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Quantitative analysis of saponins in a polyherbal unani formulation used in *Bafa* (dandruff)

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SHORT COMMUNICATION

ABSTRACT

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Bafa (dandruff) is a common scalp disorder affecting almost half of the population at the pre-pubertal age of either gender or ethnicity. No population in any geographical region would have passed through freely without being affected by dandruff at some stage in their life. Dandruff (pityriasis capitis, seborrheic dermatitis confined to scalp) is a disease that has been around for centuries despite several treatment options. Although the exact cause of SD has yet to be known, *Malassezia* yeasts, hormones (androgens), sebum levels and immune response are known to play important roles in its etiopathogenesis. Since centuries, Unani medicine has been used in the treatment of *Bafa*. Keeping in mind the desirable action, the quantitative analysis for saponins of a polyherbal formulation used in *Bafa* was done. Saponins are high-molecular-weight glycosides, consisting of a sugar unit(s) linked to a triterpene or a steroid aglycone. Many saponins have detergent properties. Saponins lower the surface tension of aqueous solutions and therefore give stable foams when in contact with water. Antifungal activity related to the saponin content has been reported. The properties responsible for the interaction between saponins and cell membranes, attributes to their fungicidal and piscicidal action. Saponins have also been reported to have antimicrobial, cancer preventing and antiviral activities. In light of the importance of saponins in treatment of *Bafa*, the quantitative analysis of a unani polyherbal formulation was done by gravimetric method and significant results were found. Results and methods will be discussed in full length paper.

Keywords: *Bafa*, dandruff, saponins, triterpene, aglycone.

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INTRODUCTION

Dandruff/*bafa* is a common scalp disorder affecting almost half of population at the pre-pubertal age and of any gender and ethnicity. No population in any geographical region would have passed through freely without being affected by dandruff at some stage in their life (Ranganathan, 2010). The peak incidence has been found at 20 years of age (Sawleshwarka, 2004).

Bafa from time immemorial have been treated in Unani medicine. *Bafa* affects aesthetic value and often cause itching. Thus, proper treatment of dandruff is a challenging task in herbal medicine. There are various treatments in western medicine but relapse of this disease is not treated effectively. Besides this, there are various side effects of western medicine which limit their

usage. *Bafa* is relapsed every now and then; its severity may also show seasonal fluctuations. Thus, safe and cost effective treatment is the need of the hour.

Saponins are a class of chemical compounds found in particular abundance in various plant species. They are amphipathic glycosides grouped phenomenological by the soap-like foaming they produce when shaken in aqueous solutions (Hostettman, 2005). They are often referred to as “natural detergent” because of this foamy property. They derive their name from the Latin word “Sapo” which means that the plant consists of frothing agent when diluted in aqueous solution. They comprise polycyclic aglycones and sugar moieties (hexoses, pentoses and saccharic acids). The sapogenin or aglycone part is either a triterpene or steroid. They are found in different plants, vegetables and herbs. Saponins are

easily extracted using hot water, ethanol or methanol because of their solubility in them (Inalegwu, 2013). There are various biological activities associated with saponins which are mainly because of chemical nature of saponins, which consists of two constitutional moieties: the hydrophilic sugar and the lipophilic sapogenin. These moieties are mainly responsible for the interaction between saponins and cell membranes. Therefore, they help in its fungicidal and piscicidal (a chemical substance that is poisonous to fishes) action (Hostettman, 2005). Antifungal activity is related to the saponin content in many plant species. The polyherbal formulation which was quantified for saponins showed promising results for its use in *Bafa*. Besides, the saponins showed significant anti-inflammatory activity (Kwak, 2003). Saponins have also been reported to have antimicrobial (Killeen, 1996), cancer preventing (Shibata, 2001) and antiviral activities (Simoes, 1999).

MATERIAL AND METHODS

Test drug

Test drug ingredients for quantification of saponins as mentioned in Unani classical literature are as follows;

Constituents: (Khan, 1996)

Nakhod (Cicer arietinum) 10 gms

Baqila (Vicia faba) 10gms

Turmas (Lupinus albus) 10 gms

Khatmi (Althea officinalis) 10 gms

Hulba (Trigonella foenum) 10 gms

Preparation of test drug

Seeds of above mentioned drug were procured and cleaned of any impurity and were partially crushed. Then, an aqueous extract was prepared in 1: 4 ratio by reflux distillation method at a temperature below 60 degrees for about 5-6 hrs. Approximately, 250ml extract was obtained and then it was dried at a temperature below 60 degrees to obtain a desirable dose of 16.4ml.

Qualitative test for saponins

Froth Test

Test drug showed the positive results. It showed froth that was higher than 2 cm that persists for almost 10 minutes.

Quantitative test for saponins

An adaptation of the method published by Shaika et al. (2011) was used to determine saponin content. Test drug was taken in quantity of 16.4 ml and was gently mixed with 50ml of *n*-butanol in a separating funnel after sometime filtrate was obtained. Evaporating the filtrate on water bath and residue left behind is total saponin with other constituents.

RESULTS

Total saponins	0.207 mg*	24.6%
Purified saponins	0.100 mg*	11.9%

*per 16.4 ml of test drug.

Similarly again 16.4ml test drug was taken and mixed gently with 50ml *n*-butanol. It was filtered through filter paper through Whatman filter paper. Filtrate obtained was evaporated to dryness. Residual extract obtained was concentrated in alcohol. Then this concentrated solution obtained was mixed with petroleum ether in separating flask. Filtrate obtained was evaporated to dryness thus; purified saponins were obtained and weighed.

DISCUSSION

Saponins, having known foaming property and detergent action are found in significant amount in the above mentioned polyherbal formulation. The constituent in our Polyherbal drugs have sufficient quantity of saponins. Phytochemical screening revealed a significant saponin contents in chloroform extract of *Vicia faba* (Rajesh, 2012). Seeds of *Trigonella foenum* have moderate amounts of saponins in them (Sumaya, 2012) Whole seeds of lupinous (leguminosae) species have two triterpenoid saponins with branched monosaccharide chain. These compounds showed moderate antifungal activity. The seeds of *Lupinus albus* (sweet and bitter) were analysed for total saponin content. There was none saponin in *L.albus* species (Ridout, 1993). *Cicer arietinum* is well known plant for saponins. Saponins from chickpea were isolated and analysis of antifungal activity was carried out and fungal inhibition was observed (Kerem, 2005).

CONCLUSION

Polyherbal formulation used in Unani medicine for *Bafa* shows significant saponins in it, so proving its efficacy for detergent action and possible antimicrobial action. Further evaluation of test drug is to be done to evaluate other components in it such as phenolics, glycosides, flavonoids, tannins etc. For proper validation of formulation and mechanism of action further studies are required. Today world is world of herbal cosmetics, so Unani medicine like other systems of medicine has to work in this direction and evaluate formulations on modern parameters with certain modifications.

CONFLICT OF INTEREST

None declared.

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