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Cirad strategies in post harvest area (fresh fruits preservation, pesticides reduction)

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Cirad strategies in post harvest area

Use of elicitors :
plant physiology modification

Use of natural molecules against disease:
essential oils, LPS, others

Use of treated water with residual actives agents for washing such Ozonation,




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Use of natural molecules against disease

Preservation of fruits by the use of the lactoperoxidase system: case of mango

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□ why post harvest contamination?


- Too quick maturation
- Pathogene existence

Anthraxnose



Stem end rot
(Pourriture pédonculaire)







Black spot
(Tache noire)

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Xanthomonas spp.



Botryodiplodia spp.

Colletotrichum spp.
Anthraxnose

CHEMICAL PROTECTION

- Fongicides
- Bactericides

PROBLEMS

- Residues of pesticides after treatment

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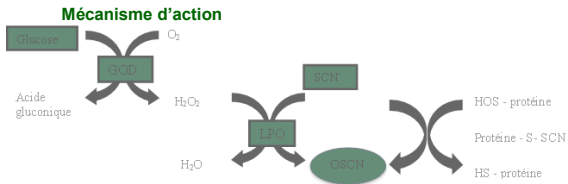
OBJECTIVES

- Effect of lactoperoxidase system (LPS) on selected microbial strains
 1. Bacteria *Xanthomonas spp.*: black spot agent (Reunion island)
 2. Molds *Botryodiplodia spp.*: stem end rot and soft rot agents (Reunion island)
Colletotrichum spp.: anthracnose agent (Guadeloupe island)
- Verification of the LPS effect on mangoes
 - Effect of LPS non inoculated mangoes by strains
 - Effect of LPS on inoculated mangoes by selected strains

Use of natural molecule and enzyme SLP

Système Lactoperoxydase (SLP):

- ☐ Lactoperoxydase
 - ☐ Peroxyde d'hydrogène
 - ☐ Thiocyanate
- Antibactérien
Antifongique
Antiviral



LACTOPEROXYDASE SYSTEM (LPS)

Effect of LPS on microorganisms

- Structural damages or cytoplasmic membrane modifications
- Inhibition of the consumption of glucose, purines and amino acids and also of the protein synthesis



Oxydation of sulphhydryl proteins (enzymes) catalysed by LPO

Analysis of mango quality

Microbiological count

- Sampling on surface
- Total aerobic mesophilic flora count on PCA medium
- Yeasts and molds count on Sabouraud Chloramphenicol medium



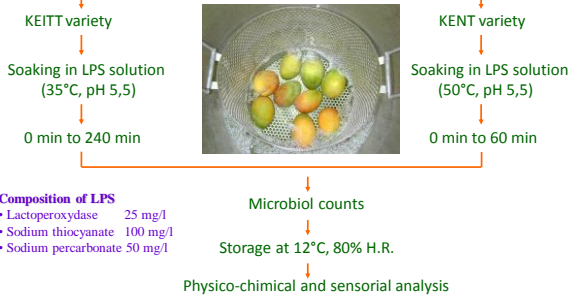
Evaluation the external aspect: ranking from 1 to 6 (sensorial test)

Physico-chemical analysis

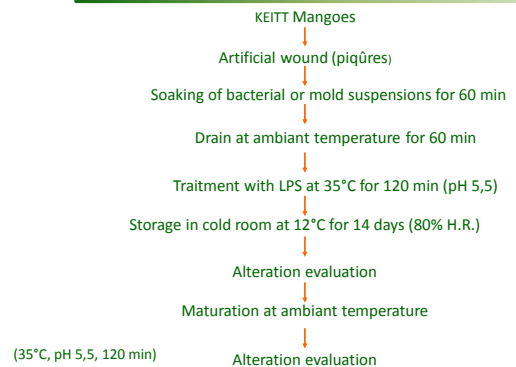
- External and internal color (Minolta CR 300, L*a*b*)
- External and internal firmness (TA XT2)
- pH
- Acidity (NaOH 0.1 N)
- Dry matter (Abbé refractometer)

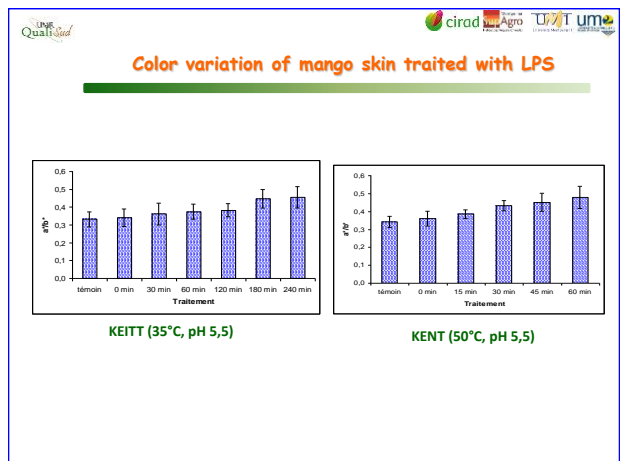
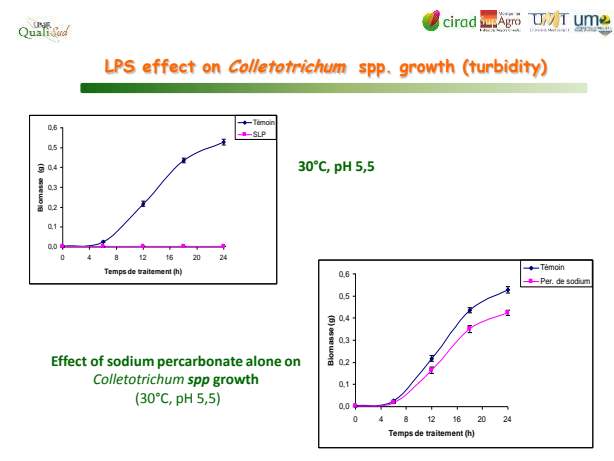
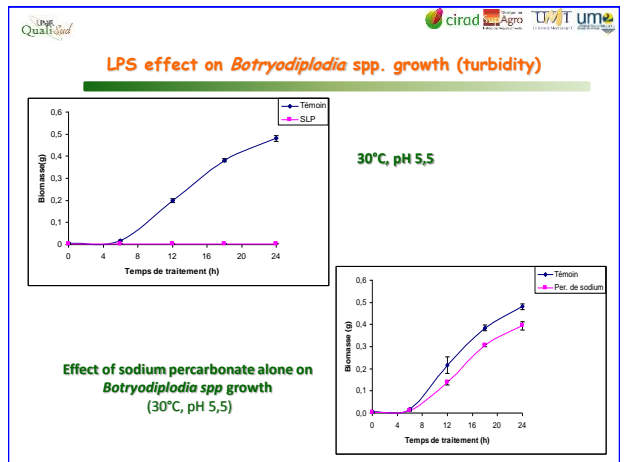
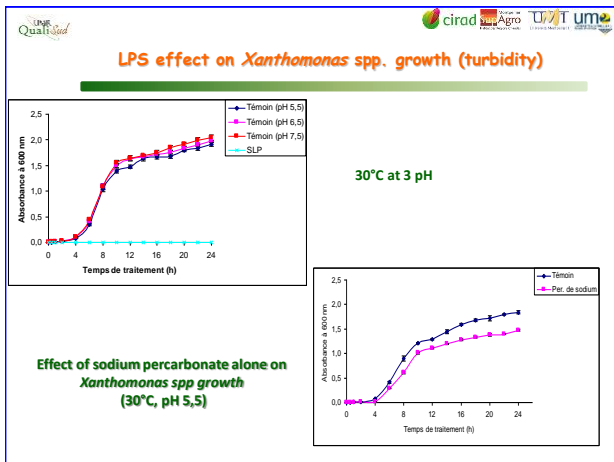
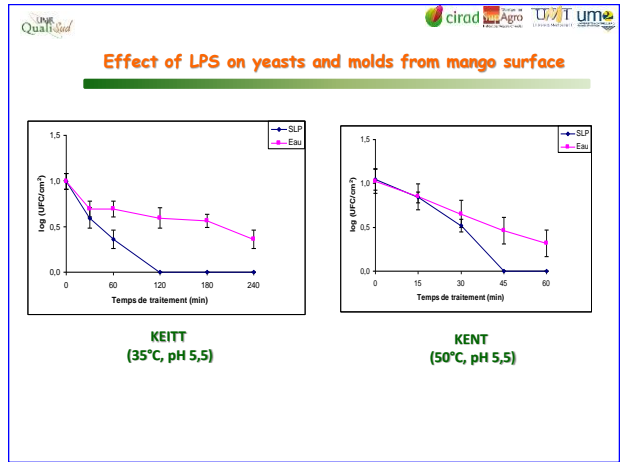
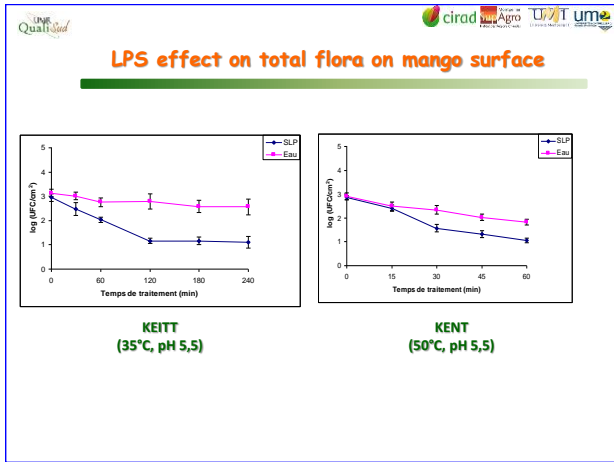
STUDY OF LPS TREATMENT ON FRESH MANGOES (Wild strains)

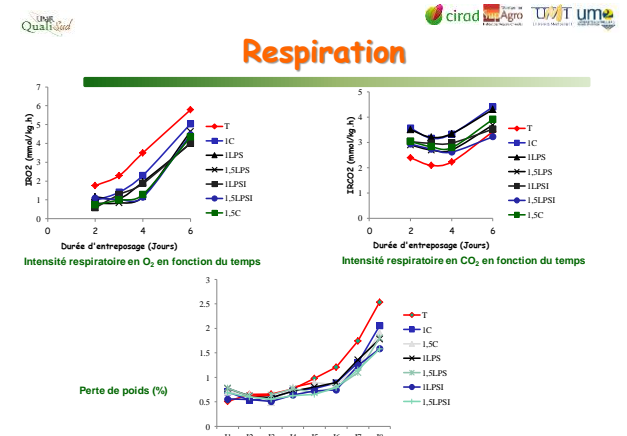
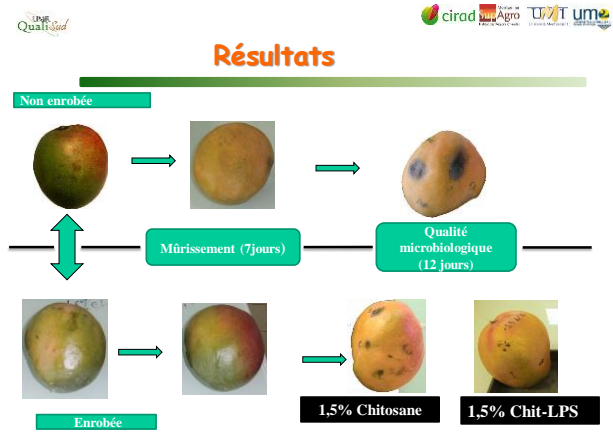
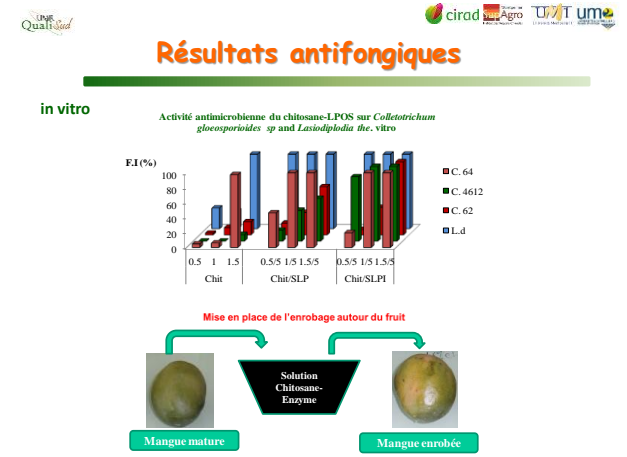
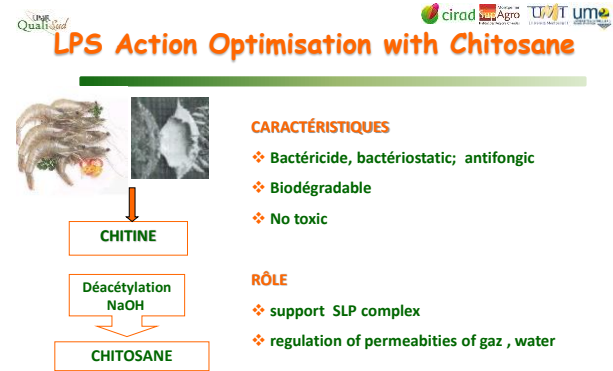
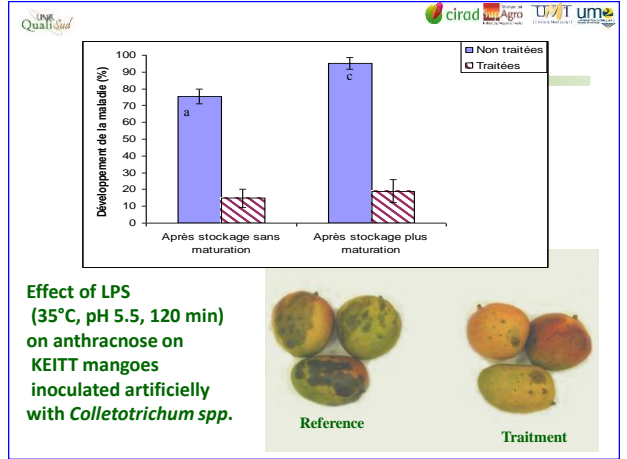
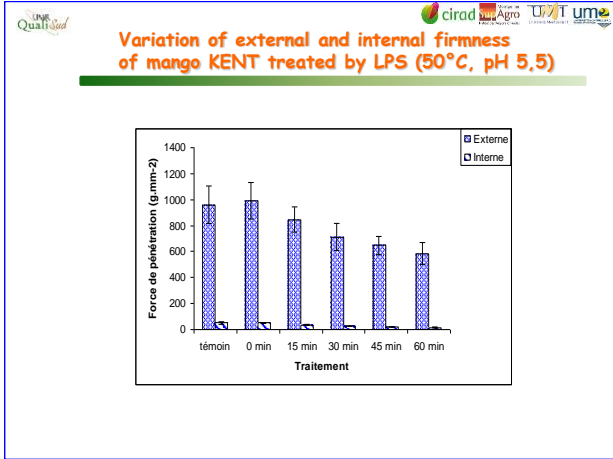
Mango KEITT and KENT (Mali)



LPS TREATMENT ON MANGOES INOCULATED WITH SELECTED STRAINS







Conclusions on LPS effect on pure strains

- ❑ LPS has an inhibitory effect on *Xanthomonas spp.*, *Botryodiplodia spp* and *Colletotrichum spp.* Growth.
- ❑ LPS is more efficient at pH 5.5.
- ❑ Sodium percarbonate at the concentration used has only a low inhibitory effect on the strain growth.

Evaluation of external aspect of mangoes treated by LPS after 3 weeks storage (12°C, 80% H.R.)

KEITT (35°C, pH 5.5)

- The most appreciated group : reference and mangoes treated from 0 to 15 min
- The less appreciated group : mangoes treated more than 120 min

KENT (50°C, pH 5,5)

- The most appreciated group : reference and mangoes treated from 0 to 15 min
- The less appreciated group : mangoes treated more than 120 min

Variation of chemical composition of mangoes treated by LPS

KEITT (35°C, pH 5.5)

- Reference and mangoes treated until 180 min : no significant difference
- Reference and mangoes treated up to 180 min : significant difference

KENT (50°C, pH 5,5)

- Reference and mangoes treated until 30 min : no significant difference
- Reference and mangoes treated up to 30 min : significant difference

Perspectives

Build any ambitious research program in the area of post harvest

Share research work in various fruits and using various molecules

Obtain international cooperation program and answer to local needs