

A Review of concepts of Acid and Base in Ancient Ayurveda

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Abstract:

Medicine and chemistry have evolved together over the centuries. Observations and experiments done by medical practitioners created the base for chemistry as a science. Modern chemistry has evolved so far that now medicine is the biggest beneficiary of applications of chemistry. Ayurveda being the most ancient medical practice, has a definite contribution in the evolution of chemistry. Knowledge of Acid and Base is the most basic concept in chemistry and has a variety of applications in day today life as well. Hence literature study of acid and base concept was done with the help of ancient and most popular treatises of Ayurveda. Study shows definite knowledge of acid and base concept and neutralisation reaction in Ancient Ayurveda.

Introduction:

Chemistry is a branch of science which studies the properties and behavior of matter. It is related to composition, structure, properties, behavior and the changes any compound undergoes during a reaction with other substances[1]. Chemistry especially Biochemistry is sometimes called the central science because it provides a foundation for understanding both basic and applied scientific disciplines at fundamental levels.[2]

Medicine is the biggest beneficiary of the application of chemical sciences. Biochemistry and medicinal chemistry are two branches of chemistry which are directly related to medical science. [3]

Biochemistry provides important insights and practical applications in medicine. It provides tools for research in medical science.[4] Medicinal chemistry is a discipline at the intersection of chemistry & pharmacology that

involves the identification, synthesis and development of new chemical entities that are suitable for medical or pharmaceutical use.[5]

Medicine and chemistry have evolved together over the years. In ancient times chemistry was known to evolve as the Handmaid of medicine. Many now known principles of chemistry found their application in ancient medical practices before they took the form of principles.[6]

Ancient India has played an important role in the development of many major branches of human knowledge including mathematics, medicine, surgery, physics, astronomy, chemistry etc. Ayurveda being an oldest form of medicine, one can definitely find applications of principles of chemistry. [7]

Acids and Bases are important concepts of chemistry and have a wide variety of applications even in day today life. Even in ancient times Acids and bases were used for their wide applications. Hence to study the application and concepts regarding Acids and Bases in ancient Ayurveda treatise, literary review was done.

Classification of substances based on Taste:

Ayurveda classifies food, medicines and biological substances as per their tastes. They are divided into 6 tastes- Madhur (sweet), amla (sour), lavan (salty), tikta (bitter), Katu (spicy) and Kashaya (astringent). But at many places One more taste is maintained, that is Kshar. Classical Ayurvedic texts mention, Kshar taste comes under lavan meaning salty or combination of lavan and katu (salty and spicy). Though some scholars consider it as the 7th taste. [8]

Sour taste and acids:

Sour taste is sometimes called acid taste, as acids give sour taste to food. In Ayurveda as well, substances given as examples of Amla taste contain various organic acids like ascorbic acid, citric acid, oxalic acid.[9] There are some examples like silver which are not actually sour in taste but are included under sour taste. It is considered that though actual sour taste is not present, these substances have effects similar to Amla substances.[10] It will be interesting to see whether the given effects of sour taste in the body are due to their acidic nature.

Kshar concept:

Kshar can be called alkali as both are prepared by extracting salts obtained from the ashes of plants.[11][12] Also kshar includes things like baking soda which are known alkaline substances. In chemistry alkaline substances are called bitter in taste. But Ayurveda says it has a peculiar taste which can be considered as combinations of Lavan (salty) & katu (spicy) tastes. [8] Even practically baking soda tastes a little salty and has a peculiar taste, which is perceived as a combination of different tastes. We can say that like acids Ayurveda has differentiated alkaline substances based on their taste only. It also gives the functions of Kshar group which are corrosive in nature.[11]

Reaction between Amla and Kshar:

Ayurveda describes the reaction between amla and kshar substances. It says that when amla and kshar are mixed together, it becomes sweet immediately.[13] It is well known in modern chemistry that when acid and alkali react generally some salt is produced immediately. Here the reaction is correct considering the time period only, as acid and alkali react instantly. Then the question arises how sweet taste is produced? Answer is possibly reaction of present organic acids in the food or herbal material, which result in some carbohydrate or other organic compound which will dominate the taste after neutralization of amla and kshar taste. Also it can be assumed that here sweet taste is not a perceptible sweet taste but the substance showing functions like sweet taste.

In Charak Samhita, this reaction is given under the treatment of alcohol intoxication, where it says that when a patient is under alcohol intoxication, food he consumed becomes kshar like in the stomach hence he should be given some more alcohol in small quantity which is amla in nature and will neutralize kshar in stomach.[13]

Possible explanation can be as follows:

1. There are studies which suggest that when alcohol is consumed in large quantities instead of stimulating it inhibits the production of HCl in the stomach. Hence may turn basic due to consumed food and after mixing with bile. Hence after consumption of little alcohol it will neutralize the alkaline condition in the stomach.[14]

Uses in management and medicinal preparations:

1. Disease conditions developed due to excess Amla are managed by use of kshar and vice versa.[15]
2. Medicine considered having kshar properties like Coral, pearl, shells which are basically calcium carbonate, are purified with the help of amla medicines like lemon juice which contains citric acid. Amla rasa also balances excess kshar properties of these drugs hence adverse effects are avoided.[9]

Conclusion:

From the above discussion it can be said that Ayurvedic texts classify substances according to their tastes, they describe Acid as Amla taste and Alkali as a kshar taste. Acids are known for their sour taste all around the world but the word kshar is uniquely coined in Ayurvedic literature which describes now known alkaline substances. Ayurveda also describes the neutralization reaction between acid and alkali. It correctly describes the reaction time as instant. Other descriptions and applications described can be better explained with the help of modern chemistry.

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