Research Article

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PHYSICOCHEMICAL EVALUATION OF SHARBAT ALOO BALOO

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ABSTRACT

Sharbat (Syrup) is one of the important dosage forms of Unani system of the medicine (USM). In the form of Sharbat, numbers of formulations are manufactured because of its various advantages in respiratory system, digestive system and urinary system. Out of these, Sharbat Aloo baloo (SAB) is one of the important formulations, being used in urinary system to cure the renal calculi and stone in bladder. Both of these diseases are very common and present everywhere. SAB is very effective for both diseases, hence was selected and prepared as per the ratio of drug and sugar (1:4) given in Bayaz Kabeer and then evaluated for its standardization on different physicochemical parameters. Physico-chemical evaluation was done on three batches of SAB of different volumes (one litre batch, five lire batch and ten litre batch). Physico-chemical standards of SAB were fixed on various parameters like (a) organoleptic properties (appearance, colour, odour and taste) (b) Viscosity (c) pH values (d) Ash values (e) Extractive values (f) Alcohol soluble matter (g) Water soluble matter (h) Specific gravity at 25ºC (i) Refractive index (j) Sugar quantity (total sugar, reducing sugar and non-reducing sugar) (k) Estimation of calcium, potassium and phosphorus (l)TLC finger printing. The results obtained for the various Physico-chemical tests of lab samples of SAB may be taken as standard values for future reference.

Keywords: Sharbat Aloo baloo, Dosage forms, Unani system of medicine

INTRODUCTION

Sharbat is an ancient dosage form of USM being invented by Pythagoras, the ancient Greek philosopher and mathematician.[1,2] Number of Unani formulations are prepared in the form of Sharbat which are used to treat different type of diseases such as in cough, as diuretics, as liver tonic and in anaemia etc. Out of these numerous Ashriba (plural of Sharbat means syrups), selected Sharbat, Sharbat Aloo baloo (SAB) is an important Unani formulation which is mentioned in Bayaz Kabeer;[3] used mainly as diuretic and lithotriptic.[3-6] It is also mentioned in different Qarabadeen such as Qarabadeen-e-Ehsani,[6] Qarabadeen-e-Azam,[4] Qarabadeen-e-Majeedi[5] and Hamdard Pharmacopoeia of Eastern Medicine.[2] During survey it was found that earlier, physicochemical studies of SAB were not done. Development of Physico-chemical data of every dosage form is mandatory for quality control check for future batches. Therefore, it was decided to develop the Physico-chemical standards of SAB.

MATERIALS AND METHODS

Preparation of Sharbat Aloo baloo

The ingredients of Sharbat Aloo baloo are given in Table 1.[1-4,7]

Procurement and identification of raw drugs and excipients

All the ingredients mentioned in the Table above, were bought from the market of Bengaluru. As one drug (Aloo baloo) was the part of formulation, so identified by Botanist S. Noorunnisa Begum, Senior Assistant Professor, Centre for Repository of Medicinal Resources (C-RMR), Trans Disciplinary University (TDU), Bengaluru. The specimen was preserved in the Repository of Medical Resources Herbarium and the Accession number is Aalu baalu - 3819.

Different batches in different volumes (1 litres, 5 litres, 10 litres) of SAB were prepared by taking one-part fruits of Aloo baloo and soak it in four parts of water for overnight. In morning boiling was done till the pulp softens and the volume of water becomes half. They are then cloth-filitresered.[3] Next, four parts of sugar[3] and citric acid (2% of sugar) were added, and the mixture was heated on gas stove. When the Qiwam of Sharbat was about to form, sodium benzoate (1% of sugar) dissolved in distilled water was added and heated for one minute, after that liquor was filtered and stocked in bottles.[2]

Physiochemical evaluation of Sharbat Aloo Baloo

All the three batches were prepared by considering classical identification procedures of Qiwam. Physiochemical evaluation was done on all the three batches (1 litres, 5 litres, 10 litres). All the three batches prepared as per recommended ingredients in the Bayaz Kabeer[3] at MT-LB (Maximum temperature on large burner, 670-680°C) for 4, 10 and 20 minutes respectively.

Physicochemical parameters such as organoleptic properties (appearance, colour, odour and taste)[8], viscosity[9], pH[10], total ash[11-13], acid insoluble ash[11-13], extractive values[13,14], water soluble matter[15], alcohol soluble matter[15], specific gravity at 25ºC[8,14], refractive index[16] were carried out by standard methods.

Quantitative estimation

Quantitative estimation such as total sugar[17], reducing sugar[18], non-reducing sugar[11], estimation of calcium[19], estimation of potassium[20] and estimation of phosphorus[21] were also done by standard methods.

Thin layer chromatography

Thin layer chromatography was carried out on TLC pre coated aluminium plates, silica gel 60 F 254 (layer thickness 0.25 mm) for chloroformic extract[12,13] of the test drug sample of SAB in various mobile phases, later sprayed by different spraying reagents to visualise the spots. The Rf values of the spots were calculated for both the drugs by the following formula.[12,22]

Rf value = distance travelled by the spot / distance travelled by solvent.

Procedure - Apply the chloroform extractive solution of SAB on chromatographic plate "Silica gel 60 F254" (manufactured by Merck) in the form of spot. Dry the plate and placed it in the chamber of the solvent of toluene: ethyl acetate in the ratio of 9:1 and thereafter dried in a drying oven for three minutes at 100˚C. Finally, the plate was put in iodine chamber.[23]

RESULTS

Physiochemical standards of Sharbat Aloo baloo

The following standards are fixed for SAB (one litre, five litres and ten litres batch). The data is based on multiple observations. One litre batch, five litres batch and ten litres batch prepared as per the ratio of drug and sugar (1:4) given in Bayaz Kabeer[3] for physicochemical evaluation.

The organoleptic characteristics i.e., appearance, colour, odour and taste of SAB of l litre, 5 litres and 10 litres of SAB was found to be same as viscous liquid, dark brown, pleasant and sweet respectively as given (Figure 1, Table 2). The values of viscosity of l litre, 5 litres and 10 litres of SAB were found to be 220-256, 222-258 and 221-257 cps respectively by Brookfield viscometer (Table 3). The mean values of pH of l litre, 5 litres and 10 litres of SAB were found to be 4.06 ± 0.011, 4.08 ± 0.011 and 4.04 ± 0.017 respectively (Table 4). The mean percentage of total ash, acid insoluble ash and water-soluble ash of l litre, 5 litres and 10 litres of SAB were found to be 0.0871 ± 0.021, 0.0327 ± 0.002 and 0.0534 ± 0.011, 0.1099 ± 0.011, 0.0548 ± 0.018 and 0.0660 ± 0.001, 0.1418 ± 0.106, 0.0762 ± 0.010 and 0.0765 ± 0.010 respectively (Table 5). The mean percentage of extractive values in alcohol of l litre, 5 litre and 10 litres of SAB were found to be 60.085 ± 0.041, 60.185 ± 0.036 and 60.524 ± 0.119 respectively (Table 6). The mean percentage of extractive values in water of l litre, 5 litres and 10 litres of SAB were found to be 62.735 ± 0.087, 61.748 ± 0.047 and 63.537 ± 0.258 respectively (Table 6). The mean percentage of alcohol soluble matter of l litre, 5 litres and 10 litres of SAB were found to be 70.21 ± 0.479, 69.82 ± 0.464 and 69.23 ± 0.259 respectively (Table 7). The mean percentage of water-soluble matter of l litre, 5 litres and 10 litres of SAB were found to be 71.78 ± 0.629, 71.44 ± 0.415 and 70.99 ± 0.346 respectively (Table 7). The mean values of specific gravity of l litre, 5 litres and 10 litres of SAB were found to be 1.346 ± 0.007, 1.346 ± 0.002 and 1.358 ± 0.001 respectively (Table 8). The mean percentage of refractive index of l litre, 5 litres and 10 litres of SAB were found to be 67 ± 0.577, 67 ± 1.155 and 67 ± 0.577 respectively (Table 9). The mean percentage of total sugar of l litre, 5 litres and 10 litres of SAB were found to be 68 ± 0.576%, 67 ± 0.577% and 67 ± 0.577% respectively (Table 10). The mean percentage of reducing sugar of l litre, 5 litres and 10 litres of SAB were found to be 15 ± 0.575%, 16 ± 0.577% and 17 ± 0.577% respectively (Table 10). The mean percentage of non-reducing sugar of l litre, 5 litres and 10 litres of SAB were found to be 50.35 ± 1.12%, 48.45 ± 0.725% and 47.5 ± 0.339% respectively (Table 10). The mean value of calcium of l litre, 5 litres and 10 litres of SAB were found to be 0.280 ± 0.002 mg/ml, 0.284 ± 0.002 mg/ml and 0.286 ± 0.002 mg/ml respectively (Table 11). The mean value of potassium of l litre, 5 litres and 10 litres of SAB were found to be 8.817 ± 0.030 mg/ml, 8.821 ± 0.052 mg/ml and 8.817 ± 0.030 mg/ml respectively (Table 11). The mean value of phosphorus of l litre, 5 litres and 10 litres of SAB were found to be 0.295 ± 0.003 mg/ml, 0.296 ± 0.005 mg/ml and 0.296 ± 0.003 mg/ml respectively (Table 11). Five same spots were found on TLC silica plate with the chloroform extract of SAB in all the three batches. The Rf values were found to be 0.240, 0.413, 0.653, and 0.880 and the colours of spots were light yellow and dark yellow respectively (Table 12, Figure 2-4).

DISCUSSION

Physicochemical evaluation is an essential work which would be done before further efficacy and safety evaluation of a drug. Identification and purity of drug should be confirmed by physical characteristics of a drug or by both physicochemical characteristics. It is possible only if the physicochemical data of all single and compound drugs is available. Therefore, it is an important area of research in Unani Medicine that physicochemical data of all the drugs, single Mufrad drugs or compound Murakkab drugs must be produced. After establishing all standards of all drugs regarding physicochemical data, it would be easy to go for an animal research and clinical research after comparing the test data with the standard values.

Table 1: Ingredients of SAB

S. No.	Unani name	Scientific name	Part used	Quantity
1.	Aloo baloo	Prunus cerasus	fruits	1 part
2.	Sugar	Sucrose	___	4 parts
3.	Satt-e-lemu	Citric acid	___	2% of sugar
4.	Natroon banjawi	Sodium benzoate	___	1% of sugar

Table 2: Organoleptic Properties of one Litre, Five and Ten Litres of SAB

Final batches	One litre	Five litres	Ten litres
Appearance	Viscous liquid	Viscous liquid	Viscous liquid
Colour	Dark brown	Dark brown	Dark brown
Odour	Pleasant	Pleasant	Pleasant
Taste	Sweat	Sweat	Sweat

Table 3: Viscosity of One, Five and Ten Litres of SAB by Brookfield Viscometer

Spindle no.	RPM	Temp. (ºC)	1 litre		5 litres		10 litres	
			Torque (%)	Viscosity (cP)	Torque (%)	Viscosity (cP)	Torque (%)	Viscosity (cP)
04	100	30	11.5	230	11.9	236	11.7	233
	100	30	23.9	239	24.5	243	24.2	241
	60	30	13.5	225	13.9	229	13.7	227
03	50	30	11.1	222	11.3	225	11	223
02	100	30	64	256	66	258	65	257
(Larger size)	60	30	35	233	37	235	36	234
	50	30	28.5	228	29.5	230	29	229
	30	30	16.7	222	17.7	224	17.1	221
	20	30	11.2	220	12.5	222	12.3	222

Note: - Readings of Brookfield viscometer is valid only in between 10-100% of torque.

Table 4: pH Values of One Litre, Five and Ten Litres of SAB

S. No.	1 litre	5 litres	10 litres
1.	4.06	4.08	4.04
2.	4.08	4.06	4.07
3.	4.04	4.10	4.01
Mean ± SEM	4.06 ± 0.011	4.08 ± 0.011	4.04 ± 0.17

Table 5: Ash Values of One Litre, Five and Ten Litres of SAB

S. No.	Total ash (in %)			Acid insoluble ash (in %)			Water soluble ash (in %)		
	1 litre	5 litres	10 litres	1 litre	5 litres	10 litres	1 litre	5 litres	10 litres
1.	0.0657	0.0982	0.1309	0.0328	0.0655	0.0650	0.0313	0.0660	0.0978
2.	0.1292	0.1321	0.1632	0.0323	0.0328	0.0979	0.0641	0.0662	0.0660
3.	0.0664	0.0995	0.1315	0.0332	0.0663	0.0657	0.0649	0.0658	0.0658
Mean ± SEM	0.087 ± 0.021	0.109 ± 0.011	0.141 ± 0.106	0.032 ± 0.002	0.054 ± 0.018	0.076 ± 0.010	0.053 ± 0.011	0.066 ± 0.001	0.076 ± 0.010

Table 6: Extractive Values in Alcohol and Water of One Litre, Five and Ten Litres of SAB by Hot Method

S. No.	Alcohol (in %)			Water (in %)		
	1 litre	5 litres	10 litres	1 litre	5 litres	10 litres
1.	60.004	60.115	60.525	62.863	61.803	63.022
2.	60.143	60.237	60.731	62.567	61.653	63.753
3.	60.108	60.203	60.316	62.775	61.789	63.837
Mean ± SEM	60.085 ± 0.041	60.185 ± 0.036	60.524 ± 0.036	62.735 ± 0.087	61.748 ± 0047	63.537 ± 0.258

Table 7: Alcohol and Water-Soluble Matter of One Litre, Five and Ten Litres of SAB by Cold Method

S. No.	Alcohol soluble matter (in %)			Water soluble matter (in %)		
	1 litre	5 litres	10 litres	1 litre	5 litres	10 litres
1.	70.21	69.82	60.525	71.78	71.44	70.99
2.	69.39	71.35	60.731	70.69	70.72	70.39
3.	71.05	70.68	60.316	72.87	72.16	71.59
Mean ± SEM	70.21 ± 0.479	60.185 ± 0.036	69.82 ± 0.464	71.78 ± 0.629	71.44 ± 0.415	70.99 ± 0.346

Table 8: Specific Gravity at 25ºC of One Litre, Five and Ten Litres of SAB

S. No.	Specific gravity at 25ºC (in gm/cm^3)		
	1 litre	5 litres	10 litres
1.	1.361	1.347	1.356
2.	1.343	1.349	1.358
3.	1.336	1.342	1.361
Mean ±SEM	1.346 ± 0.007	1.346 ± 0.002	1.358 ± 0.001

Table 9: Refractive Index of One Litre, Five and Ten Litres of SAB

S. No.	Refractive index (in %)		
	1 litre	5 litres	10 litres
1.	67	67	67
2.	66	69	68
3.	68	65	66
Mean ± SEM	67 ± 0.577	67 ± 1.155	67 ± 0.577

Table 10: Estimation of Total Sugar, Reducing and Non-Reducing Sugar in One Litre, Five and Ten Litres SAB

S. No.	Total sugar (in %)			Reducing sugar (in %)			Non reducing sugar (in %)		
	1 litre	5 litres	10 litres	1 litre	5 litres	10 litres	1 litre	5 litres	10 litres
1.	68	67	68	15	16	17	50.35	48.45	47.50
2.	67	68	66	14	15	16	48.50	50.27	46.74
3.	69	66	67	16	17	18	53.35	47.26	48.25
Mean ± SEM	68 ± 0.576	67 ± 0.577	67 ± 0.577	15 ± 0.575	15 ± 0.577	15 ± 0.577	50.35 ± 1.120	48.45 ± 0.725	47.50 ± 0.339

Table 11: Estimation of Calcium, Potassium and Phosphorus in One Litre, Five and Ten Litres of SAB

S. No.	Calcium (mg/ml)			Potassium (mg/ml)			Phosphorus (mg/ml)		
	1 litre	5 litres	10 litres	1 litre	5 litres	10 litres	1 litre	5 litres	10 litres
1.	0.280	0.279	0.283	8.78	8.60	8.72	0.288	0.279	0.272
2.	0.276	0.284	0.286	8.81	8.67	8.75	0.295	0.286	0.278
3.	0.284	0.289	0.290	8.86	8.75	8.78	0.304	0.294	0.287
Mean ± SEM	0.280 ± 0.002	0.284 ± 0.002	0.286 ± 0.002	8.81 ± 0.023	8.67 ± 0.043	8.75 ± 0.017	0.295 ± 0.004	0.286 ± 0.004	0.278 ± 0.003

Table 12: TLC of One Litre, Five and Ten Litres of SAB

One litre of SAB				
Extract	**Solvent**	**No. of spots**	**Rf Values**	**Colour**
Chloroform	Toluene:ethylacetate (9:1)	5	0.240, 0.413, 0.653 and 0.880	Light and dark yellow
Five litres of SAB				
Chloroform	Toluene:ethylacetate (9:1)	5	0.240, 0.413, 0.653 and 0.880	Light and dark yellow
Ten litres of SAB				
Chloroform	Toluene:ethylacetate (9:1)	5	0.240, 0.413, 0.653 and 0.880	Light and dark yellow

Figure 1: Sample of SAB

Figure 2: TLC of 1 litres SAB

Figure 3: TLC of 5 litres SAB

Figure 4: TLC of 10 litres SAB

It is clear by above discussion that physicochemical evaluation is a mandatory work. So, this drug SAB was evaluated on various physicochemical parameters for establishing the standards. Parameters on which SAB was evaluated are organoleptic properties. Their individual discussion based on the result is as under:

Organoleptic Properties

Appearance
The general outward appearance of the Sharbat is the first impression on consumers. The appearance of SAB was evaluated and found to be viscous liquid. Almost all Ashriba mentioned in Physiochemical Standard of Unani Formulations are viscous liquid in appearance.[11,24,25]

Colour
For any product Colour is very important role to attract consumers. Colour is the examination which can be done by the sense organ. The Colour of all three batches (one litres, five litres and ten litres) of SAB were evaluated and found to be dark brown.[16]

Odour
The fragrance of Sharbat has an impact on the elegance of the product. The fragrance should be light and clean. The Odour of all three batches (one litre, five litre and ten litre) of SAB were evaluated and found to be pleasant.[16]

Taste
Taste plays an important role in herbal product for consumers. The taste of all the three batches (one litre, five litre and ten litre) of SAB were evaluated and found to be sweet.

Physicochemical properties

Viscosity
Viscosity is an important parameter to check the ability of flow of liquid.[26] Viscosity of a liquid is constant at a given temperature and is an index of its composition. Hence it can be used as a means of standardizing liquid drugs.[27] The values of viscosity of l litre, 5 litres and 10 litres of SAB were found to be 220-256, 222-258 and 221-257 cps respectively.

pH values
It provides a useful practical means for the quantitative indication of the acidity or alkalinity of a solution.[28] The mean values of pH of l litre, 5 litres and 10 litres of SAB were found to be 4.06 ± 0.011, 4.08 ± 0.011 and 4.04 ± 0.017 respectively.

Ash values
The residue remaining after incineration is the ash content of the drug. Total ash includes both physiological and non-physiological ashes.[29]

Estimation of ash values is an important parameter for the detection of impurities and adulteration of drug. This establishes the quality and purity of the drug. The ash value of the drug is the residue remaining after incineration, it usually determines the inorganic substances present in the drug. Similarly, it can also detect the nature of the material, which is added to the drug for the purpose of adulteration. Hence, determination of the ash value provides a criterion for judging the identity and purity of the drug.[30] The total ash, acid insoluble ash and water-soluble ash values of various Ashriba are mentioned in Physiochemical Standard of Unani Formulations are in range of 0.19 to 0.90, 0.10 to 0.20 and 0.08 to 0.135% respectively. The mean percentage of total ash, acid insoluble ash and water-soluble ash of l litre, 5 litres and 10 litres of SAB were found to be 0.0871 ± 0.021, 0.0327 ± 0.002 and 0.0534 ± 0.011, 0.1099 ± 0.011, 0.0548 ± 0.018 and 0.0660 ± 0.001, 0.1418 ± 0.106, 0.0762 ± 0.010 and 0.0765 ± 0.010 respectively, which are more or less similar to values given in Physiochemical Standard of Unani Formulations for various Ashriba.

Extractive values in alcohol and water

The amount of the extract that the drugs yield in a solvent is often an approximate measure of the amount of a certain constituent that the drug contains. Therefore, for establishing the standard of any drug the extractive value plays a major role.[30] The mean percentage of extractive value in alcohol of l litre, 5 litres and 10 litres of SAB were found to be 60.085 ± 0.041, 60.185 ± 0.036 and 60.524 ± 0.119 respectively. The mean percentage of extractive value in water of l litre, 5 litres and 10 litres of SAB were found to be 62.735 ± 0.087, 61.748 ± 0.047 and 63.537 ± 0.258 respectively.

Alcohol and Water-Soluble Matter

This indicates the amount and solubility of the soluble constituents present in any drug. The alcohol or water-soluble matter of the various drugs is specified and fixed; if the yielded amount of the same is decreased, expresses degradation or decomposition of the drug. Less value indicates addition of exhausted material, adulteration or incorrect processing during drying or storage. It is employed for materials for which as yet no suitable chemical or biological assay exists.[29] The mean percentage of alcohol soluble matter of l litre, 5 litres and 10 litres of SAB were found to be 70.21 ± 0.479, 69.82 ± 0.464 and 69.23 ± 0.259 respectively. The mean percentage of water-soluble matter of l litre, 5 litres and 10 litres of SAB were found to be 71.78 ± 0.629, 71.44 ± 0.415 and 70.99 ± 0.346 respectively

Specific gravity at 25ºC

Specific gravity is the ratio of specific weight of the material to the specific weight of the distilled water. It varies with temperature and pressure, so reference and sample must be compared at same temperature and pressure. It is commonly used in industry as a simple means of obtaining information about the concentration of solution of various materials such as sugar solutions, syrups, juices, honeys etc.[31] The specific gravity of various Ashriba are mentioned in Physiochemical Standard of Unani Formulations which is in the range of 1.341 to 1.374. The specific gravity of SAB was found in the range of above-mentioned value. The mean values of specific gravity of l litre, 5 litres and 10 litres of SAB were found to be 1.346 ± 0.007, 1.346 ± 0.002 and 1.358 ± 0.001 respectively.

Refractive index

Refractive index is a fundamental physical property of a substance often used to identify a particular substance, confirm its purity, or measure its concentration. Refractive index is used to measure solids (glasses and gemstones), liquids, and gases. Most commonly it is used to measure the concentration of a solute in an aqueous solution. A refractometer is the instrument used to measure refractive index. For a solution of sugar, the refractive index can be used to determine the sugar content.[16] The mean percentage of refractive index of l litre, 5 litres and 10 litres of SAB was found to be 67 ± 0.577, 67 ± 1.155 and 67 ± 0.577 respectively.

Quantitative estimation
Sugar quantity

Total sugar
The mean percentage of total sugar of l litre, 5 litres and 10 litres of SAB were found to be 68 ± 0.576%, 67 ± 0.577% and 67 ± 0.577% respectively.

Reducing sugar
Reducing sugar is any sugar that is capable of acting as a reducing agent because it has a free aldehyde group or a free ketone group. Monosaccharides are reducing sugar, along with some disaccharides, oligosaccharides, and polysaccharides.[32] The mean percentage of reducing sugar of l litre, 5 litres and 10 litres of SAB were found to be 15 ± 0.575%, 16 ± 0.577% and 17 ± 0.577% respectively.

Non reducing sugar
It is carbohydrate that is not oxidized by a weak oxidizing agent (an oxidizing agent that oxidize the aldehyde but not alcohol) in basic aqueous solution. The characteristic property of non-reducing sugar is that, in basic aqueous medium, they do not generate any compounds containing an aldehyde group. The example of non-reducing sugar is sucrose, which contains neither a hemiacetal nor a hemiketal group, therefore, stable in water.[32] The mean percentage of non-reducing sugar of l litre, 5 litres and 10 litres of SAB were found to be 50.35 ± 1.12%, 48.45 ± 0.725% and 47.5 ± 0.339% respectively.

Estimation of calcium, potassium and phosphorus

Estimation of Calcium
Calcium is essential for living organisms, in particular in cell physiology, where movement of the calcium ion into and out of the cytoplasm functions as a signal for many cellular processes. As a major material used in mineralization of bone, teeth and shells, calcium is the most abundant metal by mass in many animals. Calcium is an important component of a healthy diet and a mineral necessary for life. The National Osteoporosis Foundation says, "Calcium plays an important role in building stronger, denser bones early in life and keeping bones strong and healthy later in life." Approximately 99% of the body's calcium is stored in the bones and teeth.[33] The mean value of calcium of l litre, 5 litres and 10 litres of SAB were found to be 0.280 ± 0.002 mg/ml, 0.284 ± 0.002 mg/ml and 0.286 ± 0.002 mg/ml respectively.

Estimation of Potassium
Potassium ions are necessary for the function of all living cells. Potassium ion shifts across nerve cell membranes are necessary for normal nerve transmission. Potassium depletion or excess can result in numerous abnormalities, including an abnormal heart rhythm and various electrocardiographic abnormalities.[33] The mean value of potassium of l litre, 5 litres and 10 litres of SAB were found to be 8.817 ± 0.030 mg/ml, 8.821 ± 0.052 mg/ml and 8.817 ± 0.030 mg/ml respectively.

Estimation of Phosphorus
Phosphorus is essential for life. Phosphates (compounds containing the phosphate ion) are a component of DNA, RNA, ATP and also the phospholipids, which form all cell membranes. Phosphorus is not found free in nature, but it is widely distributed in many minerals, mainly phosphates.[33] The mean value of phosphorus of l litre, 5 litres and 10 litres of SAB were found to be 0.295 ± 0.003 mg/ml, 0.296 ± 0.004 mg/ml and 0.296 ± 0.003 mg/ml respectively.

Thin Layer Chromatography (TLC)

It is one of the important parameters used for detecting the adulteration for evaluating the quality of drugs. If the drug is adulterated there might be appearance of the other compounds present in adulterant, in turn may increase the number of spots. On the other hand, the exhausted or deteriorated drugs may lose the component and the number of spots appeared might be less.[34] Five same spots were found in the sample SAB in all three batches and their Rf values were found to be 0.240, 0.413, 0.653, and 0.880 and the Colors of spots were light yellow and dark yellow respectively.

CONCLUSION

The results obtained for the various Physico-chemical tests of lab samples of SAB may be taken as standard values for future reference.

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