

AUTOFLUORESCENCE VISUALIZATION OF PHENOLIC COMPOUND UPTAKE BY MICROSCOPIC AND SPECTROSCOPIC TECHNIQUES IN CACO-2 CELL LINE MODEL

C. PETCHLERT^{1,4}, C. DHUIQUE-MAYER², B. CAPORICCIO¹ and L.P.B. BIDEL³

¹UMR : Prévention des Malnutritions et des Pathologies Associées, ED SP-SA, UM1, UM2, Montpellier, France.

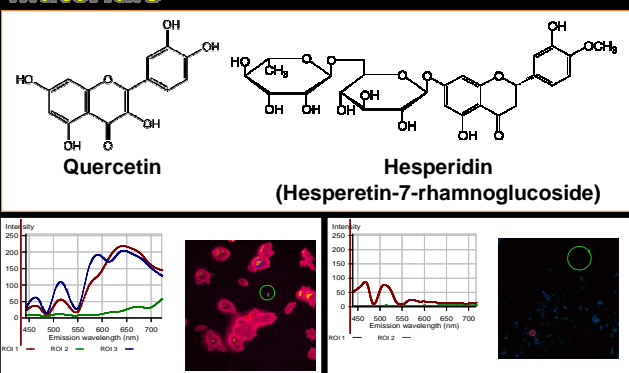
²UMR Qualisud, Centre International de Recherche Agronomique pour le Développement (CIRAD), Montpellier, France.

³UMR : Diversité et Adaptation des Plantes Cultivées, UM II, Montpellier, France.

⁴Department of Biochemistry, Faculty of Science, Burapha University, Chonburi, Thailand.

Objective Use the natural fluorescence of certain phenolic compounds : quercetin and hesperidin to characterize and investigate their localization and uptake by human intestinal epithelial cells

Materials



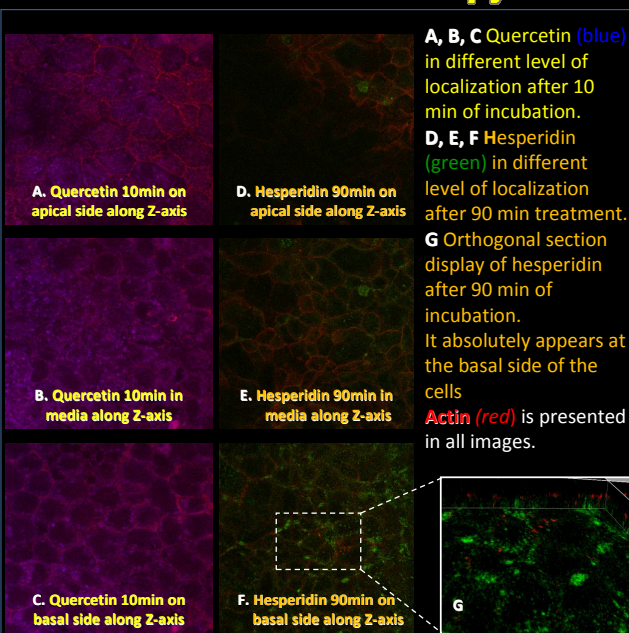
Emission spectra filtrated through the optical pathway of quercetin (left) and hesperidin (right) detected by LSM510 META, Zeiss.

Methods



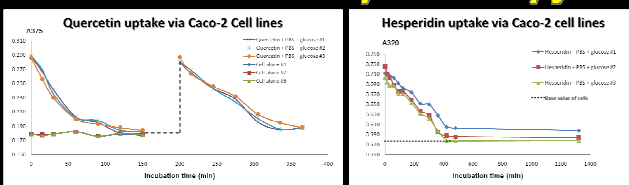
Caco-2 cells confluency (phase-contrast inverted microscope-left) and natural fluorescence of quercetin in Caco-2 cells (epifluorescence microscope-right).

Results: Confocal Microscopy



(Images by LSM Image Browser 4.2 and Imaris 6.2 after taken them with LSM510 META, Zeiss)

Results: UV-Visible Spectroscopy



Absorption ratios of 375/650nm and 320/650nm were performed to investigate the uptake of quercetin (left) and hesperidin (right), respectively. Both figures show different polyphenol assimilative rate via human intestinal Caco-2 cell lines : the quercetin is remarkably reduced faster than the hesperidin at similar concentration (250 μ M) before all of them approach to constant rate at the final stage. However, either quercetin or hesperidin clearly display in the exponential manner for the uptake through enterocytes .

Conclusion

✓ The passage of quercetin occurred rapidly with transcellular mechanism whereas the passage of hesperidin was observed with transcellular as well at the first stage, then became progressively in paracellular mechanism after incubation time of 90 min.

✓ According to the UV-visible spectroscopy, we have also seen the absorptive manner of quercetin (aglycone flavonoid) and hesperidin (glycosylated flavonoid) that correlated to the results of confocal microscopy. The quercetin can be assimilated exponentially by human intestinal epithelial cells faster than the hesperidin.

