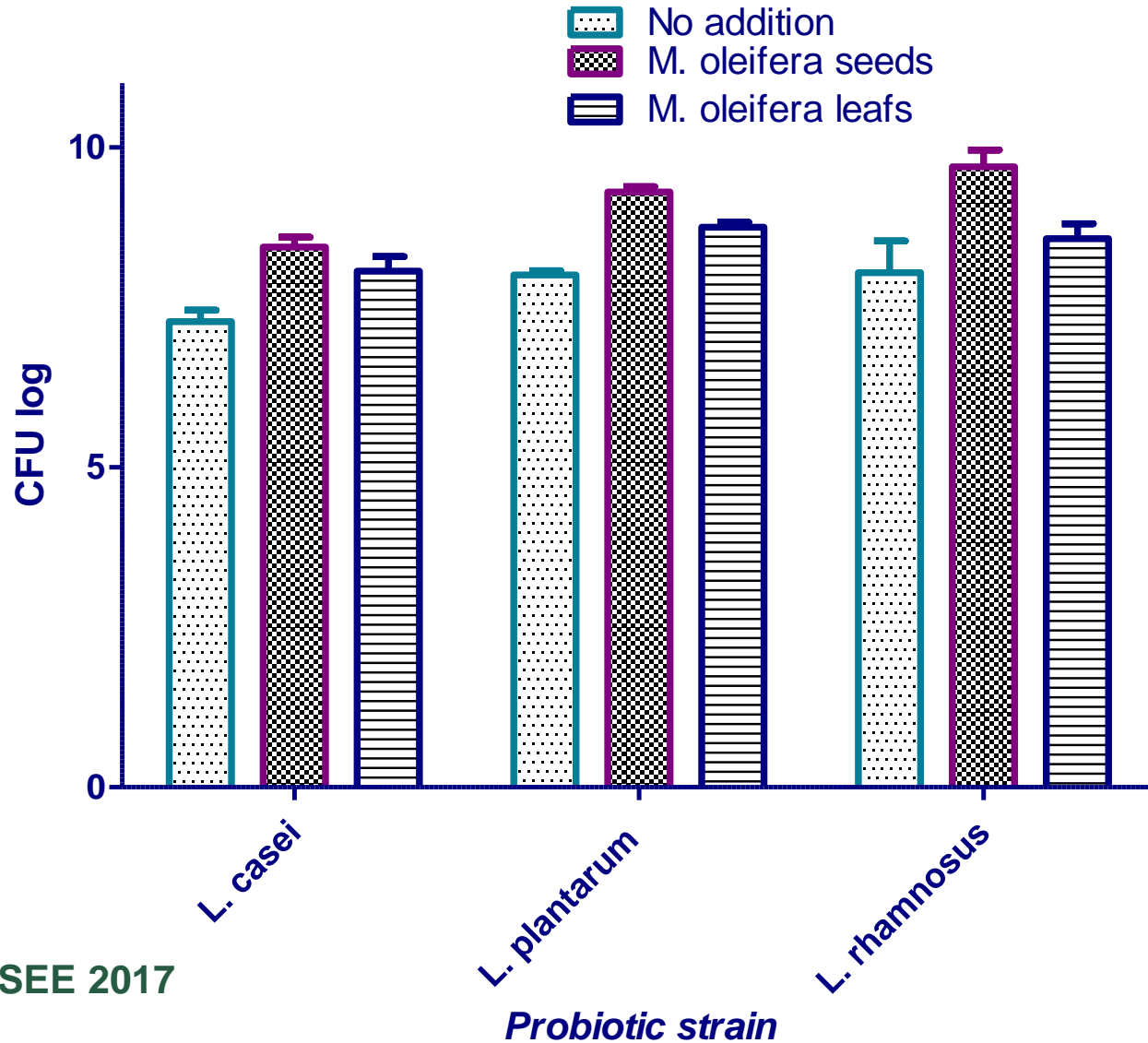
# PREBIOTIC ACTIVITY flooding



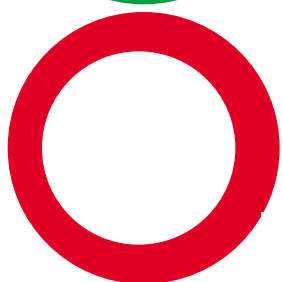
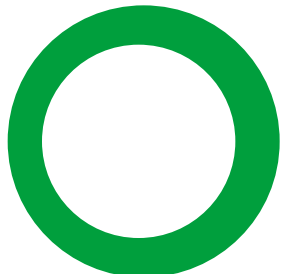
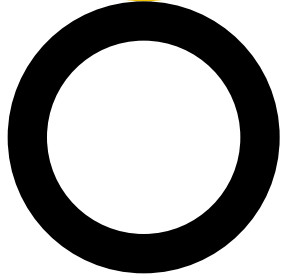
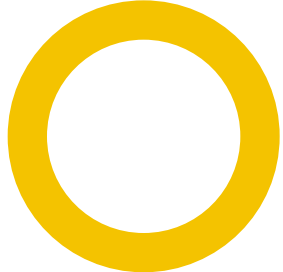


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# PREBIOTIC ACTIVITY embedding







# PREBIOTIC INDEX

✓ A quantitative equation – analysis of prebiotic activity

$$PI = \text{Log}_{10} \text{CFU } L. \text{ strain} / \text{Log}_{10} \text{CFU total counts mean}$$

Probiotic strain	<i>L. casei</i>	<i>L. plantarum</i>	<i>L. rhamnosus</i>
PI seeds	1,01	1,07	1,10
PI leaf	0,95	1,00	0,97



# CONCLUSIONS

- ✓ FTIR characterization of *M. oleifera* – seeds rich in carbohydrates
- ✓ Cultivation – flooding & embedding
- ✓ Prebiotic index – *M. oleifera* seeds for *L. plantarum*

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