A microfluidic DPPH assay device with immobilized microsomes in 3-D hydrogel to examine antioxidtive activity of flavonoid

이정우, 김시현, 성종환*
홍익대학교
(jhsung22@gmail.com*)

Flavonoids, polyphenol produced by plant, are thought to play various beneficial roles against cancer. This beneficial effect of flavonoids is thought to come from the anti-oxidant activity, but the detailed mechanisms of absorption, metabolism and bioactivity are not fully known. A microfluidic system with immobilized microsomes in 3-D hydrogel scaffold was developed to mimic *in vitro* the metabolism and subsequent biological activity of flavonoids *in vivo*. UV-polymerizable hydrogel, poly(ethylene glycol) diacrylate (PEGDA) was used to immobilize liver microsomes inside a microfluidic channel which reproduces the blood flow in the human liver. The kinetics of metabolism in the microfluidic channel was examined and quantified with a mathematical simulation. The biological activity of the flavonoid metabolites was examined by using 1,1-diphenyl-2-hydrazyl(DPPH) assay commonly used for determination of antioxidant capacity. This microfluidic system can be helpful in clarifying the mechanism underlying the beneficial effect of flavonoids and improve the efficiency of the screening process for developing dietary supplement from plants.