

# Detection and Identification of Estrogen Based on Surface-enhanced Resonance Raman Scattering (SERRS)

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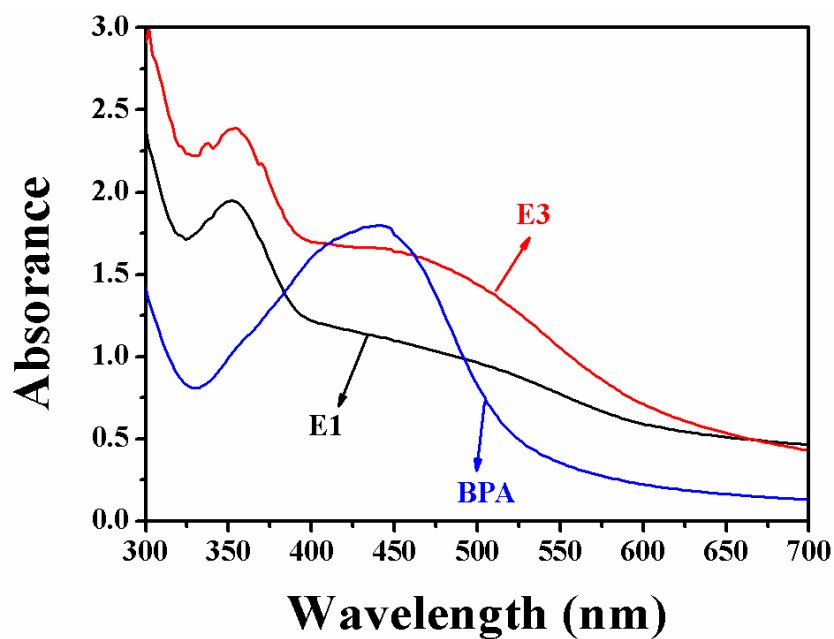
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## Abstract

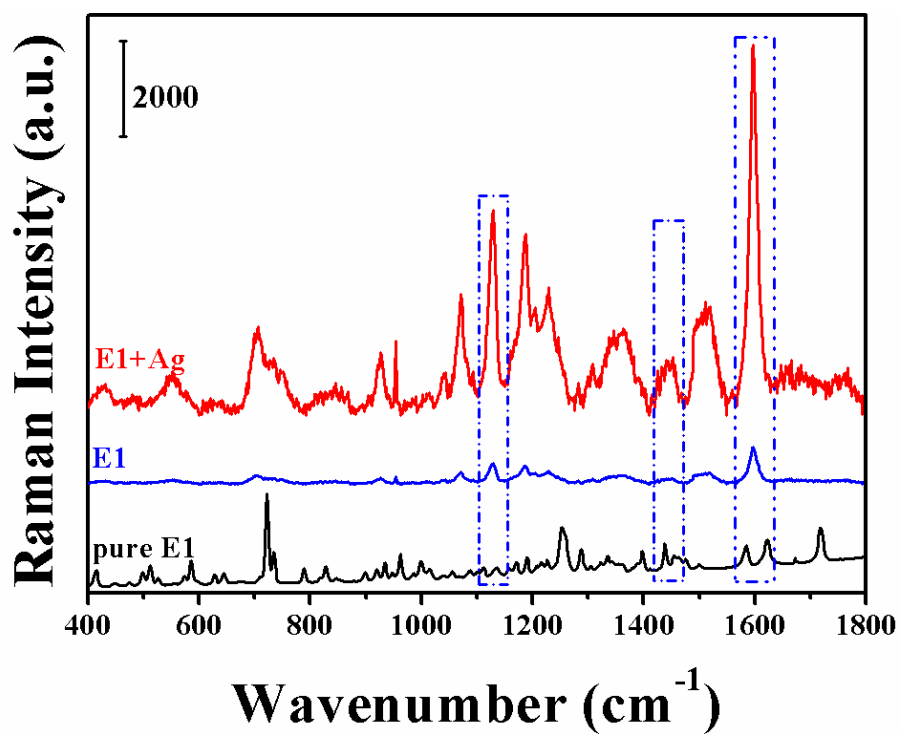
A large number of studies have shown that the harmful **effect** of the phenolic hormones on the human body should be **considered**. Traditional UV detection has many limitations, **so it is urgent to develop new detection methods**. We demonstrate a simple and rapid surface-enhanced resonance Raman scattering (SERRS) based detection method of trace amounts of phenolic estrogen. As a result of the coupling reaction, the formation of a strong SERRS activity of azo compounds, therefore, the detection limits are as low as  **$0.2 \times 10^{-4}$ ,  $0.4 \times 10^{-4}$ ,  $0.6 \times 10^{-4}$ ,  $0.8 \times 10^{-4}$ , and  $1.0 \times 10^{-4}$  M** for estrone(E1), estriol (E3), and bisphenol A (BPA). **This method is universal because each SERRS fingerprint of the azo dye corresponds to its own corresponding hormone. The use of this method not only is applicable to test phenolic hormones through coupling reactions, but also to investigate other phenolic molecules.** Therefore, this method can be used as a new type of efficient detection one.

Keywords: Phenolic hormones; SERRS; Detection.

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**S1. The UV/Vis spectrum of silver colloids added after coupling reaction of phenol and diazo ion.**



**S2. Raman spectra of pure E1, dissolving in ethanol and its SERRS spectra in silver colloid; concentration of E1 was  $1.0 \times 10^{-4}$  M.**