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Research Paper

Physico-chemical studies of the Gum Acacia

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Abstract

Gum acacia is a potent drug having diverse pharmacological effects and wide therapeutic potential. It is used in diarrhoea and dysentery, irritations and ulcers of the stomach and intestine. It is also used in haemoptysis, bleeding piles, menorrhagia, leucorrhoea and spermatorrhoea. Keeping in view the high medicinal importance physico-chemical studies of the drug obtained from Dawakhana Tibbiya College, Aligarh Muslim University, Aligarh has been done. The parameters applied for the present study include extractive value, ash value, moisture content, TLC, *p*H value, qualitative phytochemical studies and fluorescent analysis.

Keywords: Gum Arabic, Gum Acacia, Physico-chemical studies, TLC, Phytochemical studies.

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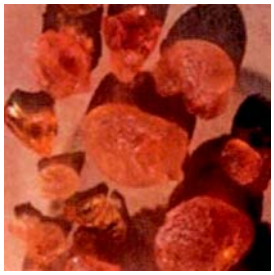
Introduction

In spite of existence of herbal medicine over many centuries as an important mean of healing in many parts of the world, scientists and research workers however, given relatively little attention towards the investigation of such medicinal plants and other natural products for their possible medicinal application. From the time of collection of the drug to its storage and up to the production of medicine, chances of deterioration in quality are quite frequent, resulting in the decline of the efficacy of drug. The herbal drugs can be used as a therapeutic agent only if they are genuine and their standard and quality are up to the mark. To overcome these problems of Unani drugs it is almost inevitable to standardize the drugs for their rational therapeutic use. A disease can not be managed comprehensively until the delivery of genuine samples of drug is ensured[1]. Therefore, physico-chemical studies of the market samples of Gum acacia or Gum arabic was carried out. It is also known as Babool gum and in Unani system of medicine it is known as *Samagh-e-arabi*. It is a multipurpose and potent drug and useful in diarrhoea and dysentery, irritations, and ulcers of the stomach and intestine[2-4]. The parameters applied in the present study makes valuable test to check the quality of drug.

Materials and Methods

Gum acacia was procured from Dawakhana Tibbiya College, Aligarh Muslim University (AMU), Aligarh. The identity of the drug was confirmed in the Pharmacognosy section of the Department of Ilmul Advia, A.K.Tibbiya College, AMU, Aligarh. It was dried well in shade and

Gum acacia



the powder of the drug was prepared in electric grinder.

Physico-chemical studies

The general standard methods were employed for the determination of extractive values and ash value. The moisture content was determined by the method of Jenkin *et al*[5]. The method of Bhattacharjee and Das[6] was followed for the phytochemical screening. TLC was carried out according to the method described in Pharmacopoeia of India[7]. Fluorescence analysis of powdered drug was conducted by the method of Chase & Pratty[8] while *p*H was determined by the method described in British Pharmacopoeia[9].

Results and Discussion

The extractive values in different organic solvents are based on the quantity, which are soluble in them. It makes a valuable test to check the quality of drug, and any variation in the chemical constituents may cause a change in the extractive values. Thus, it helps in the determination of the adulteration and is an index of the purity of drug. The extractive value of *Samagh-e-arabi* therefore, was determined by successive extraction in different solvents using a Soxhlet's apparatus. The results are shown in Table 1. Since, the extractive percentage of the drug has not been reported in the literature, it may be taken as an addition to the existing stock of knowledge. The variation in the extractive values may be possible due to the presence of specific compound, according to the solubility, soil condition, atmospheric condition and water content of the sample.

The other commonly applied parameter for the detection of impurities and adulteration of drug is the estimation of ash value, which establishes the quality and the purity of drug. Ash value can also detect the nature of the material added to the drug for the purpose of adulteration. The sample of gum acacia analysed during this study had the following ash values: total ash, 3.34±0.077; acid insoluble ash, 1.35±0.119; and water soluble ash, 1.29±0.064%. Our finding is in consonance with some other reports where it has been shown to amount maximally up to 4% [Refs. 3, 10] or found between, 2.7-4%[Ref. 11], in other study however, the ash yield has been estimated between a range of 2.7-8%[Ref. 12]. The upper range appear to be too high as compare to our findings and other reports this may be due to the adulteration in the gum.

Table 1: Extractive value of Gum acacia

S. No.	Organic solvents	Mean percentage of extracts±SE
1	Petroleum ether	1.592±0.147
2	Solvent ether	0.080± 0.008
3	Chloroform	0.041±0.003
4	Benzene	0.028±0.003
5	Methanol	0.866±0.030
6	Water	14.596±0.248

The moisture content is a good parameter for detecting the quality of the crude drugs. Low or high moisture content compromise the quality of drug and affect its efficacy. This parameter was also applied for the drug and mean percentage was found to be 9±0.979. Various workers have reported the percentage of moisture of *Samagh-e-arabi* as 10-13, 14 and 12-18% [Refs. 10, 3, 12]. The value of moisture of *Samagh-e-arabi* in our study was 9±0.979% which is less than the above mentioned values but considering the range of moisture contents determined in the experiments, it comes 8-12% that is corresponding to most of the reports consulted.

Chromatography is used for the isolation and identification of various substances present in the drug. In the present study thin layer chromatography (TLC) has been conducted for the separation of different component and R*f* value of developed spots in different solvent system have been noted. The details are given in Table 2. R*f* value can be used as a tool for the standardization of drug. The *p*H value of the drug was also determined at 35ºC temperature and found to be 5.10.

The phytochemical screening of the drug is a very sensitive aspect in the process of standardization and quality control because the constituents vary quantitatively and qualitatively not only from plant to plant but also in different samples of the same species depending upon various atmospheric factors and storage conditions. Qualitative analysis of the drug gave positive result for the presence of sterols, phenols, flavonoids, reducing sugar, saponin, protein, amino acids, tannin and resin. Generally the herbal drugs are used in powder form and adulteration in the powdered drug is very easy but it can be detected by observing the powder under the ultra violet light, because the fluorescence characteristics of any powdered drug is very distinctive and helpful in distinguishing features for the determination of a drug. In the present study the powdered drug exhibited various shades of green (Table 3). This parameter may be utilized not only for the identification of the drug but also to establish its purity and standard.

Conclusion

In the light of above results it can be concluded that to ascertain authenticity

Table 2 : TLC analysis of Gum acacia

Extract of drug	Solvent system	Spray/treatment	No. of spots	Rf values	Colour of spots
Pet. ether	Pet. ether Di-ethyl ether (4:1)	40% perchloric acid, heated at 105 ºC	05	0.70, 0.38, 0.30, 0.17, 0.07	All spots black
Di-ethyl ether	Pet. ether Di-ethyl ether (1:1)	10% venaline 10% H_2SO_4 heated at 105 ºC	04	0.96, 0.90, 0.84, 0.76	One spot pink, three spots black
Chloroform	Chloroform Benzene (1:1)	10% venaline 10% H_2SO_4 heated at 105 ºC	08	0.96, 0.93, 0.90, 0.84, 0.66, 0.53, 0.20, 0.03	One spot green, two spots pink, five spots grey
Benzene	Chloroform Benzene (3:1)	10% venaline 10% H_2SO_4 heated at 105 ºC	04	0.91, 0.86, 0.68, 0.36	All spots black
Methanol	Chloroform Methanol (3:1)	10% venaline 10% H_2SO_4 heated at 105 ºC	04	0.92, 0.80, 0.58, 0.03	All spots black

Table 3 : Fluorescent analysis of Gum acacia

S. No.	Treatment	Colour of the powder under ultra violet light
1	Powder as such	Creamy colour
2	Treated with NaOH in methanol	Yellowish green
3	Mounted with nitrocellulose in amyl acetate	Dull green
4	Treated with NaOH mounted in nitrocellulose	Light green

and to do standardization of the Gum acacia sample, this study will be useful.

References

1. Hashmi S and Singh VK, Standardization of Controversial Herbal Drugs: A Dire Need of the Day, Proceedings of the National Seminar on Research Methodology in Unani Medicine, 3-4 April, 1995, Published by Deptt. of History of Medicine, Jamia Hamdard, New Delhi,First Edn,1998, p. 60
2. Ghani HN, *Khaza-en-ul-Advia, Idarah Kitab-al-Shifa*, New Delhi, 1921, Vols.1-4, 341 pp.
3. Nadkarni KM, Indian Materia Medica, Popular Prakashan Bombay, 1954, Vol. 1, 3rd Edn, pp. 9-10.
4. Said, Hamdard Pharmacopoeia of Eastern Medicines, Sat Guru Publications, A Division of Indian Book Centre, Delhi, India, 1997, 2nd Edn, 363pp.
5. Jenkins Gtenn L, Christian Johins E, Nager P and George P, Quantitative Pharmaceutical Chemistry, 1957, pp. 34-44, 243-44, 247, 457.
6. Bhattacharjee AK and Das AK, Phytochemical Screening of Some Indian Plants, *Quart J Crude Drugs*, 1969, **9**, 1408-1412.
7. Anonymous, Pharmacopoeia of India, Government of India, Ministry of Health, Manager of Publications, Delhi, 1966, 2nd Edn, 238pp.
8. Chase CR and Pratty R, Fluorescence of powdered vegetable drugs with particular reference to development of a system of identification, *J Am Pharm Sci*, 1967, **38**, 324.
9. Anonymous, British Pharmacopoeia, General Medical Council, Pharmaceutical Press - 17, Bloomsbury Square London, 1968, p. 1209.
10. Norman E and Elsdon GD, the Analysis of the Drugs and Chemicals, London Charles, Griffin and Co. Ltd, 1929, pp. 204, 230, 234.
11. Wallis TE, Textbook of Pharmacognosy, CBS Publishers and Distributors, Shahdara, Delhi, 1985, 5th Edn, Reprinted in 2005 in India by arrangement with Pitman, London, p. 474.
12. Dymock W, Warden CJH and Hooper D, Pharmacographica Indica: A History of the Principal Drugs of Vegetable Origin, met with in British India, 3 Vols, 1889-1891; Index and Appendix, 1893; Reprint Edn, Bishen Singh Mahendra Pal Singh, New Cannaught Place, Dehra Dun, 1976, Vol. II, pp. 313-315.