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# Identification and Separation of *Cannabis sativa*, *Embleia ribes*, *Myristica fragrans* and *Piper longum* from Organic Extract on Silica Gel Surface with Anionic Micellar Solvent System: Application in Ayurvedic Medicine

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**Abstract:** *Cannabis sativa*, *Myristica fragrans*, *Piper longum* and *Embleia ribes* are the active pharma ingredients of an ayurvedic herbal formulation Jatiphaladya, which is beneficial in many typical stomach related disorders.

The present study is aimed to develop a simple and reliable thin layer chromatographic (TLC) method using micellar solution of sodium dodecyl sulfate (SDS) as mobile phase for the identification of all the four herbal drugs with preliminary separation on silica gel 'G' TLC plate. The active components of drug were extracted in a mixture of ethanol and water (4:1), chromatographed on silica gel TLC plate using aqueous SDS (5%) as mobile phase and the resolved spots for *Cannabis sativa* ( $R_F$ -0.95), *Myristica fragrans* ( $R_F$ -0.64), *Piper longum* ( $R_F$ -0.41) and *Embleia ribes* ( $R_F$ -0.26) were identified using vanillin-sulfuric acid (2% solution of vanillin in 5% methanolic sulfuric acid). In order to realize most favorable mobile phase system in combination with silica gel 'G' as stationary phase, the effect of nature of surfactants (anionic, cationic or nonionic) and the level of concentration of each surfactant [sodium dodecyl sulfate (SDS), N-cetyl-N, N, N-trimethylammonium bromide (CTAB) or t-octyl phenoxydacaethoxy ethanol (TX-100)] on the mobility of all four active components was examined. In addition, the effect of organic (urea and alkanols) and inorganic (NaCl) additives in 5% aqueous SDS solution on mobility pattern of active herbal pharma ingredients was examined. The presence of ammonia and nitrate in the drug sample was found to hamper the resolution and identification of all active components. However, NaCl, KCl and glucose do not offer serious interference.

**Key Words:** Thin layer chromatography, herbal, jatiphaladya, ayurvedic, surfactant.

## INTRODUCTION

Jatiphaladya is a powdered herbal formulation of 6000 year old Indian ayurvedic system of medicine. Therapeutically Jatiphaladya is beneficial in many human intestinal disorders like tastelessness (aruci), Diarrhea (Atisara), Malabsorption syndrome (Graha), Dysentery (Pravahika), Cough (Kasa) and Rhinitis (Vatsale-ma-Pratisyaya). The main constituents of Jatiphaladya formulation are *Cannabis sativa* (Bhang), *Myristica fragrans* (Jatiphala), *Piper longum* (Pippali) and *Embleia ribes* (Vidanga) [1]. *Cannabis sativa* (Bhang) is a major constituent of the Jatiphaladya formulation (20 % wt/vol). It is a commonly grown herb of high medicinal importance [2]. *Myristica fragrans* (Jatiphala) commonly known as nutmeg, is a popular herbal plant used in traditional Ayurvedic, Chinese and Thai medicine as aphrodisiac, antimicrobial, antipyretic, abortifacient and stomachic [3]. This plant is pharmacologically studied for various activities like chemo protective,

antioxidant, aphrodisiac, antimicrobial, hepatoprotective, and anti-inflammatory [4]. *Piper longum* (Pippali) is a widely available species of the genus piper. Because of high therapeutic values, pipali has been used as antibacterial, anti-inflammatory and as a local anesthetic [5]. *Embleia ribes* (Vidanga) is a climbing herb found in Sri-lanka, India and Singapore. Therapeutically Embeleia inhibited pregnancy, possessed anti-estrogenic and weak progestational activity, shows analgesic, anti-inflammatory, antibacterial, antitumor and free radical scavenging activities [6, 7]. As per our literature survey there is no analytical study available for Jatiphaladya formulation, But Previously Cannabis was analysed by various analytical methods including immunoassays (EMIT, Elisa fluorescence polarization, radioimmunoassay) [8], Gas Chromatography- Mass spectrometry [9], High performance liquid chromatography-Mass spectrometry [10] and TLC [11]. However in case of *Myristica fragrans* (Jatiphala), *Piper longum* (Pippali) and *Embleia ribes* (Vidanga) a very few analytical studies are available using GC or HPLC [12-14]. Most of these techniques involves costly instruments and require highly purified standard reference samples [15]. Thin Layer Chromatography is a suitable method to screen simultaneously numerous samples extracted directly from

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