

**Design, Development and Evaluation of *Orthosiphon******Thymiflorus Poly Herbal Cough Syrup***Sudarshan Singh¹, Tanvi R Dodiya², Rajesh Dodiya³, Ozioma F Nwabor¹, Dwi MarlinaSyukri¹, and Bothara Sunil

¹Excellence Research Laboratory on Natural Products, Natural Product Research Center of Excellence, Department of Microbiology, Faculty of Science and, Prince of Songkla University, Hat Yai, Songkhla, 90112, Thailand.

²Parul Institute of Pharmacy and Research, Parul University, Vadodara, Gujarat, India

³Laxminarayandev College of Pharmacy, Bharuch, Gujarat, India

⁴Government College of Pharmacy, Aurangabad, Maharashtra, India.

Abstract

The objective of the present study was to design, development and evaluation poly-herbal cough syrup. Potential anticough herbs were used for formulating poly-herbal syrup. Decoction of plant *Orthosiphon thymiflorus*, Leaves of *Adhathoda vasika* (Adulsa), stems of *Glycyrrhiza glabra* (mulethi), fruits of *Piper longum* (Lindi pepper) and plant of *Mentha piperita* (pudina) was prepared. 1:5 proportion used i.e. one part of decoction was mixed with five parts of simple syrup IP to prepare formulation. The formulations were evaluated by various parameters like PH, density, viscosity, Specific gravity, etc. Ploy-herbal syrup was also subjected for the accelerated stability testing (AST) for the period of 72hours. No marked changes were noticed in all the evaluated parameters and during AST. The laboratory scale preparation of poly-herbal syrup may be used as a stable, liquid dosage form and the work done in stability testing may help in the progress of shelf-life determination studies.

Keywords: *Orthosiphon thymiflorus*, Poly-herbal, Syrup, Parameters, Shelf-life.

Corresponding author: Dr. Sudarshan Singh, Post Doctoral Research Scholar; Natural Product Research Center for Excellence (NPRCoE); Department of Microbiology, Faculty of Science, Prince of Songkla University, Thailand 90112, Contact: +66-948750952, Email id: sudarshansingh83@hotmail.com

Introduction

Orthosiphon is a genus of plants in the Lamiaceae family native to Africa, Southern Asia and Queensland, with one species (*O. americanus*) in Colombia. It is an

herbaceous shrub which grows to a height of 1.5 m (5 ft). *Orthosiphon* is a popular garden plant because of its unique flower, which is white and bluish with filaments resembling a cat's whiskers. In the wild, the plant can be seen

growing in the forests and along roadsides. *Orthosiphon thymiflorus* is a medicinal plant, slightly aromatic sub-shrub commonly seen in India, It is grown in Hills above 600m on the slopes, in crevices of rocks; more numerous by arable lands, etc. (Kavimani S. *et al.*,1998). It have a number of pharmacological uses as, aqueous extract of leaves is reported to have diuretic activity in rats and acetylcholine antagonistic activity in frog skeletal muscle contraction, also have antioxidant activity (Sundarammal S *et al.*,2012). As per our knowledge there is no poly-herbal cough syrup prepared for *Orthosiphon thymiflorus*. Therefore we focused our study on the formulation and evaluations of *Orthosiphon thymiflorus* poly-herbal cough syrup.

A drug administered in solution is immediately available for absorption, and in most cases, is more rapidly and efficiently absorbed than the same amount of drug administered in a tablet or capsule (Lachman L, et al; 1987). Designing of oral herbal formulations (solutions) is a challenge in modern pharmaceuticals till date. However the final preparation must satisfy the requirements of pharmaceutical elegance with regard to taste, appearance and viscosity.

As the plant is very potential in pharmacological uses the hypothesis were made that its herbal cough preparation may prepared and evaluated along with adulsa, mulethi, lindi pepper and pudina.

MATERIALS AND METHODS

Procurement of Plant Material

Whole plant of *Orthosiphon thymiflorus* was collected from Toranmal forest, at an altitude of 1800 m (Satpuda valley) Maharashtra, India, in the month of Aug–Nov 2019. Botanical identification was carried out and voucher specimen of the plant material has been deposited at Institute level.

Preparation of Plant Material

Fresh plant of *Orthosiphon thymiflorus* are shade dried and powdered was prepared by passing through sieve # 40, and kept in air tight polythene bags for further study.

Chemicals and Instruments

Solvents and reagents were procured from Research Lab-Fine Chem Industries, Mumbai, India. Some apparatus and other common glassware and instruments like Brookfield's viscometer, Specific gravity bottle etc used for the study.

Method of preparation of decoction

170 g powder of *Orthosiphon thymiflorus*, 120g powder of Adulsa, 90 g powder of Mulethi, 50 g powder of Lindi pepper and 50 g powder of Pudina were taken. All the powders were mixed with 3000 ml of water. The mixture was boiled until total volume become one fourth of the initial volume. Then the decoction was cooled and filtered. Filtrate was taken to prepare final herbal syrup (Kumar SP, Nayak DP; 2013).

Method of preparation of final herbal syrup

One part of decoction was mixed with five parts of simple syrup IP (1:5). Required quantity of

methyl paraben was added as preservative, to the above mixture. Solubility was checked by observing the clarity of solution visually. The final herbal syrup was then subjected for evaluation (Kumar SP, Nayak DP; 2013).

Evaluation of Poly-Herbal syrup

Physicochemical parameters

Herbal syrup was evaluated for various physicochemical parameters such as physical appearance, pH, Specific Gravity and viscosity. For determination of pH 10% v/v solution prepared and specific gravity determined by specific gravity bottle (Khandelwal KR; 2005, Kokate CK; 1994). For determination of viscosity Ostwald's viscometer used.

Accelerated Stability Testing (AST)

Stability testing of the prepared poly herbal syrup was performed on keeping the samples at accelerated temperature conditions. Nine portions of the final syrup (S₁, S₂, S₃, S₄, S₅, S₆, S₇, S₈ and S₉), were taken in amber colored glass bottles and were kept at accelerated temperature at 4⁰C, Room temperature and 47⁰C respectively (Kumar

SP, Nayak DP; 2013). The samples were tested for all the physicochemical parameters, turbidity and homogeneity at the interval of 24 hr, 48 hr and 72 hr to observe any change.

Results and Discussion

The prepared poly herbal syrup was evaluated immediately after preparation and all the tested parameter along with turbidity/homogeneity were compared with the changes in accelerated stability testing. The final syrup found to have pH 4.5 and specific gravity 1.1540g/ml (Table 1).

Table 1: Physicochemical Parameters of *Orthosiphon thymiflorus* Poly-herbal Syrup.

Parameter	Inference
Color	Reddish
Odor	Pleasant
Taste	Sweet
pH	4.5
Specific Gravity	1.1540g/ml
Viscosity	0.09 poise

The results of stability study of the final syrup (Table-2) reveal that no changes were noticed in all the tested physicochemical parameter as well as turbidity/homogeneity during 24 hrs, 48 hrs and 72hrs.

Table 2: AST of *Orthosiphon thymiflorus* Poly-herbal Syrup

Hours	24hrs			48hrs			72hrs		
	S1	S2	S3	S4	S5	S6	S7	S8	S9
Sample	S1	S2	S3	S4	S5	S6	S7	S8	S9
Temperature	4 ⁰ C	RT	47 ⁰ C	4 ⁰ C	RT	47 ⁰ C	4 ⁰ C	RT	47 ⁰ C
Color	RC	RC	RC	RC	RC	RC	RC	RC	RC
Odor	RC	RC	RC	RC	RC	RC	RC	RC	RC
Taste	RC	RC	RC	RC	RC	RC	RC	RC	RC
pH	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Specific Gravity (g/ml)	1.1540	1.1540	1.1560	1.1540	1.1540	1.1560	1.1540	1.1540	1.1560

Conclusion

In conclusion, the poly-herbal cough syrup of *Orthosiphon thymiflorus* prepared in the

laboratory scale may be used as a liquid dosage form which is stable and the results of the AST may make some progress in shelf-life

degradation studies of poly-herbal syrup helping Ayurvedic pharmaceuticals in near future.

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