



## Effect of Shodhana & marana process on toxicity of metal (Vanga) (Tin)

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**Abstract:** There are certain things which are harmful for human being. Metallic Poisons are one of them. In many Ayurvedic preparations Vanga is widely used. But it is used after sodhana & marana process. As the Tin-toxicity affects the human life, it is necessary to test these old concepts against the current development and available parameters. Also it is important to test its safety and must be ensured if it is to be used in human being or not.

Acute Toxicity study of vanga is carried out by means of LD50 studies. LD50 study of three samples was carried out in IDRAL (Pune). Changes in toxicity of Vanga are observed in 3 stages.

**Key Words**-Shodhan ,maran ,toxicity, Vanga, LD50.

**Introduction :-** Today is the world of computer & internet. All this tremendous modern technology is the creation of human being. But there are certain things which are harmful to human being. Metallic poisons are some of them. Tin (Vanga) is one of them. Organo-tin compounds are used in making plastics cans for food packages, plastic pipes, paints. Humans can absorb tin bonds through –

- A) **Skin- Dermal exposure** is potentially important as a route of exposure around hazardous waste sites. Dermal exposure produces acute irritation with evidence for absorption and systemic symptoms such as anaemia, renal and hepato-cellular damage.
- B) Breathing Potentially, high **inhalation exposure** to tin and its compounds may occur in the work place or in agricultural uses of tin compound. Prolonged exposures (15 to 20 years) to dust and fumes can cause pneumoconiosis. This benign form of pneumoconiosis is known as STANNOSIS.
- C) **Food-** Tin toxicity documented over the last 200 years in humans has been commonly associated with foods consumed that were stored in tinned, unlacquered containers. The soft pliable properties of tin are exploited in many manufacturing and other situations. It is used as a resistant coating for mild steel to produce so called 'tin plate' widely used to produce containers, can cause pneumoconiosis. Canned food from lacquered cans contains less than 25 ppm of tin since the lacquer prevents the food from reacting with the tin. Food from unlacquered cans contains up to 100 ppm of tin since the reaction of the food with the can causes some of the tin to dissolve in the contents of the can. Thus due to food from unlacquered cans under long-term, low-pH conditions, and where levels of several hundred to several thousand mg/kg are ingested and produce mainly gastro-intestinal symptoms such as nausea, abdominal pain and vomiting, with excess tin being rapidly excreted. The uptake of tin bonds can cause acute effects as well as long-term effects. **Acute effects** : Eye and skin irritations, Headache, Stomachache, Dizziness. Severe sweating, Breathlessness, Urination problems. **Long-term effects** : Depression, Liver damage, Malfunctioning of immune systems, Chromosomal damage, Shortage of red blood cells, Brain damage (causing anger, sleeping disorders, forgetfulness and headaches). In Ayurveda also, it is stated that if impure vanga is consumed it produces many serious effects like nausea, vomiting & abdominal pain,, jwara, bhagandar, etc.

**Methodology : Study design**-Crude Vanga : 50 gm

Vanga for sodhan – 50 gm

Vanga for sodhana & marana process – 50 gm

**Toxicity studies** - LD50 study of 3 samples was carried out.

**Acute toxicity study:** Three samples were submitted for LD50 studies in Indian Drug Research Association & Lab. (IDRAL). The study was carried out in their laboratory.

**Trial Design-** According to the protocol submitted by Dr. Gaitonde to Pesticide toxicology committee, LD50 studies of above 3 samples were carried out.

Sample (A) – Vaṅga (before Śodhana)

Sample (B) – Vaṅga (after Śodhana) &

Sample (C) - Vaṅga bhasma (after mārana process)

And it was determined by using Miller & Tainters graphical method & LD50 results were noted & compared with each other. Parameters

Animals species	Albino Mice
Source	National Toxicological centre, Pune
Average Wt.	20 gms
No. of animals	50 for each test.
Samples	1) Crude sample 2) Vaṅga after Śodhana. 3) Vaṅga after Mārana.
Administration	Orally (One dose to each group)

### 3) Procedure –

- Overnight fasted Albino mice were selected in 5 groups with 10 mice in each group (50% male & 50% female) were allotted for study of each sample.
- All three samples were in dry powder form. 0.2gms of Gum-acacia was taken in the mortar. 1gm of powder was added and triturated. Then it was diluted to 10ml and suspension was prepared.
- These samples were administrated orally with the help of Tuberculin syringe (0.1 x 1 ml) with 14 No. needles, curved at 130o angle. The doses are given in increasing order i.e. 1 gm/kg, 1.5gms/kg, 2.25gms/kg, 3.375gms/kg, 5.06gms/kg.
- Animals were observed for death due to acute toxicity & comparative observations were tabulated.
- A graph of log doses against % mortality was plotted and LD50 was read as the dose that corresponds to 50%.
- Assessment of 3 samples was done by means of Acute toxicity Studies, Histopathological observations and Spectrophotometry.

#### Variables & definitions-

Review of tin toxicity: The uptake of tin may cause- Acute effects - Eye and skin irritations  
Stomachaches, Severe sweating, Urination problems.

#### Long-term effects :

- Liver damage, Malfunctioning of immune systems, Chromosomal damage, Shortage of red blood cells, Brain damage (causing sleeping disorders, and forgetfulness.)

#### ŚODHANA REVIEW.

In Āyurvedā, before use of metals for medicinal purpose process of Śodhana is done on that metal. This Śodhana saṅskar is speciality of Āyurvedā.

According to Āyurvedā, Śodhana means to purify. . Chemical purification is different from this medicinal purification. In chemical purification, there is only elimination of foreign matters. This process is carried out for Detoxification or Purification of metals. . In Aurvedic samhita's process of shodhan of vanga is described as,

द्रावयित्वा निशायुक्ते क्षिप्त्वा निर्गुण्डिकारसे ।  
विशुद्ध्यति त्रिवारेण खुरवङ्गं संशयः ॥  
(R.R.S.: 5/156)

#### REVIEW OF MĀRANA PROCESS:

Mārana process is also speciality of Āyurvedā. This process is particularly described for metals. It is carried out after Śodhana process. In these processes following aims are taken into consideration:

- Elimination of harmful matters.
- Modification of undesirable physical properties.
- The enhancement of therapeutic action, thereby potentizing the drug.

#### MĀRANA OF VAṅGA :

After Śodhana process, Māran of Vaga is done. There are many methods of Mārana described by different authors.

वङ्गं क्षर्पके कृत्वा चूर्त्यां संस्थापयेत् मूर्धाः।  
द्रवीभूते बुधैस्तस्मिन् चूर्णानि एतानि दापयेत् ॥  
प्रथमं रजनीचूर्णं द्वितीयं च यमानिका ।  
तृतीयं जीरकं चैव ततश्चिश्वात्वग्दमवम् ॥  
अश्वत्थवल्कलीत्थं च चूर्णं तत्र विनिःक्षिपेत् ।  
चालयेत् विरामं तत्तलीं हृदय्यां च क्षपरे ॥  
एवं विधानतो वंगं म्रियते नान्न संशयः।  
चूर्णानि मर्मीभूतानि क्षालयेद्धारिणा ततः ॥ (R.R.S. – 5/162)

Vaṅga is taken in an earthen pot and placed over fire. When it melts, the following powders are placed upon it, the whole thing is turned constantly by means of an iron ladle :-Curcuma longa, Trachyspermum ammami, Cuminum cyminum, Bark of Tamarindus indica & Bark of ficus religiosa, all of these are finely powdered. The whole thing is thus reduced to ashes. The ashes of the powders are then to be washed off by the means of water, leaving the white powder of Vaṅga deposited at the bottom..

**Observations--** No. of animals 50 for each test .

**1. Observations of toxicity studies** of three samples- For crude vanga LD50 in mice of 20gms is **15.84gms/kg** i.e.maximum non-lethal dose in man is **17.45 gms/kg**. 2. For vanga after sodhana LD50 in mice of 20gms is **89.12 gms/kg** i.e.maximum non-lethal dose in man is **26.18 gms/kg** 3. For vanga after sodhana and marana process.maximum non-lethal dose in man is **39.17 gms/kg**.

**2 Spectrophotometry** – Remains same of all three samples

**3.Histopathological observations- Liver** –a. No changes in control group

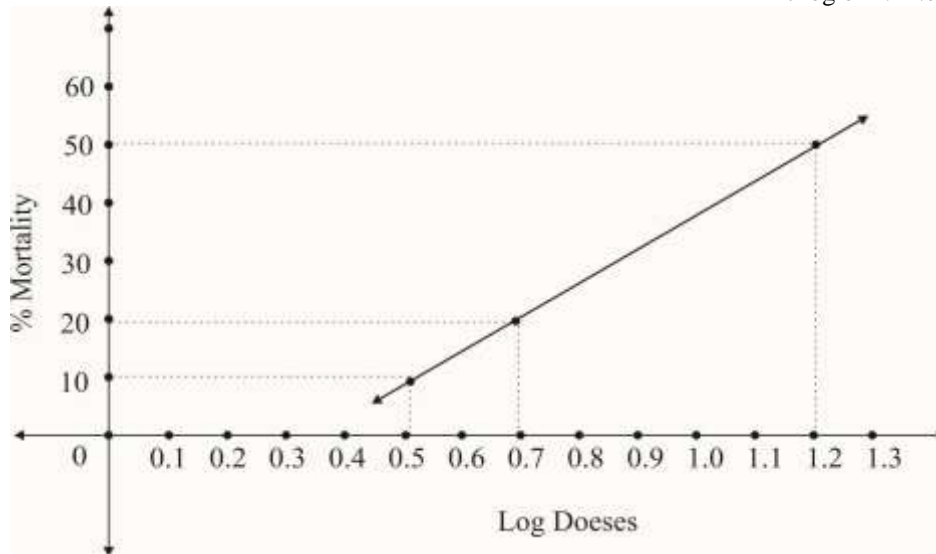
.b. In animals receiving crude vanga **Chronic inflammatory exudate** was seen.

In kideys no changes were observed.

**Graphical Representation**

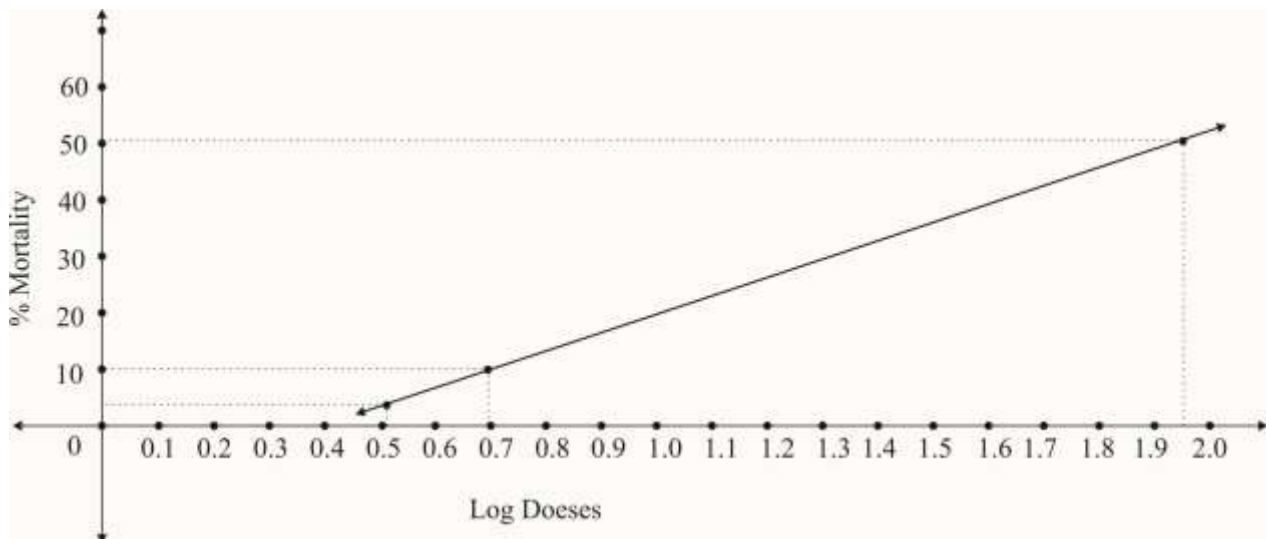
**LD<sub>50</sub> (Before Shodhana Process)**

Antilog of 1.2 i.e. LD<sub>50</sub> = 15.84 gms/kg



**LD<sub>50</sub> (After Shodhana Process)**

Antilog of 1.95 i.e. LD<sub>50</sub> = 89.12 gms/kg



**Result –Shodhana and marana processes decreases toxicity of Vanga.**

**Discussion & conclusion :**

1. These process are useful to reduce toxicity of vanga.

2. Modern technologies like TLC, Spectrophotometry were used.
3. Histopathological studies of relevant organs was carried out.

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