

Review of *Saamanya Shodhan* (Common Purification) of Metals (*Dhatus*)

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Abstract

Metals are in use as medicines since centuries. These metals have to undergo various types of processing before it is used in medicines. One of these processes is *saamanya shodhana* (common method of purification where the thin (*kantakvedhi*) sheets of metals are subjected to heat and immediately quenched in different organic liquid media. This method is common to all the metals like gold, silver, copper, iron, tin, zinc, lead, and alloys like brass and bronze. In this process thin sheets of metals are heated and quenched in different liquid media for a specific number of times repeatedly. This introduces the organic properties in the metals as well as reduces its particle size and reduces/removes toxic properties from the metals. The effect of this is that microcracks develop in the metal, and the metal loses its physical properties of malleability and ductility. Toxic properties if any are reduced to the minimum (tolerable). In summation the shodhana causes reduction in particle size, introduction of organic elements, removes impurities and reduces toxicity of the metals. The different liquid media are variable in nature and components. Micro fractures are caused on the surface of the metals due to imbalance in the tension and compression forces. Depth and size of these fractures depend on the tensile stress, stress concentration, temperature, and surface energy according to fracture mechanics (Griffith's theory). Difference in nature of the fluids may cause addition to the stress. These factors cause particle size reduction of the metals.

Keywords

Saamanya Shodhana, Metals, Liquid Media, Stress, Fracture Mechanics



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INTRODUCTION

Dhatus (metals) are in use since the Vedic period. It is used in preparation of medicines since the 8th century. The *dhatus* are said to be anti-ageing, immunomodulator according to Ayurveda¹. The *dhatus* have special properties like luster, ductility malleability, etc. They are also good conductors of heat and electricity. The purified *dhatus* are then incinerated and their incinerated ash is used as medicines. The chemically pure *dhatus* have to undergo *saamanya shodhana* (common purification), *visheshashodhana* (Special purification) and *jarana* (for lead, tin and zinc only) and then *marana* to be used as medicines². The present article focuses on the *saamanya shodhana* of the *dhatus*.

OBJECTIVE

The chemically pure *dhatus* are subjected to various processes which change its nature to organic. The objective remains to study and analyze this process.

MATERIALS AND METHODS

During *saamanya shodhana* the *dhatus* have to be converted to thin sheets then, heated till red hot and quenched in the *TilaTaila* (Sesame seed oil), *Takra*(buttermilk made

from milk obtained from cow), *Gomutra* (Cows urine), *Kaanji* (Sour gruel) and *Kulattha kwatha* (Decoction prepared from *Dolichous biflorus*). This process is to be done in each liquid media for seven times. *Rasatarangini* (Classical text) mentions the order in a different way where *the kanji, takra, kulattha kwatha, gomutra, and tila taila* is taken in this order. *Rasatarangini* also mentions the *saamanya shodhana* where the metals are heated and quenched in the *kaadalimula swarasa* for seven times.

The result of this *shodhana* is that the *dhatus* lose their luster and become brittle. They also become bioassimible. They gain organic properties and become organometallic in nature. They further have to undergo *vishesh shodhana* where they further become organic in nature. Information about the different liquid media to be used is as follows-

Tila Taila (Sesame seed oil) -The *tila taila* is pungent, bitter, astringent and sweet in taste. Pungent in the post digestive effect and has hot potency. It alleviates all the three *doshas*, predominantly, *vata*. It possesses heavy and oily attributes. It has special potency as a hair tonic. The chief properties of *tila* oil are a hair tonic, galactogogue, an appetizer general tonic

digestant and it is used in skin diseases, wounds, anorexia and dental diseases³. The only essential nutrient having significant content in sesame oil is vitamin K. For fats, sesame oil is approximately equal in monounsaturated (oleic acid) and polyunsaturated (linoleic acid) fats, totalling together 80% of the fat content. The remaining oil content is primarily the saturated fat, palmitic acid and stearic acid. Sesame contains magnesium, copper, calcium, iron, zinc, and vitamin B6⁴.

Takra (buttermilk) -The term buttermilk refers to the liquid left over after extracting butter from churned yogurt prepared from cow's milk. It has a characteristically sour taste caused by lactic acid bacteria. The tartness of buttermilk is due to acid in the milk. The increased acidity is primarily due to lactic acid produced by lactic acid bacteria while fermenting lactose, the primary sugar in milk. The buttermilk tends to be less viscous. It has less fat compared to milk and is rich in calcium, potassium and vit B12⁵. Its taste is astringent, sour, and sweet while secondary taste is astringent. Its potency or energy is hot and post digestive effect is sweet while it possesses qualities of binding, light, dry in nature⁶.

Gomutra (cow's urine) -The biochemical estimation of cow urine has shown that it contains sodium, nitrogen, sulphur, Vitamin A, B, C, D, E, minerals, manganese, iron, silicon, chlorine, magnesium, citric, succinic, calcium salts, phosphate, lactose, carbonic acid, enzymes, creatinine and hormones. It contains most interestingly – hippuric acid, which removes toxins through urine, Aurum hydroxide, which acts as germicide and there by acts as immunomodulators in increasing immunity if body and build resistance against all minor to major infectious agents⁷. The taste is pungent followed by salty and bitter, its post digestion effect is bitter and has hot property⁸.

Kaanji (Sour gruel)-The kaanji is a fermentation of the different herbs like *Kullatha kwaath* (decoction of *Dolichus biflorus*), *Hingu* (*Ferula narthex*), *Maasha* (*Phaseolus mungo*), and rice (*Oryza sativa*), etc mentioned in *Rasayansaara*. This *kaanji* is also called as *Dhatu-shodhini* which is used for *saamanya shodhana* of the metals. *Kaanji* may be considered as an acidic fermentation in the absence of air. The acetic acid producing bacteria produces acetic acid which reduces the pH (increases the acidity) to the level that it prevents

growth of micro-organisms⁹. Its rasa is *kashaya*, *guna* is *laghu*, *snigdha*, *mridu* and *veerya* is *ushna* while *vipaka* is *madhura*¹⁰.

Kulattha Kwatha -It is a decoction of the *Dolichus biflorus*. The aqueous extracts of seeds contain carbohydrates, proteins, steroids, tannins and lactones¹¹. The decoction shows anti-inflammatory and analgesic properties¹².

All the liquid media (*drava dravyas*) are very different in their properties and contents. This certainly adds to the stress during heating and quenching.

Action during processing-The repeated heating causes increase in tension forces of the metal while sudden quenching in liquid media at room temperature causes compression of the metals. The metals are to be heated and quenched in every liquid media for seven times. This repeated process causes in equilibrium in the metal and results in the brittleness and loss of lustre of the respective metal. This also introduces organic properties in the metal. The process causes micro cracks on the surface of the metal. This may be the reason why thin sheets of the metals are used instead of wires/any other shape¹³.

DISCUSSION

The method of heating and rapid quenching in different liquid media brings about the changes in the molecular forces of the metals. This processing leads to physical changes in the metals like loss of lustre of the metals. According to the Griffiths theory of fracture mechanics the micro cracks develop due to subjection of stress on the material. The cracks further widen and increase in depth when there is change in energy levels. These principles perfectly describe the reduction in particle size of the metals upon subjection to the *saamanya shodhana*.

The nature of these liquid media plays a very important role in the same. Majority liquid media are acidic in nature which adds to the stress levels of pressure induced to create fracture on the surface of the metals. Most certainly the viscosity, specific gravity, the nature (acidic or basic) nature of these drugs may play a very important role in the faster reduction of these metals. The other factors affecting the fracture are surface energy, tensile stress, stress concentration and temperature. The liquid media not only provide organic content to the metals they reduce the particle size, decrease the toxicity, and make the metals more bioassimilable.

CONCLUSION

Saamanya shodhana of the metals is the most advanced science of the ancient era. The rationale of using the different liquid media, different in nature and contents most certainly display the wisdom and simplicity of science. The processes are vital and significant even today. Fracture mechanics (Griffith's theory) most certainly supports the processing of *saamanya shodhana*.

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