New plasticizer was prepared by glycolysis degradation of waste PET bottles using ethylene glycol. Adding prepared plasticizer in filler-filled rubber composites containing carbon black or oxidized carbon black slightly reduce bound rubber content and significantly reduce glass transition temperature for natural rubber composite which were different from those of filler-filled acrylonitrile-butadiene rubber composite and filler-filled acrylic rubber composite. Major reduction of glass transition temperature shows the efficient plasticity of new prepared plasticizer applicable for natural rubber. The slightly decrease of bound rubber values for plasticizer-added natural rubber composites confirms the persistence of major reinforcement in composites. These suggest the applicability of prepared plasticizer in natural rubber processing.