

**Khaled abdel-hamied selim** (1998). Degradation of encapsulated saffron carotenoids in amorphous polymer matrices, **MSc.**; Mediterranean agronomic institute of chania, Crete, Greece

### **Abstract**

Kinetic studies on degradation of encapsulated saffron carotenoids were carried out under varying condition of water activity. The encapsulated samples were prepared using freeze drying. Saffron carotenoid (mainly crocins) degradation followed first order reaction kinetics, and it was strongly dependent on  $a_w$  and the nature of matrix used. The dependence of the rate constant ( $K$ ) for decoloration on  $a_w$  was different from that of other typical nonpolar carotenoids, resembling more the kinetic responses of water-soluble pigment degradation and nonenzymatic browning reaction. The effect of three different encapsulating agents pullulan and two polyvinylpyrrolidone, PVP, samples differing in their molecular weight) on saffron carotenoid stability was statistically examined. All matrices used largely increased the half-life of saffron carotenoids. The PVP40 was found to be the most effective carrier in stabilizing the pigments under all conditions examined. The water sorption isotherms of encapsulated saffron carotenoids were also determined. Within the  $a_w$  range tested (0.11-0.84), both Brunauer-Emmett-Teller (BET) and Guggenheim-Anderson-Deboer (GAB) sorption models seemed to fit well the adsorption data for all materials with the exception of the BET fit for the sorption results of the saffron carotenoid extracts. The glass transition temperature ( $T_g$ ) of the encapsulated saffron carotenoids, as detected by calorimetry (DSC), was very sensitive to the moisture content of the system

**Keywords:** Saffron; Crocins; Degradation; Encapsulation; water activity; Glass transition temperature