



Qualities and Purification Methods of Potable Water Described In *Unani Literature*

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ABSTRACT

Historical evidences prove that the success and failure of civilization depends upon its distance from the water resources. Those which lies near the rivers and sea cost flourishes well. Examples are Mesopotamian civilization (Euphrates & Nile river), Indian valley civilization (river Ganga) etc. Right from the human evolution better say evolution of life, water is the primary and vital need for the existence of life. As the civilization advances, the thrust to get the pure water become more vigorous. Water is necessary for many house hold purposes like agriculture, food production, drinking, washing and preparing many household items and many more. We use streams, rivers, ponds as well as ground water reservoirs as source of water. But these sources aren't always clean. Since ancient times, the need of pure water resulted in the development of water purification methods. Initially they didn't know the microbes, but the visual impurities. So mainly they used to purify the water from visual pollutants. Various plants like *Amla* and *Khus* etc., were used to purify the water. Here in this paper authors describe the different methods of purification of water mentioned in ancient unani literature in addition with methods to neutralize the ill effect of contaminated water if consumed.

Keywords: Unani System of Medicine; Water Purification; Hard water; Churning.

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INTRODUCTION

Much of ill health which effects humanity, especially in the developing countries can be traced to lack of safe and wholesome water supply. There can be no state of positive health and well being without of safe water. Water is not only a vital environmental factor to all forms of life, but it also a great role to play in socio-economic development of human population. The global importance of safe drinking water can be understand by that; In 1980, the United Nations General Assembly launched the International Drinking Water Supply and Sanitation Decade, 1981-1990- the aim being to provide all people with adequate supplies of safe water and sanitation by 1990. In 1981, the 34th World Health Assembly in a resolution emphasized that the safe drinking water is a basic element of “primary health care” which is the key to the attainment of “Health for all by the year 2000 AD.”¹

Our ancestors reach were only up to the physical appearance of the water. The visual pollutants, unpleasant taste, unwanted colouring agents and intolerable smell are the main parameters in ancient times, which were identified and washed away from the water resources. They were known and restricted to limited and natural process of water purification. As the science advances we expose to the various techniques and procedure. Large range of various new chemical compounds and instruments are available these days to purify the water not only from the physical impurities, also from the microscopic pollutants and impurities as well. Apart from all these above advancement, the old methods described by *Unani* scholars are still working and proved beneficial both at individual/small scale and community level/large scale

DESCRIPTION OF WATER IN UNANI LITERATURE^{2,3,4,5,6,7,8,9}

It should be known that water is one of the elements, which is distinguished from the other elements by the fact that it is a part of all foods and drinks, and though it does not nourish, it carries food (into the body) and rectifies its consistency. Water is not nutritious only because a nutritious thing is that which is potentially blood and has the remote ability of becoming a part of an organ of human body. But water is a substance which helps to liquefy food and carries it into the vessels and the channels. The help thus rendered by water in completing the process of nutrition is indispensable.

Best Source of Water^{2,3,4,5, 6,7,8,9}

Water is of different kinds, not because of its aquosity but purely watery substance, and because of what is mixed with it and the conditions which dominate it. The best water is that of springs not all springs but springs on pure earth which is not dominated by any condition or any

extraneous elements or spring which are on rocky ground and thus they do not putrefy as easily as those on pure earth. But a spring situated on pure earth is better than the one on rocky ground. But all springs on pure soil are not so. Only those springs which, in addition to being located on pure earth, are better. Again, the simple running of springs is not enough, they must be exposed to the sun and winds, and for this is what imparts purity to the springs. As for stagnant water, it becomes impure if it is exposed, but is free of impurity if it is deep and covered.

Rain water is one of the best waters, especially during summer and falling from thundering clouds. Rain from clouds accompanied by stormy wind produces turbid water because it comes from turbid vapours and clouds. Rain from these clouds is usually adulterated and impure. Rain water readily undergoes putrefaction although it might be the best of its kind. This is because it is so thin that obnoxious matter from earth and atmosphere is quick to act upon it, and its putrefaction becomes a cause for the putrefaction of humours. There is a school that attributes this putrefaction to the formation of rain waters from the vapors which rise up out of different moistures. If this were so, rain water would have been unhealthy and uncommandable. But it is not so. The reason lies in the water being excessively rarefied. Indeed, when a substance is rarefied, it is (easily) affected. If rain water is promptly boiled its tendency to putrefaction is lessened.

Well water and canal water are worse in comparison to the spring water. Because it is stagnant, remaining in contact with earthy matters for long period, and consequently cannot avoid being putrefied to some extent. Water from well and canal is drawn and moved by external force, not by its own power which enables it to flow and come out, but by some invention or device which takes it through nearby channels. As the flowing of well water is continuous, because of drainage, it is in perpetual motion, and is not stationary for long nor does it linger at its source. On the other hand, marshy water stays in the stationary pores of the earth for a long time and it moves and comes out slowly. This too happens not by its own power to come out, but from its huge quantity. Besides, such water is found only in spoiled, putrid earth.

Characteristics of Wholesome Water^{2,3,4,5, 6,7,8,9}

It should be known that water which runs on earth is better than that which runs over stones. It is because the earth cleanness water and absorbs the extraneous matter in it, making it pure, whereas stone does not do so. But the earth on which it flows must be pure and not muddy and salty. If incidentally this water is deep, flows rapidly and is so abundant as to dissolve what is mixed with it, and the direction of its flow is towards the sun, i.e., it flows towards the east, especially towards the summer east, then it is excellent, particularly when it is very far from its

source. The next best water is that which runs towards the north, whereas the water which runs westwards or southwards is bad, especially when the southerly winds are blowing at that time. Water which comes down from high regions and has all the (aforementioned) qualities is better. Water having (the aforementioned) qualities is fresh and is considered to be sweet.

- It is cold in winter and warm in summer.
- It has no taste or odour
- It quickly passes down the epigastria.
- Cooking with it is easy.

Estimation of Quality of Water^{2,3,5,7,9}

It should be noted that one of the successful methods for knowing the quality of water is by its weight. For, in most cases, light water is better. The weight may be ascertained by a measure or by taking two pieces of linen or cotton wool of equal weight and soaking them into two different kinds of water. Then they are thoroughly dried and weighed. The water of the lighter cotton wool is better. Hard water is purified by distillation and filtration. If this is not possible, it should be boiled. It is because boil water, as the learned have said, produces less flatulence and passes down easily. Some ignorant physicians think that when water is boiled, its attenuated part is evaporated and the dense part is left behind, and thus there is no use of boiling because water becomes harder.

It should be known that water in its very sense of aquosity is homogenous in rarefaction and density because it is simple, not compound. But water becomes dense either because of the action of intense cold upon it, or because of the earthy particles mixing thoroughly into it. These earthy particles, being extremely minute, fail to be separated from water and settle down in it. Their quantity is not such as to break the continuity of water and enable them to settle down in it. Thus they are bound to remain admixed with water.

Hard Water^{2,3}

Hard water generally has extra amounts of minerals, like salts of carbonates, iron, zinc, copper, iodine and fluorine etc. Because of this extra amount of minerals, the balance of composition of wholesome water get disturbed and the water lost their natural property due to which it is to be used for drinking purpose. Apart from various health hazards it causes loss of wealth too-because more detergent is needed to wash the clothes in hard water in comparison to normal water. In ancient era, peoples were aware of this property of water and its health hazards; at that time they were using the following technique to identify the above quality of water.

Test for Hardness of Water^{2,3}

Take a small amount of cotton and weight it first, then dip it into the water, again weight it when it becomes dry. If there is increase of weight in later one; it shows the water is hard. Because solid contents of water get trap in the cotton which results in the increase of weight. Degree of hardness increases with the increase of weight of the cotton in later case. In case of normal water in both the cases weight remain similar. They used to apply this technique to save the population from the various hazardous effects of hard water.

BENEFITS AND ILL EFFECT OF DIFFERENT TYPES OF WATER^{2,3,4,5, 6,7,9}

All water which has minerals substances or the lime and is infested with leeches is bad. But certain kinds of such water are beneficial. Water containing iron is advantageous as it strengthens the viscera, prevents sprue and stimulates appetite and carnal desire. We shall describe the qualities of such water just now. When ice and snow are pure, and are not adulterated, it is equally good whether they are melted into water, or water is cooled by them externally, or they are added to water. Water obtained ion these ways does not differ greatly. But this kind of water is harder than all other kinds, and is thus injurious to one suffering from neuralgia. When it is boiled it becomes good. When ice is made of dirty water or snow has acquired impurity on feeling to the ground then it is better to cool water without allowing ice or snow to mix with it. Cold water in moderate quantity is suitable for healthy persons. It is however, injurious to the nerves and is harmful for persons having swelling in viscera. It stimulates the appetite and strengthens the stomach.

Hot water impairs digestion, and keeps the food floating. It does not appear thirst instantly. Sometimes it causes dropsy and hectic fever and emaciation of the body. If the water is tepid it induces nausea. If it is hotter and is taken on empty stomach, it often cleanses the stomach and loosens the bowels. But it is excess is bad. It weakens the faculty of stomach. Every hot water sometimes dissolves the colic obstruction and breaks gases in spleen. Persons for whom artificial hot water is beneficial are those suffering from epilepsy, melancholia, cold headache, ophthalmic, and those who have pustules in pharynx and gums and swelling behind the ears and those suffering from different kinds of catarrh and having ulcer in diaphragm and dissolution of continuity in the region of thorax. It is emmenagogue, diuretic and analgesic.

Salt water causes emaciation and dryness. By virtue of its abstergence/abstinence it first induces diarrhoea and later produces constipation by its desiccating nature. It corrupts the blood and thus causes itch and scabies. Turbid water gives rise to calculi and emboli. So a diuretic should be taken afterwards. Nevertheless, a patients of abdominal affections is often benefited by it and by all (kinds) of dense and had water because it is stays in the stomach and passes down slowly. The

antidote of turbid water is fat and sweets. Water containing ammonia moves the bowels whether it is taken as a drink or is used for sitz-bath or as enema. Alum water helps menstrual discharge, haemoptysis and bleeding piles. But it is strongly inductive of fever in the bodies predisposed to it. Ferruginous water resolves splenitis and is useful to sexual power. Water containing copper is good for dyscrasis. When various kind of water, good and bad, is commingled, the strongest of them has the dominate effect.

Rain water is injurious to chest and voice. Water which passes through lead is the worst as it acquires certain property from the lead, and thus often produce ulcers of the intestines. Marshy water is worse than the well water. Water from hail and snow are thick. Marshy and stagnant water especially when exposed is unhealthy and hard. Such water becomes cold in winter because of snow and produces *phlegm* while during summer it is hot because of the sun and putrefaction and hence produces *bile*. Since water being hard and admixed with earthy particles, with its attenuated particles having been dispersed, the persons who drink it develops diseases of spleen. Their abdominal wall becomes thin, their viscera becomes stiff, their arms and legs, shoulders girdles and neck waste away, appetite and thrust become excessive, their stomach are obstructed, and emesis is difficult. Sometimes they suffer from dropsy as a result of retention of fluids in them. Sometimes they suffer from pneumonia, lenteric diarrhoea and splenitis. Their legs become lean, liver become weak. And nutrition is impaired due to splenitis. Insanity, piles, varices, pneumonia and oedema occurs among them, especially among women. In women, both conception and parturition is difficult. Their off-springs are flabby. They often suffer from pseudocyesis. Their children suffer from hydrocele and grown-ups from varices and ulcers of legs. Their ulcers do not heal easily and theirs appetite is increased. They hardly suffer from diarrhoea, but, if they do it causes pain and ulcer in the viscera. Quartan fever is frequent among them, and the old people often suffer from burning fevers owing to the dryness of their faces and constipation. All stagnant water, from whatever sources, is unfavourable to stomach. Water taken in a pit from springs has almost the same rule as the stagnant water has. But it is superior to the stagnant water in the sense that its stagnancy in one place is not long, and as long as it does not flow, there is necessarily some heaviness in it. Stagnant water often causes constipation and quickly becomes hot inside the stomach. Hence it does not suit persons having fevers and those in whom bile is dominating. It is more suitable for those needing constipation and maturation.

ANCIENT METHODS OF WATER PURIFICATION

There was following methods were in vogue among ancient people for the purification of contaminated water.

Storage^{1,2,3,7,9}

This is natural purification process. Firstly water is drawn out from source and impounded in natural or artificial reservoirs. Storage provides a reserve of water from which further pollution is excluded. As a result of storage, a very considerable amount of purifications takes place. It is done by mean to achieve preparation and sedimentation. Storage especially in Ghada (clay pots) should be done. Storage tank must be open. It may help to purify the water in following ways

- During stay period settlement of heavy /colloidal particles by their gravity.
- Bacteria present in the water is generally aerobic, they oxidize organic or an ammoniac substances present in water.
- Bacteria sacrifice their life due to loss of nutrition due to oxidizing process and also due to direct exposure to sun rays.

This is the oldest method, but their exact mechanism was not so clear at that time. This is the cheapest process, so can be applied at large scale and even weaker section of people can manage it as easily as it is very cost effective.

Filtration^{1,2,3,7,9}

It is the second stage in the purification of water. Filtration by cloths was the popular methods to exclude out the earthy and other micro pollutants from the water. Clothes having different pore sizes were in use to filter the water. This method was very cheap, easy and popular among weaker section of community

Boiling^{1,2,3,7,9}

It is the satisfactory method of purifying for household purposes; still in use popularly and effectively. To be effective, the water must be brought to a “rolling boil” for 10 to 15 minutes. Boiling makes water thin and removes temporary hardness (produced by cold) by driving off carbon dioxide and precipitating the calcium carbonate; the taste of water is altered, but this is harmless. Thus the particles of water become well rarefied till it becomes thin in consistency. Thus it is possible for the heavy earthy particles mixed in water to be separated from it. They sink down in water and are thus separated from it in the form of sediment. There remains only water which is nearer to the simple water. Distilled water is different from it. It is because when water is free from admixture, its particle is homogenous in rarefaction. Hence distilled water is not much superior to the rest of the boiled water. Thus boiling rarefies water by removing the hardness produced by cold and by causing the admixed matter settle down. The proof of this statement is that if you let hard water stand for a very long time, the sediment that settles down is not considerable. But when you boil it, abundant sediment settles down soon and water becomes

light in weight and clear. Some people have praised the 'Nile' water very highly. They have summed up its virtues in four ways: Remoteness of its sources; cleanness of its course; its south north direction which makes its water rarefied; its depth, but this is common to other rivers also.

Vessels Method^{2,3}

If you purify hard water daily by transferring it from one vessel to other, there will be fresh sediment every day. The sediment does not settle down unless (the water) is allowed to stand in a vessel for a longer time. Even then, it does not become thoroughly clear. The reason is that the admixed earthy particles easily settle down in water that is thin not hard, and not viscous and oily. But they do not so easily settle down through dense substances. It was considered as very sophisticated but time taking methods to purify the water at ancient time.

Churning^{2,3}

After boiling, churning is another method of purification. Water is made to move about violently. Due to this heavy impurities and pollutants are settled down and leaving pure water.

Percolation^{2,3}

This is the best measure to distil the water. This may be done by making a wick from twisted wool. One end of this wick is placed in a vessels filled with water and the other end is placed in an empty vessel. Then water passes from the one to the other vessel drop by drop. This is a good way of clarifying water, especially when this process is repeated several times.

PREVENTIVE ASPECT TO COUNTER THE HAZARDS OF IMPURE WATER^{2,3,4,5,6,7,9}

Exposure to diversity of drinking water causes various illnesses than foods. Hence it is necessary to be careful in this respect and take precautions against the injurious effect of water. Water may be improved or some other interesting measures for countering the impurity/toxicity of the contaminated/polluted water before it used and even after it was consumed.

- Filtering it repeatedly through porous Earthenware.
- Boiling purifies water and separates it from the impurities which are admixed with the intrinsic substance of water in the manner already described.
- Distil the water by percolation.
- Similarly bitter and impure water may be improved by adding to it pure clay and a few hanks of wool, while it is boiling. The water squeezed out of the wool, would be better than the one purified by means of the above *wick* method.
- Sometimes water is purified by mixing it with pyre clay which has been burnt in the sun and thus has no harmful contents. The by means of filtration its impurity is removed.

- Harmfulness of water is can be removed by taking wine with it provided the harmfulness is the result of the lack of diffusibility. When water is in a little quantity, it should be taken with vinegar, especially in summer because then more water is not needed (due to its quenching property).
- Salty water should be taken with vinegar or oxymel. Moreover crab, myrtle berry and azarole must be added to it.
- If one is forced to take rain water which is susceptible to putrefaction, some sour thing should be taken to prevent its harmful effects.
- After drinking aluminous and acrid water laxative should be used. Wine is useful after taking such water.
- After drinking bitter water sweet and oily things should be used. Sometimes rose syrup is also mixed with such water.
- Using water of gram seeds before drinking bitter water or before water of the similar quality, removes its harmfulness. Oral use of gram-seeds also has the same effect.
- Warm food should not be taken before drinking stagnant and marshy water having also putrefaction. After such water some astringent cold fruits and vegetables such as quince and apple should be taken.
- Garlic should be taken after drinking heavy turbid waters.
- Among the things which will purify such waters is alum of Yemen.
- And among the things which remove the impurities of different waters is onion, because it is antidote for this purpose, especially when it is used with vinegar. Garlic too has the same property.
- And among cold things lettuce has a similar effect.
- A good regimen for a person encountering different waters is to carry some water from his home town. He should mix it with the water available at the next halt and in this way continue repeating the process of mixing some water from the previous halt with that of the next one until the destination is reached. Similarly this is also useful if he carries some clay from his home town. He should mix this clay with the water which he happens to encounter and shake it well and then leave it until the water becomes clear. It is also necessary to take water after passing it through a strainer so that one might not swallow leeches unknowingly or other minute foreign particles of obnoxious nature admixed with water. It is also a good regimen to carry a sour rob (rub) with oneself and mix it with various waters. It is a good regimen.

Material And Methods

The literature and claims in support of this article has been taken mainly from the ancient Unani literature.

CONCLUSION

Ancient civilization flourished and thrived near the water source. Water was necessary for survival as it was used for drinking purpose and agricultural operations. Our ancestors were much concerned about quantity rather than the quality of water source; they were mostly concerning about physical appearance, taste and odour. Slowly humans started realizing the importance of pure and drinking water. It takes long path, several centuries, various inventions and a never ending quest to reach up to this position where we have a list of sophisticated methods and instruments for water purification, which purify the water even from the microbes very rapidly. But the ancient methods of water purification described in this article, which are still in use especially in weaker section of community, can easily be adopted as such or with slight modification for water purification at small as well as community level.

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