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This paper demonstrates that etched Fiber Bragg Gratings (eFBGs) coated with single walled carbon nanotubes (SWNTs) and graphene oxide (GO) are highly sensitive and accurate potential biochemical sensors. Here, for detecting protein Con A, mannose-functionalized poly(propyl ether imine) (PETIM) dendrimer (DM) has been attached to the SWNTs (or GO) coated on the surface modified eFBG. The shift in the Bragg wavelength ($\Delta\lambda_B$) with respect to the λ_B values of SWNT (or GO) – DM coated eFBG for various concentrations of lectin follows Langmuir type adsorption isotherm, giving an affinity constant of $\sim 4 \times 10^7 \text{ M}^{-1}$ for SWNTs coated eFBG and $\sim 3 \times 10^8 \text{ M}^{-1}$ for the GO coated eFBG.