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DEVELOPMENT & EVALUATION OF POLY HERBAL SYRUP FROM SOME PLANT EXTRACTS WITH HIGH ANTIOXIDANT ACTIVITY

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ABSTRACT

The liquid pharmaceuticals are easy to administer to those individuals who have difficulty in swallowing solid dosage forms. The seeds, leaves and peels are used in tribal medicine for various applications. In the present study, different samples used in traditional medicine were selected for developing poly herbal syrup. 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 1.1610 g/ml. The results of stability study of the final syrup reveal that no changes were noticed in all the tested physicochemical parameter as well as turbidity/homogeneity during 24 hr, 48 hr and 72 hr. Syrup will help in providing the antioxidant required on daily basis along with reducing blood glucose level and helping in preventing cancer growth, along with other benefits of the individual components that were used to make the extract. Yet the long term effect of the products and their toxicity along with pharmacokinetic and pharmacodynamic activities needs to be assessed.

KEYWORDS: Poly herbal, Syrup, Physicochemical, antidiabetic, antioxidant, stability

INTRODUCTION

The oral use of liquid pharmaceuticals has generally been justified on the basis of ease of administration to those individuals who have difficulty in swallowing solid dosage forms.

With rare exceptions, a drug must be in solution in order to be absorbed. 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. The

formulation of solutions presents many technical problems to the industrial pharmacist. Designing of oral herbal formulations (solutions) is a challenge in modern pharmaceutics till date. However the final preparation must satisfy the requirements of pharmaceutical elegance with regard to taste, appearance and viscosity.

Vitis vinifera seed flour, the residue from seed oil manufacture, has not received much attention but may be a potential rich source of natural antioxidants and other healthful bioactive compounds (Luther et al., 2007). *Vitis vinifera* seed proanthocyanidins were found to induce apoptosis and inhibit metastasis in both cultured breast and colon cancer cells (Mantena, Baliga, & Katiyar, 2006).

The fruit of pumpkin is one of the most important vegetables in traditional agricultural systems in the world. So far, several beneficial physiological effects, immunological activity and other pharmacological activities such as lipid-lowering, hepatoprotective, anti-carcinogenic, anti-microbial and anti-diabetic properties of various pumpkin extracts have been published.

Psidium guajava Linn, belonging to the family of *Myrtaceae*, has been used as health tea. Its leaf contains copious amounts of phenolic phytochemicals which inhibit peroxidation reaction in the living body, and therefore can be expected to prevent various chronic diseases such as diabetes, cancer, heart-disease (Kimura *et al*., 1985). Furthermore, decreasing of free-radicals has antioxidizing effect in the body, meaning these guava leaf polyphenols can prevent arterial sclerosis, thrombosis, cataract and inhibit senescence of the body and skin (Okuda *et al*., 1982). Many people habitually take medicinal decoction of guava leaf for long for treatment of diarrhoea and therefore, the safety of guava leaves have empirically been confirmed (Hamada and Kitanaka, 1999).

Solanum trilobatum, a thorny creeper with bluish violet flower, more commonly available in Southern India is a widely used plant in the Indian indigenous systems of medicine (Siddha system of medicine) as an expectorant and in the treatment of respiratory diseases, asthma, chronic febrile infections, and tuberculosis, cardiac and liver diseases. The leaves are used for curing cough, respiratory disorders, especially bronchial asthma (Govindan *et al.,* 2004). It was reported that *S. trilobatum* possess anti-inflammatory, antioxidant activity, hepatoprotective activity (Shahjaha *et al.*, 2004) and protects UV induced damage and radiation induced toxicity in mice (Mohanan *et al.*, 1998,).

MATERIALS AND METHODS

Plant Material

The raw materials(*Vitis vinifera* and *Cucurbita maxima* seeds and leaves of *Psidium guajava* and *Solanum trilobatum*) were procured from the local market and garden. Their identity was confirmed by correlating their morphological characters with those given in literature. They were shade dried, powdered and stored for further use.

Development of Herbal Syrup

a) Method of preparation of decoction[8]:- 100 g of each of the sample was taken and all the powders were mixed with 2000 ml of water. The mixture was boiled until total volume become one fourth of the initial volume. Then the decoction was cooled and filtered and the filtrate was taken to prepare final herbal syrup.

b) Method of preparation of simple syrup (USP):- 700 g of Sucrose was weighed and dissolved in purified water and heated with occasional stirring until it obtained a desired constituency. The total volume was made up to 1l by adding water and boiling.

c) Method of preparation of final herbal syrup: - one part of decoction was mixed with five parts of simple syrup (1:5). 0.05 g of Methyl paraben and 0.08 g of polyparaben was added as preservative, to the above mixture. Solubility was checked visually by observing the clarity of solution. The final herbal syrup was then subjected for evaluation.

EVALUATION OF HERBAL SYRUP

Physicochemical parameters:- The herbal syrup was evaluated for various physicochemical parameters such as physical appearance (colour, odour, taste), pH and Specific Gravity.

a) Color examination: - Five ml final syrup was taken into watch glasses and placed against white back ground in white tube light. It was observed for its color by naked eye.

b) Odor examination: - Two ml of final syrup was smelled individually. The time interval among two smelling was kept 5 minutes to nullify the effect of previous smelling.

c) Taste examination: - A pinch of final syrup was taken and examined for its taste on taste buds of the tongue.

d) Determination of pH: - 10 ml of the final syrup was made up the volume up to 100 ml with distilled water. The solution was sonicated for about 10 minutes. pH was measured with the help of digital pH meter.

e) Specific gravity at 25^{0}C:- A thoroughly clean and dry Pycnometer was selected and calibrated by filling it with recently boiled and cooled water at 25^{0}C and weighing the

contents. It was assumed that the weight of 1 ml of water at 25^{0}C when weighed in air of density 0.0012 g/ml was 0.99602 g. The capacity of the Pycnometer was calculated. Adjusting the temperature of the final syrup to about 20^{0}C and the Pycnometer was filled with it. Then the temperature of the filled Pycnometer was adjusted to 25^{0}C, any excess syrup was removed and weight was taken. The tare weight of the Pycnometer was subtracted from the filled weight. The weight per milliliter was determined by dividing the weight in air, expressed in g, of the quantity of syrup which fills the Pycnometer at the specified temperature, by the capacity expressed in ml, of the Pycnometer at the same temperature. Specific gravity of the final syrup was obtained by dividing the weight of the syrup contained in the Pycnometer by the weight of water contained, both determined at 25^{0}C.

Stability testing:- Stability testing of the prepared poly herbal syrup was performed on keeping the samples at accelerated temperature conditions. Nine portions of the final syrup (1A, 1B, 1C, 2A, 2B, 2C, 3A, 3B and 3C), were taken in amber colored glass bottles and were kept at accelerated temperature at 4^{0}C, Room temperature and 47^{0}C respectively. 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

In the past it was the practice in many pharmaceutical manufacturing companies to evaluate the stability of pharmaceutical preparations by observing them for a year or more, corresponding to the normal time that they would remain in stock and in use. Such approach was time consuming. Now a day's accelerated stability studies are used by most of the pharmaceuticals for stability evaluation of all types of formulations. Though the primary aim of this work was to develop poly herbal syrup but the stability study will mark an important advancement in the area of phytopharmaceuticals. 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 1.1610 g/ml (table 1). The results of stability study of the final syrup reveal that no changes were noticed in all the tested physicochemical parameter as well as turbidity/homogeneity during 24 hr, 48 hr and 72 hr.

Table 1: Basic Physiochemical Studies.

S.no.	Physiochemical parameters	Observed values
1.	Colour	Straw yellow
2.	Odour	Tea like odour
3.	Taste	Sweet
4.	pH	5.2
5.	Wt/ml at room temperature	1.284 g
6.	Specific gravity	1.2946 g/ml

CONCLUSION

The prepared poly herbal syrup was evaluated immediately after preparation and all the tested parameter were considerably good for both the decoction and syrups.

The hydroxyl radical can damage virtually all types of macromolecules: carbohydrates, nucleic acids (mutations), lipids (lipid peroxidation) and amino acids (e.g. Conversion of phe to m-tyrosine and o- tyrosine). The hydroxyl radical has a very short *in vivo* half-life of approximately 109 seconds and a high reactivity. This makes it a very dangerous compound to the organism. Unlike superoxide, which can be detoxified by superoxide dismutase, the hydroxyl radical cannot be eliminated by an enzymatic reaction.

The extract powder can be made into tea for drinking on regular basis. Syrup will help in providing the antioxidant required on daily basis along with reducing blood glucose level and helping in preventing cancer growth, along with other benefits of the individual components that were used to make the extract. Yet the long term effect of the products and their toxicity along with pharmacokinetic and pharmacodynamic activities needs to be assessed.

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