

## AN AYURVEDIC TOXICO-ANALYSIS OF THE POISON “BHALLATAKA” (*Semecarpus anacardium* Linn.)

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### ABSTRACT

*Bhallataka* is a well-known poisonous plant, mentioned as a *Phala Visha* (Fruit poison) by *Acharya Sushruta* and included under the *Upavisha Varga* in *Ayurveda*. According to the Modern toxicology, its Tarry oil contains Anacardic Acid containing Urushiol, which is the main cause for its local toxicity which is manifested as allergic dermatitis. However, the mechanism of its toxic action according to *Ayurveda* is not well established yet. The “Principle of *DravyaGuna*” (Ayurvedic Pharmacology) can be used for this purpose. Based on the *Guna* (Property), *Rasa* (Taste), *Veerya* (Potency), *Vipaaka* (Final transformation), and *Prabhaava* (Specific power) of *Bhallataka*, we can analyze the mechanism of its toxicity from the perspective of *Ayurveda*. Therefore, an attempt has been made in this article to present the toxico-analysis of *Bhallataka*, in order to find out the mechanism of its toxic action, purely based on the principles of *Ayurveda*.

**Keywords:** *Bhallataka*, Ayurvedic properties, Toxic action

### INTRODUCTION

*Ayurveda* is an ancient medical science of indigenous origin, which is being practiced since times immemorial. When we call it a science, it should be based on some sound scientific principles. Surely, *Ayurveda* has a strong scientific basis, as we find various Ayurvedic principles described in the Ayurvedic literatures. However, the foundation of these Ayurvedic principles is quite different than the modern scientific principles; because the tools and resources available at

that time were very unlike of those in today’s era. With their limited means to gain the knowledge, the ancient peers had developed these robust principles, which have stood up the test of time and have been proven effective even in the modern times.

One such important principle in *Ayurveda* is the “Principle of *DravyaGuna*” i.e. the principle of Ayurvedic Pharmacology. It is the principle which deals with properties and actions of drugs. Based on this

principle only, *Ayurveda* explains the actions of the drugs. According to *Ayurveda*, all *Dravya* (Substances – Either drugs or dietetic) in the universe have some medicinal properties and can be used as medicines in one form or other. There is no such substance which cannot be used as a drug.

As per this principle of Ayurvedic Pharmacology, *Karma* (Action) of any *Dravya* (Drug) depends upon the other 5 factors, which all reside within the *Dravya* (Drug) only. The action of drugs is exerted based on its *Guna* (Property), *Rasa* (Taste), *Veerya* (Potency), *Vipaaka* (Final transformation), and *Prabhaava* (Specific power). Usually some actions of a drug are exerted by its *Guna*, some by its *Rasa*, some by its *Veerya*, some by its *Vipaaka* and some by its *Prabhaava*, if any. Therefore, the pharmacological action of a drug is a combination of the actions collectively exhibited by all these factors.

The relative strength of all these factors decides the action of that drug, as the stronger factor prevails above all. Basically, the action of any drug is exhibited by its *Rasa* (Taste). But *Vipaaka* (Final transformation) suppresses this factor and expresses itself. However, *Veerya* (Potency) of a drug overpowers above both and it expresses itself more prominently. The cause-effect relationship between *Veerya* and *Karma* is so prominent that, the principal activity of any drug is dependent on its *Veerya* only. The last but a very special factor is *Prabhaava* (Specific power), which isn't observed in all the drugs, but where it exists, it stands above all the other factors.<sup>[1]</sup>

Another fundamental, yet imperative principle in *Ayurveda* is the "*PanchaMahabhuta Siddhanta*" (Principle of 5 basic elements). As per this principle, everything in the world is made up of 5 elements only. Therefore, all *Dravya* (Material objects) are composed of 5 Physico-chemical components i.e. *Pancha Mahabhutas* (*Akasha*, *Vaayu*, *Teja*, *Jala* and *Prithvi*).

The same proposition applies to *Dravya* (Drugs) as well. Hence, as a rule of thumb, every *Dravya* (Drug) contains these five basic Physico-chemical elements altogether. However, every *Dravya* (Drug) is unique and shows its distinctive *Karma* (Action). This is because; the composition of every drug is different with

respect to the proportions of *Mahabhutas*. Every drug prominently contains only one *Mahabhuta* and other four *Mahabhutas* are proportionately lesser in its composition. Therefore, it is specifically expressed as an *Aakashiya Dravya*, *Vaayaviya Dravya*, *Aagneya Dravya*, *Jaleeya Dravya* or *Paarthiva Dravya*; and its distinguished *Karma* (Actions) are also observed according to the particularity of Physico-chemical elements present in that *Dravya* (Drug).

As the *Bhautik* composition of any *Dravya* (Drug) cannot be perceived superficially, it needs a quick-witted perception to identify the proportion of these Physico-chemical elements. For this purpose, the *Guna* (Property) as well as *Rasa* (Taste) of a *Dravya* (Drug) reveal the permutations and combinations of *Pancha Mahabhutas* constituting that *Dravya*. Thus, we can infer the *Bhautik* (Physico-chemical) composition of any drug according to its *Guna* and *Rasa*. Even *Vipaaka* (Final transformation) of a *Dravya* have been categorized by *Acharya Sushruta* into 2 types – *Guru* (Heavy) and *Laghu* (Light). *Madhur Vipaaka* is *Guru Vipaaka*, having predominance of *Prithvi* and *Jala Mahabhuta*; while *Amla* and *Katu Vipaaka* are included in *Laghu Vipaaka*, showing dominance of other three *Mahabhutas*. Thus, even *Vipaaka* can be beneficial to reveal the *Bhautik* (Physico-chemical) composition of the drugs.

The *Karma* (Action) of a *Dravya* (Drug) can be seen on *Tridosha* (Three types of body humors), *Sapta Dhatu* (Seven types of Tissues) and *Trimala* (Three types of body wastes). A *Rasa* exerts its specific effect on the body humors (*Dosha*) and the combination of *Rasa* present in a *Dravya* decides its action of aggravation or pacification of the body humors. Also, every *Rasa* demonstrates its specific actions in the body according to its inherent properties, which contribute to the overall action of that *Dravya* (Drug). Even the three types of *Vipaaka* emerged after digestion; also exert their specific effects on the *Dosha*, *Dhatu* and *Mala*. The *Ushna* (Hot) or *Sheeta* (Cold) *Veerya* (Potency) of the drug grossly exemplifies the paramount actions of the drug. *Prabhaava* (Specific power) of a drug can empower it to perform some special action indifferent to the other drugs. Also, *Guna* (Properties)

of the drug influence the pharmacodynamics of the drug and are remarkably responsible for the action of that drug. Therefore, the *Karma* (Action) of a *Dravya* (Drug) is a combined action of all the *Rasa*, *Veerya*, *Vipaaka*, *Prabhaava* and *Guna* on the *Dosha*, *Dhatu* and *Mala* in the body.

**Aim:** To analyze the mechanism of Toxic Action of *Bhallataka* according to the Ayurvedic Principles

### Materials & Methods:

- 1) First, the "Principle of *DravyaGuna*" i.e. the principle of Ayurvedic Pharmacology has been thoroughly studied from the Literature of *Dravya Guna Vigyana*.
- 2) The mechanism of Pharmacological Action of any Herbal Drug has been recognized from the viewpoint of Ayurveda and the applicability of the same principles in order to find out the mechanism of Toxic Action of any Poisonous Drug has been identified.
- 3) The Ayurvedic properties of *Bhallataka Phala* have been identified from the literature and the probable mode of action during the toxic effect of *Bhallataka* has been analyzed, based on the *Bhautik* Composition, *Dosha Prabhaava* (Effect on *Dosha*) and *Karma* (Action) of these inherent properties.
- 4) Further, the prominent *Mahabhuta* and *Prabhaava* (Effect) on *Dosha* (Body Humors) observed during the Toxic Action of *Bhallataka* have been assessed.
- 5) The results of this "Ayurvedic Toxicology Analysis of *Bhallataka Phala*" have been drawn after this complete assessment based on the Principle of *DravyaGuna* only.

### Ayurvedic Toxicology Analysis of *Bhallataka Phala* (Marking Nut):

*Bhallataka* has been mentioned under the *Upavisha Varga*<sup>[2]</sup> in many Ayurvedic classical texts like *Rasa Tarangini* and *Dhanvantari Nighantu*. It is classified as *Sthavara Visha* and *Vanspatija Visha* in *Ayurveda* and recognized as an Irritant - Organic - Vegetable poison in the modern science. It has also been includ-

ed under poisonous medicinal plants in Drugs and Cosmetics Act, 1940.<sup>[3]</sup>

The toxic effects of *Bhallataka* have been described in both *Ayurveda* and Modern toxicology. Even *Acharya Charaka* has described that contact with fruit or flower of *Bhallataka* causes *Agantuja Shotha* (Exogenous swelling) in the body.<sup>[4]</sup> That's why; the synonyms of *Bhallataka* like *Shophahetu*, *Shophakrita*, *Vranakrita* have been mentioned which mean it causes inflammation and ulceration. *Charaka Samhita* has mentioned properties of *Bhallataka* fruits that they are *Teekshna* (Sharp), *Paki* (Corrosive), and *Agnisama* (like fire).<sup>[5]</sup> If juice of *Bhallataka* (even in traces) meets body, it produces severe *Daha* (Burning sensation), *Vrana* (Ulcer) and *Sphota* (Blisters). When it meets face, it produces acute burning sensation with *Shotha* (Edema) and *Visarpa*.<sup>[6]</sup>

According to Modern toxicology, it is an irritant poison. Tarry oil present in the pericarp of the fruit of *Bhallataka* contains Anacardic Acid that contains Urushiol, which is the main cause for blisters formation on contact and causes allergic dermatitis.<sup>[7]</sup> When juice is applied to the skin, it causes irritation and painful blisters containing acrid serum, which causes an eczematous eruption on any part of the skin with which it comes into contact. The lesion is painful, and it resembles a bruise with marginal small blisters. The lesions itch and may later ulcerate and slough. Local manifestations are more common than systemic manifestations. Internally administered, the juice is much less irritant.<sup>[8]</sup>

In order to analyze the mechanism of toxicity of *Bhallataka* which causes appearance of the above said symptoms, it is important to study the properties of *Bhallataka Phala* as per *Ayurveda*, as it is a *Phala Visha* (Poisonous fruit) according to *Acharya Sushruta*.

### Ayurvedic properties of *Bhallataka Phala* (True fruit/Nut of *Semecarpus anacardium* Linn.) according to *Bhavaprakash Nighantu*<sup>[9]</sup> –

- *Guna* - *Laghu* (Light), *Snigdha* (Unctuous), *Teekshna* (Sharp & Piercing)
- *Rasa* - *Madhura* (Sweet), *Kashaya* (Astringent)

- *Veerya* - *Ushna* (Hot)
- *Vipaaka* - *Madhura* (Sweet) in post-digestive effect
- *Prabhaava* - -----

**Mechanism of Toxic Action of Bhallataka<sup>[10]</sup>** – Just like the Pharmacological action of any medicine, the Toxic action of all the poisons also depends upon their *Guna*, *Rasa*, *Veerya*, *Vipaaka* and *Prabhaava*. When we study the common characteristics of *Bhallataka*, we find that it possesses the properties like *Laghu* (Lightness) & *Teekshna* (Sharp & Piercing) and its *Veerya* is *Ushna* (Hot). All these properties are like those of a poison.

According to *Acharya Sushruta*, *Laghu Guna* keeps the poison moving in the body from one place to another easily, thereby, making it *Asthira* (Unstable). Due to this, the therapeutic measures cannot catch up with the poison. As the poison keeps on escaping, the therapies don't produce desired effects and the poisoning becomes *Dushchikitsya* (Incurable). Even *Acharya Charaka* admits that, it is very difficult to find any therapeutic measures to treat the poison due to its *Laghu Guna* only.

Due to *Teekshna Guna*, the poison causes injury to *Marmas* (Vital sensitive areas), which can cause death or severe disfigurement; because *Marmas* are the vital junction points in the body which carry the subtle energy (*Prana*) and an injury to these points can be life threatening.

Though *Bhallataka* has a *Snigdha Guna* (Unctuousness or Oiliness) as well, it is always accompanied and undeniably nullified by the *Teekshna Guna* (Sharp & Piercing Property). Therefore, the *Snigdha Guna* doesn't show its soothing property like the other *Sneha* (Ghee, Oil etc.) and the toxic action is prominently exhibited by this *Teekshna Guna* only. However, this *Snigdha Guna* of *Bhallataka* seems to demonstrate its effects when it is utilized as a medicine, as observed from its *Shukrala* (Aphrodisiac) action.

*Bhallataka Phala* has *Madhura* (Sweet) and *Kashaaya* (Astringent) *Rasa* (Tastes). According to *Acharya Charaka*, the taste of *Visha* (Poison) is *Anirdeshya Rasa* i.e. its taste cannot be described. Even *Acharya*

*Vagbhata* has accepted that the taste of *Visha* is *Avyakta Rasa* i.e. the taste can't be expressed. Therefore, it can be an argument whether *Rasa* plays any role in the toxic action of a poison, as the *Acharyas* haven't bothered about specific composition of *Rasa* of the *Visha*. Even we find some *Visha* like *Vatsanabha* having *Madhura Rasa*, while some other poisons have acrid tastes like *Katu Rasa* of *Dhattura* (*Dhatu* metal) or *Tikta Rasa* of *Ahiphena* (Opium). However, the poisons of all *Rasa* appear to be toxic and fatal. Therefore, *Rasa* seems to play no role in the toxicity of the poison. At least we can say this in the case of *Bhallataka Phala*; because the *Madhura* and *Kashaaya Rasa* of *Bhallataka* don't seem to be pacifying *Pitta Dosha* and don't depress the digestive fire as well, exactly opposite to the common rule. However, it plays a vital role in its pharmacological action, as evident from *Shukrala* (Aphrodisiac) *Karma* of *Madhura Rasa* and *Vrana Shodhana-Ropana Karma* of *Kashaaya Rasa*.

Some other *Nighantu Grantha* like *Dhanvantari Nighantu* and *Raj Nighantu* have attributed even *Katu* (Pungent) and *Tikta* (Bitter) *Rasa* to *Bhallataka*. The presence of these two *Rasa* seems more acceptable, as the *Bhautik* composition of these two *Rasa* viz. *Katu Rasa* (*Vaayu* + *Teja*) and *Tikta Rasa* (*Vaayu* + *Akasha*) matches exactly with the active properties of *Bhallataka* i.e. *Laghu Guna* (*Teja* + *Vaayu* + *Akasha*) and *Teekshna Guna* (*Teja*). Also, the *Guna* of *Katu Rasa* are *Laghu*, *Ushna*, *Teekshna*, which are prominently seen in the *Bhallataka*. Therefore, *Katu Rasa* seems to play an important role in the toxic action of *Bhallataka*. However, *Tikta Rasa* isn't *Ushna-Teekshna*; but still, it is *Laghu* and its *Vipaaka* is *Katu Vipaaka*. Therefore, it expresses its *Karma* like *Krimighna*, *Kushtha-Kandughna*, *Agnideepana-Pachana*, *Shoshana* and *Vranashodhana*; and seems to play a major role in the Pharmacological action of *Bhallataka*, while its role in the toxic action appears trivial.

*Ushna Veerya* (Hot potency) aggravates the *Pitta Dosha* & *Shonita (Rakta) Dhatu* in the body. *Ushna Veerya* specifically shows the tendency of *Pachana* (Digestion). Therefore, it improves the digestive fire

(Agni) in the body. However, the excessive *Ushna Veerya* of *Bhallataka* causes *Dhatu Pachana* i.e. burning, inflammation and corrosion of the body tissues due to aggravation of *Pitta and Rakta*, thereby damaging the tissues.

Even though *Bhallataka* has a *Madhura Vipaka* (Sweet post-digestive taste), it predominantly acts by its *Ushna Veerya* (Hot potency) only. *Vipaka* is the aftertaste developed post-digestively. However, the property of poison is *Apaaki* i.e. it is indigestible for the *Jatharagni* (Digestive fire). *Visha* also possesses properties like *Sukshma* (Fine), *Ashu* (Quick) and *Vyavayi* (Diffusible). Therefore, it quickly spreads in the whole body and there's no chance for its digestion by *Jatharagni*. This seems to be the reason that, *Madhura Vipaka* of *Bhallataka* doesn't show any effect in its toxic action. However, this *Vipaka* is

very effective in its pharmacological action, as observed from its *Shukrajanana Karma*.

*Kaiyadeva Nighantu* and a contemporary scholar *Vaidya Go. Aa. Phadke* have described *Katu Vipaka* of *Bhallataka*, as opposed to the traditional belief of it possessing *Madhura Vipaka*. Even this argument stands good if we ponder upon the prominence of *Katu, Tikta, Kashaya Rasa* and *Laghu, Ushna, Teekshna Guna* in *Bhallataka*. Therefore, in the context of toxic action of *Bhallataka*, the *Vipaka* can be *Katu* and for explaining its pharmacological action, the *Vipaka* may be considered as *Madhura*.

Based on the properties of *Bhallataka*, we can contemplate about *Panchabhautik* composition, *Dosha Prabhaava* and both Toxic action as well as Therapeutic action (*Karma*) of *Bhallataka Phala* as follows.

**Table 1:** *Bhautik* Composition, *Dosha Prabhaava* (Effect on *Dosha*) and *Karma* (Toxic Action) of *Bhallataka Phala* according to its Properties

Sr. No.	Properties of <i>Bhallataka Phala</i>	<i>Bhautik</i> Composition	<i>Dosha Prabhaava</i>	<i>Karma</i> (Toxic Action)
1	<i>Laghu Guna</i>	<i>Teja + Vaayu + Akasha</i>	<i>Vaatakara, Kaphaghna</i>	<i>Dushchikitsya</i>
2	<i>Snigdha Guna</i>	<i>Jala</i>	<i>Kaphakara, Vaata-Pittaghna</i>	<b>No role</b>
3	<i>Teekshna Guna</i>	<i>Teja</i>	<i>Pittakara, Vaata-Kaphaghna</i>	<i>Daaha-Paaka-Straavakara, Chhedana-Bhedana, Marmaghna</i>
4	<i>Madhura Rasa</i>	<i>Prithvi + Jala</i>	<i>Kaphakara, Vaata-Pittaghna</i>	<b>No role</b>
5	<i>Kashaaya Rasa</i>	<i>Prithvi + Vaayu</i>	<i>Vaatakara, Pitta-Kaphaghna</i>	<i>Laghu, Ruksha, Vishada, Vikashi</i>
6	<i>Katu Rasa</i>	<i>Vaayu + Teja</i>	<i>Vaata-Pittakara, Kaphaghna</i>	<i>Laghu, Ushna, Teekshna, Ruksha, Daaha-Straavakara, Chhedana-Bhedana</i>
7	<i>Tikta Rasa</i>	<i>Vaayu + Akash</i>	<i>Vaata-Pittakara, Kaphaghna</i>	<i>Laghu, Ruksha, Vishada, Katu Vipaka, Chhedana</i>
8	<i>Ushna Veerya</i>	<i>Teja</i>	<i>Pittakara, Vaata-Kaphaghna</i>	<i>Laghu, Daaha-Sweda-Trusha-Moorchchakara, Dhatu Pachana</i>
9	<i>Madhura Vipaka</i>	<i>Prithvi + Jala</i>	<i>Kaphakara, Vaataghna</i>	<b>No role</b>
10	<i>Katu Vipaka</i>	<i>Teja + Vaayu + Akasha</i>	<i>Vaatakara, Kaphaghna</i>	<i>Laghu, Ushna, Teekshna, Ruksha, Vishada, Daaha-Straavakara, Chhedana-Bhedana</i>

Based on these properties, their *Panchabhautik* composition & individual *Dosha Prabhaava*, we can statistically assess prominence of *Mahabhuta* in *Bhallataka*

and its conspicuous effects on body humors (*Dosha*). However, 7 properties which have role in toxic action have only been considered here for Toxicology analysis.

**Table 2:** Assessment of prominent *Mahabhuta* in Toxic action of *Bhallataka*

Sr. No.	Name of <i>Mahabhuta</i>	No. of properties indicating presence of specific <i>Mahabhuta</i> (Out of 7)	Percentage
1	<i>Aakash</i>	3	21.42 %
2	<i>Vaayu</i>	5	35.71 %
3	<i>Teja</i>	5	35.71 %
4	<i>Jala</i>	0	0 %
5	<i>Prithvi</i>	1	7.14 %

From the above assessment of *Mahabhuta*, it is very evident that only *Teja*, *Vaayu* and *Aakash Mahabhuta* are prominently responsible for toxic action of *Bhallataka*; while *Jala* and *Prithvi Mahabhuta* seem to be having their role in its pharmacological action only. Out of these three *Mahabhutas*, *Teja* and *Vaayu Mahabhuta* dominate the toxic action of *Bhallataka* due to their *Laghu*, *Ushna*, *Teekshna*, *Ruksha*, *Khara*, *Vi-*

*shada*, *Sukshma Guna* and therefore cause *Daaha-Paaka-Straava-Santaapa-Bhedana* and *Dhatu Pachana* as well. On the other hand, *Aakash Mahabhuta* seems to play a supportive role to aid in its *Laghu*, *Sukshma*, *Vishada Guna* and thereby increasing spread of the toxin due to *Aashukari Karma*, making it difficult to cure.

**Table 3:** Assessment of *Dosha Prabhaava* (Effect on *Dosha*) during Toxic action of *Bhallataka*

<i>Dosha</i>	<i>Prabhaava</i> (Effect) On a <i>Dosha</i>	No. of properties indicating specific effect on a <i>Dosha</i> (Out of 7)	Percentage
<i>Vaata</i>	<i>Vridhhi</i>	5	71.42 %
	<i>Kshaya</i>	2	28.57 %
<i>Pitta</i>	<i>Vridhhi</i>	4	57.14 %
	<i>Kshaya</i>	1	14.28 %
	No Effect	2	28.57 %
<i>Kapha</i>	<i>Vridhhi</i>	0	0 %
	<i>Kshaya</i>	7	100 %

From the above assessment of *Dosha Prabhaava* (Effect on *Dosha*), it appears that *Bhallataka* has the potential for an increase in *Vaata* and *Pitta Dosha* in the body during its Toxic action. It's obvious that *Pitta Dosha* can be seen increasing due to *Ushna*, *Teekshna Guna* of *Bhallataka* causing its toxicity. However, it's potential to increase the *Vaata Dosha* seems to be adjourned due to the *Ushna-Teekshna Guna*, which are so prominent and resilient that they seem to control *Vaata Dosha* very effectively despite other properties being favorable to *Vaata Vridhhi*. Therefore, *Bhallataka* shows the effect of *Ekaantika* (Solitary) *Pitta Vridhhi* only, while pacifying the *Vaata Dosha* due to its *Ushna-Teekshna* properties.

Due to the toxic effect of *Bhallataka*, there seems a very prominent decrease in *Kapha Dosha* inside the body, due to the *Kaphaghna* nature of all its properties responsible for its toxicity. All 100% properties of

*Bhallataka* appear to bring out the pacification of *Kapha Dosha*. Even *Acharya Charaka* has identified *Bhallataka* as an amazing drug in diseases of *Kapha Dosha*. In this way, *Bhallataka* appears to demonstrate its toxic action on body humors.

At the level of *Dhaatu* (Tissues), it has been mentioned that any *Visha* initially causes *Shonita Dushti* (Defect in the Blood element). It can be prominently observed in case of local toxicity of *Bhallataka*, as all type of dermatological manifestations usually occur due to defect in the *Shonita (Rakta) Dhaatu*. Even *Maansa Dhaatu Dushti* (Defect in the Muscle tissue) and its *Upadhaatu* (Subsidiary tissue) *Shat Tvacha Dushti* (Defect in the 6 types of skin) can be observed in *Bhallataka* toxicity, as the wound due to *Bhallataka* affects these elements.

Finally, the fatal action of any *Visha* occurs due to defect in *Oja* (The essence of all *Dhaatu*), as the 10

properties of *Visha* are exactly opposite to the 10 properties of *Oja*. However, the defect in *Oja* can be classified into three stages. The first stage is *Ojo Visransa* (Displacement), the second one is *Ojo Vyapad* (Derangement) and the last is *Oja Kshaya* (Diminution). The death due to *Visha* occurs in the terminal stage of *Oja Kshaya*. However, as we observe that the toxic action of *Bhallataka* usually occurs as a hypersensitivity reaction, it can be correlated to the stage of *Ojo Visransa*, where displacement of Body humors (*Dosha Chyavana*) can be observed. The defect in *Oja* is caused due to its displacement from *Hridaya* (Heart) due to *Teja (Pitta)* driven by *Vaayu*. As *Bhallataka* causes extreme vitiation of *Pitta Dosha*, it can displace the *Oja* and generate a hypersensitivity reaction due to *Ojo Visransa*.

## DISCUSSION

As a result of the above assessment for "Ayurvedic Toxicology Analysis of *Bhallataka*", it can be observed that total 10 properties can be attributed to *Bhallataka*, which show different sorts of effects on the *Dosha* (Body Humors) according to their *Bhautik* Composition and express different inherent *Karma* (Actions) as well. However, only 7 of these properties appear to play a role in the Toxic Action of *Bhallataka*, while the other 3 properties viz. *Snigdha Guna*, *Madhura Rasa* and *Madhura Vipaka* have no connection with its Toxic action. On the other hand, these 3 properties seem to play a major role in the Pharmacological action of *Bhallataka*.

The *Bhautik* assessment of *Bhallataka* revealed that only *Teja*, *Vaayu* and *Aakash Mahabhuta* are prominently responsible for toxic action of *Bhallataka*; while *Jala* and *Prithvi Mahabhuta* seem to be having their role in its pharmacological action only. This result is very much on the expected lines, due to the omission of these 3 properties from the Toxic action of *Bhallataka*.

The assessment of *Dosha Prabhaava* (Effect on *Dosha*) discovered that *Bhallataka* shows the effect of *Ekaantika* (Solitary) *Pitta Vriddhi* only, while pacifying the *Vaata Dosha* due to its *Ushna-Teekshna* properties; even though it shows the potential of *Vaata*

*Dosha Vriddhi* as well. The decrease in *Kapha Dosha* (*Kapha Kshaya*) can be prominently observed in this assessment as well, as the *Kaphaghna* nature of *Bhallataka* is well-known since the very ancient period.

At the level of *Dhaatu* (Tissues), *Shonita (Rakta) Dhaatu Dushti*, *Maansa Dhaatu Dushti* (Defects in the Blood tissue and Muscle tissue) and its *Upadhaatu* (Subsidiary tissue) *Shat Tvacha Dushti* (Defect in the 6 types of skin) can also be observed.

Finally, the extreme vitiation of *Pitta Dosha* by *Bhallataka* can lead to displacement of Body humors (*Dosha Chyavana*), displacing the *Oja* and generating a hypersensitivity reaction due to *Ojo Visransa*; which can be attributed to all these Anti-*Oja* properties of *Bhallataka*.

## CONCLUSION

The toxicity of any poison is usually analyzed by using the modern principles of Toxicology. The modern science focuses on the presence of chemical constituents present in the toxin and evaluates its toxic effects in the body according to the mechanism of action of those chemical constituents. Though this is a proven and very effective methodology to analyze the toxicity of any poison, but from the viewpoint of *Ayurveda*, it proves insufficient as the poisons and their actions mentioned in *Ayurveda* cannot be assessed holistically using the modern principles. Therefore, it's important to analyze these poisons using Ayurvedic principles as well.

Though *Ayurveda* doesn't prescribe any specialized principles for the toxicology analysis of the poisons only; however, the principles of Ayurvedic Pharmacology are very much efficient to serve for this purpose as well. These principles in *Ayurveda* are universal and are applicable to any substance in a broader sense. The toxicology analysis of *Bhallataka* here reveals the mechanism of its toxicity from the Ayurvedic perspective and we hope that it can help to establish a standard methodology for toxicological assessment of other poisons mentioned in *Ayurveda* as well.

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