

HPLC Determination of Parthenolide in Migraine Orally Dispersible Tablets

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Author's Contribution

All the authors contributed significantly to the research that resulted in the submitted manuscripts

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ABSTRACT

Background: The Herb *Tanacetum parthenium* (feverfew) commercially used for the treatment of migraine due to the presence of parthenolide. It contains sesquiterpene lactone which is the main active compound of this plant. Since ancient times, the herb has been known for asthma, rheumatism and mainly for migraine with anti-inflammatory effects.

Methodology: In this study, oral dispersible tablets consisting of *Tanacetum parthenium* and vitamin B2 were prepared by direct compression method. Anhydrous dextrose, Raspberry flavor, Aerosil 200, Magnesium stearate and Stevia and Sucralose were used as excipients. Samples were analysed by using RP18 column (150 x 4.6 mm id, 5 micron particle size) and having Mixture of Acetonitrile with water 55:45 as a mobile phase. Flow rate were 1.0 ml/min and volume of injection were 20 µL on 210 Wavelength.

Results: The prepared batches of tablets were evaluated for weight variation, hardness, friability. Quantitative determination was evaluated via an HPLC method for standard versus tablets. Parthenolide was found 0.365 mg/tablet via an HPLC method. The results confirmed the authenticity of the manufactured tablet with the labelled indication.

Conclusion: The active biomarker Parthenolide has quantified with the help of peak by HPLC and authenticated the presence of active in the dispersible oral tablets as compared to the standard.

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INTRODUCTION

Feverfew (*Tanacetum polytheism*) is a therapeutic herb which incorporates active ingredient eg. Parthenolide and flavonoids. It has customarily been utilized as a part of the treatment of headache, tinnitus, vertigo, joint pain, fever, menstrual turmoil, and stomach pain, toothache and creepy crawly nibbles [1]. For the prevention of Migraine, the mechanism of action has not been fully established. Several

researchers have declared that bioactive element for the pharmacologic effect is parthenolide [2]. The established mechanism of action of Parthenolide resembles with Aspirin. It facilitates inhibition of excessive clumping of chemicals including serotonin and inflammatory mediators [3, 4]. It was established that the extract of feverfew helps to release 5-hydroxytryptamine or serotonin and helps to activate platelets in whole body including

aggregating factors and agent. The efficacy of extract was also assessed with the help of crossover, double blind, randomize placebo control clinical trial [4, 5]. It also established that the active constituents of feverfew i.e. parthenolide works on inhibition of tumour cells and helps on inhibition of inflammatory transcriptional elements produced by NF-kappaB [6-8].

Since (50 B.C.), at the time of Dioscorides, feverfew has been utilized as a part of the anticipation of headache, through the medieval times up to the present [9]. The Phytochemical researches has established that the species contains mainly active constituents including flavonoids, sesquiterpene including lactones. The sesquiterpene lactone parthenolide is the real compound and the substance marker of *T. parthenium* [10].

Clinical investigations have demonstrated that feverfew has other therapeutic advantages, for example, alleviating queasiness and heaving, diminishing the aggravation and torment of joint pain, advancing peaceful rest, enhancing assimilation, and mitigating asthma problems [11, 12]. The best possible parthenolide content is fundamental for the movement of feverfew to happen. Feverfew arrangements utilized as a part of fruitful clinical trials had a 0.4% to 0.66% parthenolide content, giving a parthenolide dose of 250 to 500 mcg/day. Clinical experience has shown that 4 to a month and a half are required to take note of a reactions [9, 12, 13].

Riboflavin, or vitamin B2, is a basic constituent and precursor to riboflavin 5 phosphate - phosphate, or flavin mononucleotide (FMN) and flavin adenine dinucleotide (FAD). It is required for the action of flavoenzymes which is engaged with the electron transport chain. Adjusted mitochondrial vitality digestion helps in headache pathogenesis and patients with headaches have shown a lessening in mitochondrial phosphorylation potential in the middle. A few investigations have indicated high-

measurements riboflavin is effective in the issue of headache prophylaxis. Hypothetically, riboflavin may work by expanding mitochondrial vitality and efficacy. Schoenen et al. (1998) contrasted 400 mg riboflavin with Placebo treatment in 55 patients with headache in a randomized trial of 3 months span. Riboflavin demonstrated better than placebo treatment [14]. It has been proven that Riboflavin improves energy metabolism similarly to coenzyme Q10 (CoQ10) and also important for migraine prophylaxis [15].

Literature evidently shows that parthenolide present in feverfew produces important pharmacological properties related to migraine and headache [4]. This study quantify the active biomarkers i.e. parthenolide for proven the effect of oral dispersal tablets.

METHODOLOGY

Preparation of Dispersible tablets

For manufacturing of dispersible tablets, Feverfew herb and Vit B2 were bought from the neighbourhood home grown market according to organization specification. Add Dextrose solution and blended them into a single unit and passed them from 40-no.sieve, blended sieved material again for 5mins. Than take DCP, powder, crospovidone, stevia, sucralose and again pass them from 40-no.sieve, blend sieved material for 5mins. After than mix all the material with the expansion of Magnesium stearate for 5 minutes and pack the table 250 mg around the punch.

Evaluation of Dispersible tablets

Physical parameters

The tablets were evaluated on PH, hardness, weight variation along with friability.

Quantitative Identification

For Quantitative Evaluation, the column specification were RP18 (150 x 4.6 mm id, 5

micron molecule/particle measure). For preparation, First Mix of Acetonitrile with water 55:45 as a mobile phase, stream rate were 1.0 ml/minutes and infusion volume were 20 μ L. Temperature of the column were 25 C and wavelength were 210 and methanol were used as a diluents.

Standard Preparation

Accurately measure 1g of the working standard (fever few concentrate) in 25 ml volumetric flask. Makeup the volume with the diluent. Shake up and sonication for 30 min. also makeup all the arrangement with 0.45 μ m channel into a HPLC vial.

Sample/test Solution Preparation

Precisely measured 25 tablet (weight variety), take roughly the heaviness of 20 tablet (5 g) in 25 ml volumetric jar .Filled the volume with the diluent and shake up and Sonicate for 30 min.

Filtered the arrangement with 0.45 μ m channel into a HPLC vial.

Calculation

$$X \text{ (mg/tablet)} = \frac{\text{ASMP} \times \text{WSTD} \times \text{Sample dilution} \times P \times \text{Avg wt. of tablet}}{\text{ASTD} \times \text{Standard dilution} \times \text{WSMP} \times 100}$$

Where,

ASMP – “Mean value of peak area of tested solution samples”

ASTD – “Mean value of peak area of standard solution samples”

WSMP – “Preparation weight, g”

WSTD – “Standard weight, g”

“Average weight of tablet = mg”

P – “Percent Purity of working standard 0.73 % Parthenolide “

RESULTS

Present experimental study quantitatively evaluate the presence of Parthenolide on 210nm wave lengths on both standard and feverfew extract by using HPLC method. Parthenolide is the common active constituents of fever few and well represented in figure 1[16]. Separately prepare standard and test sample for evaluation. For test sample 25 oral disposable tables were taken, shake and sonicate for 30 minutes. Both were filtered with 0.45 μ m channel via an HPLC. The (R_f) value of standard were 10.84 however for extract it was found to be 10.31 as shown in figure 2 at 210 nm. Pinnacles were symmetrical in nature and no tailing was watched when plates were checked at 210 nm.

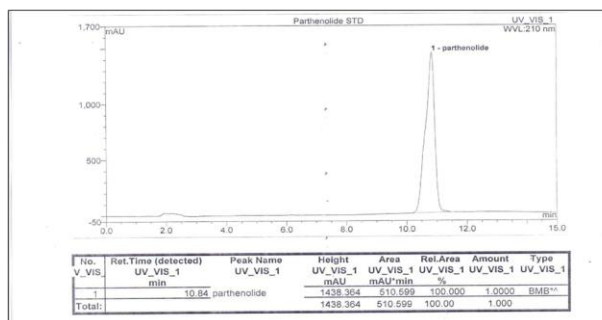


Figure 1: Parthenolide peak in Standard via HPLC

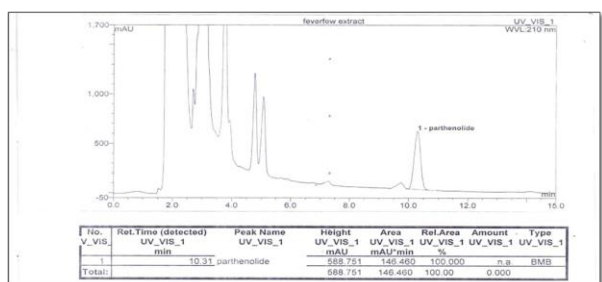


Figure 2: Parthenolide peak in feverfew extract via HPLC

DISCUSSION

Feverfew is the popular herbal remedy for the prevention of migraine in recent past[17].It has been proven in the many randomized clinical trial that it is effective for the prevention of migraine

with fewer and less side effects[18]. Its active constituent parthenolide not only helps for release [C] -5HT but also helps in platelets aggregation [19]. For the determination of parthenolide quantitatively HPLC was used [20]. In this study we compared and determined the peak in both standard and extract which authenticates the presence of active in the dispersible oral tablets.

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