

# IMPACT OF AGEING AND FOOD ADDITIVES ON THE PHYSICO-CHEMICAL PROPERTIES OF PARTIALLY HYDROLYZED AND PREGELATINIZED RICE FLOUR



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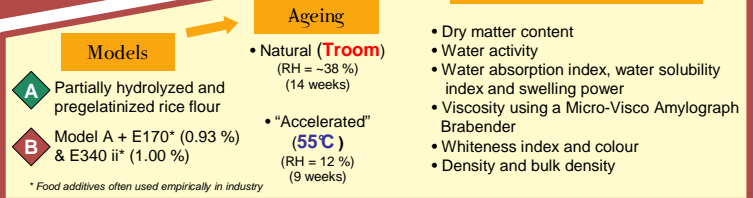


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## INTRODUCTION



## METHODOLOGY



## RESULTS AND DISCUSSION

### Dry Matter Content (DM)

Model	Initial DM (%)	DM after 14 weeks	DM after 9 weeks
<b>A</b>	96.73 ± 0.04 %	95.20 ± 0.03 %	97.37 ± 0.02 %
<b>B</b>	96.73 ± 0.04 %	95.57 ± 0.05 %	97.74 ± 0.05 %

- Slow evolution of DM
- Model B keeps a higher DM

Troom - 55°C

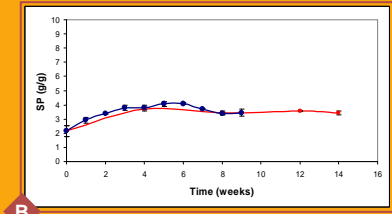
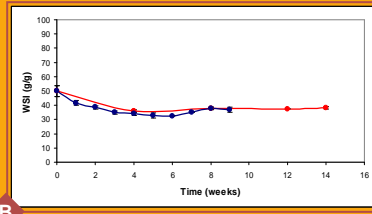
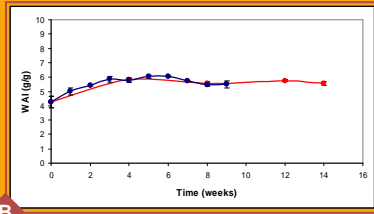
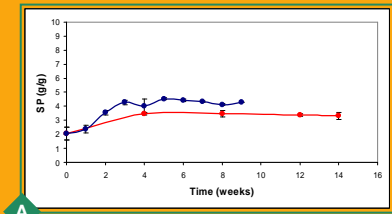
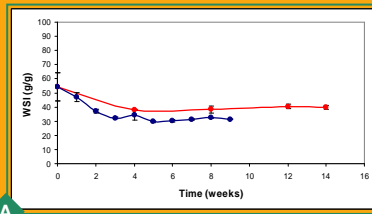
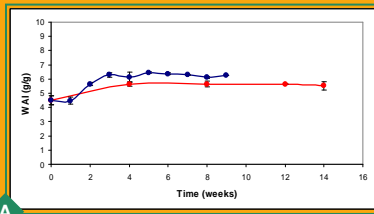
### Water Activity (Aw)

Model	Initial Aw	Aw after 14 weeks	Aw after 9 weeks
<b>A</b>	0.15 ± 0.01	0.30 ± 0.01	0.13 ± 0.00
<b>B</b>	0.17 ± 0.01	0.26 ± 0.00	0.10 ± 0.02

- Aw tends to equilibrium with RH
- Eventually, model B has a lower Aw

Troom - 55°C

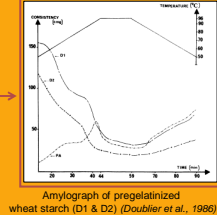
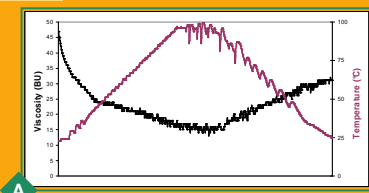
### Water Absorption Index (WAI), Water Solubility Index (WSI), Swelling Power (SP)



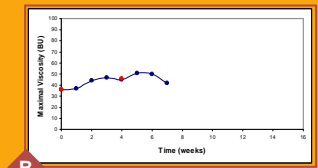
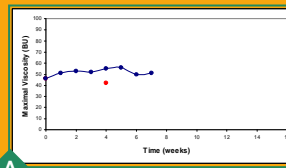
- Initial WAI is within the range given in literature (2 – 8 g/g), but WSI is highly superior (3 – 15 g/g), maybe because of the step of hydrolysis (Anderson, 1982)
- WAI and SP increase, WSI decreases. All present a plateau at the 4th week at Troom, and at the 3rd week at 55°C
- Addition of additives has no effect at Troom, but limits the evolution at 55°C

Troom - 55°C

### Viscosity



- Same type of curve than those obtained by Doublier *et al.* (1986)
- Micro-Visco Amylograph Brabender is not adapted for this kind of product (not sensible enough)
- During ageing, the main change is the increase of maximal viscosity



- Maximal viscosity is higher in model A
- Addition of additives has no effect at Troom but limits the evolution at 55°C

Troom - 55°C

### Whiteness Index (WI) & Colour

Model	Initial WI	WI after 14 weeks	WI after 9 weeks
<b>A</b>	88.82 ± 0.01	88.55 ± 0.64	81.83 ± 0.05

- No change of coloration at Troom
- Browning at 55°C

a 7 & b 7

Troom - 55°C

### Density & Bulk Density

Model	Density (g/L)	Bulk Density (g/L)
<b>A</b>	334 ± 6	427 ± 9

- Values are higher than literature (bulk density of 190 – 260 g/L), but different size of particles (Shu *et al.*, 2007)
- No agglomeration of the product

no changes (Troom or 55°C)

- Reactions of alteration most likely responsible for the evolution of physico-chemical properties of partially hydrolyzed and pregelatinized rice products are:

- Starch depolymerization,
- Oxidation and denaturation of proteins,
- Maillard reaction.

## CONCLUSIONS

- Food additives E170 & E340ii change the initial properties of the product, they have no effect at room temperature, but have an antioxidant effect at high temperature
- They should be added before the drum-drying step of the industrial process

- Ageing at 55°C presents the same evolution than the ageing at room temperature (plateaus are reached at the same time), only the intensity of those evolution changes

→ Ageing at 55°C ≠ acceleration of natural ageing

## REFERENCES

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