

## **Green photosensitisers for the degradation of selected pesticides of high risk in most susceptible food: A safer approach**

### **ABSTRACT**

Pesticides are the leading defence against pests, but their unsafe use reciprocates the pesticide residues in highly susceptible food and is becoming a serious risk for human health. In this study, mint extract and riboflavin were tested as photosensitisers in combination with light irradiation of different frequencies, employed for various time intervals to improve the photo-degradation of deltamethrin (DM) and lambda cyhalothrin ( $\lambda$ -CHT) in cauliflower. Different source of light was studied, either in ultraviolet range (UV-C, 254 nm or UV-A, 320–380 nm) or sunlight simulator (> 380–800 nm). The degradation of the pesticides varied depending on the type of photosensitiser and light source. Photo-degradation of the DM and  $\lambda$ -CHT was enhanced by applying the mint extracts and riboflavin and a more significant degradation was achieved with UV-C than with either UV-A or sunlight, reaching a maximum decrement of the concentration by 67–76%. The light treatments did not significantly affect the in-vitro antioxidant activity of the natural antioxidants in cauliflower. A calculated dietary risk assessment revealed that obvious dietary health hazards of DM and  $\lambda$ -CHT pesticides when sprayed on cauliflower for pest control. The use of green chemical photosensitisers (mint extract and riboflavin) in combination with UV light irradiation represents a novel, sustainable, and safe approach to pesticide reduction in produce.