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

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Abstract

Polyphenols are the most abundant health benefits in the human diets. However, there is a little understanding on the bioavailability particularly the localization of these compounds in the human intestinal cells. In the present study, two polyphenols (quercetin, and hesperidin) chosen according to their structural characteristics, were used to evaluate the localization from their natural fluorescence properties in human intestinal Caco-2 cell lines. Through the technique of fluorescence and confocal microscopy, such compounds were found to exhibit a specific fluorescence. According to the structure of the phenolic compounds (aglycone or glycosylated), the absorptive conditions showed themselves differently. Indeed, the rate and the route of transporting through the cellular monolayer did not seem to be identical, passing time varied from 10 to 90 min depending on which type of phenolic compounds, quercetin or hesperidin. The results showed that the passage of quercetin occurred rapidly with transcellular mechanism while the passage of hesperidin was visualized with transcellular mechanism as well at the first time then paracellular mechanism after incubation time of 90 min. Furthermore, by the detection of polyphenol absorbance, the correlation was observed with cellular uptake and polyphenol visualization by confocal microscopy.

Key words: flavonoids, Caco-2 cells, epifluorescence and confocal laser-scanning microscopy