

# Extraction of Bioactive Compounds from *Withania somnifera* Using Hydrothermal Technique †

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**Abstract:** Ashwagandha (*Withania somnifera*), also known as winter cherry, has been used to manage and treat multiple illnesses in humans for centuries. Specifically, ashwagandha root extracts exhibit a broad range of pharmacological activities. The present study was undertaken to evaluate bio-active compounds present in the Ashwagandha root extracts. The hydrothermal extraction process was used to access the extraction yields using different solvents (ethanol, methanol, n-hexane, and water) from 2 gm dried root powders of sizes 5 µm to 500 µm. Hydrothermal extraction involved high-temperature (100°C) and high-pressure to effectively extract selected phytochemicals with a reduced solvent amount (50 ml) and extraction time (2 hours). The size of the powder particles was confirmed using an optical microscope with a digital imaging technique. All the extracts were studied through Ultraviolet-Visible (UV-Vis) spectroscopy and Fourier Transform Infra-Red (FTIR) spectroscopy. Strong absorption peaks in the UV-Vis spectra of all the extracts around 280 nm and 320 nm confirmed the presence of flavonoid and other phenolic compounds. However, the relative variation of absorption peak showed that extracts in methanol possess the highest yield of flavonoids. The FTIR spectra of the extracts confirmed the observations of the optical spectroscopy. It was found that extract in water contains only small amounts of these bioactive molecules. It can be concluded from the current study that different solvents can be used to selectively extract a range of bioactive nuclei from the *Withania somnifera* roots.

**Keywords:** alkaloids; glycosides; flavonoids; natural products; *Withania somnifera*.

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## Conflicts of Interest

The authors declare no conflict of interest.