

## AMA FROM AYURVEDIC AND MODERN PERSPECTIVE

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(Published Online: December 2021)

## Open Access

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Article Received: 15/11//2021 - Peer Reviewed: 07/12/2021 - Accepted for Publication 08/12/2021



## ABSTRACT

*Agni* is one of the most powerful transformative principles of Ayurveda. Deranged *Agni* leads to the formation of *Ama*. *Ama* is responsible for causing most of the diseases in human beings. The disease produced, clinically manifests itself in form of various signs and symptoms. These signs and symptoms are the principal tools for a physician to diagnose the disease and treat it promptly. On the basis of these symptoms, all diseases can be classified in *Samavastha* and *Niramavastha*. If an objective Parameter that could measure the severity of *Ama* is searched, it will prove to be an advantage for the physician, who could then catch the cause (*Ama*) and save patients from this harmful disease entity. A definite line of treatment of *Ama* can be planned after considering the symptoms and severity of the condition. Keeping this approach, the review is carried out to understand *Ama* from Ayurvedic and Modern perspectives. After reviewing it can be concluded that *Ama* has no direct correlation in modern science but can best be equated to 'toxins'. They may be endotoxins like enzymes, hormones, catalysts, etc. when these are unable to function properly or entirely, different metabolites are formed which are not acquired by the body. On further process these go on accumulating in different systems, affecting the normal mechanism of that respective system or exotoxins produced by some bacteria or micro-organism when they enter into the body.

**Keyword:** *Agni*, *Ama*, Toxin

## INTRODUCTION

Health is the supreme foundation of virtue, wealth, enjoyment and salvation. Acharya Caraka has mentioned the general principles for maintaining health. These include observing various measures like following a dietic and behaviouristic regimen of life according to *Desa*, *Kala* and *Prakruti*, avoidance of *Sahasa*, *Asatmayaindriyartha* *Samyoga* etc.

*Agni* is one of the most powerful transformative principles of Ayurveda. It holds the secret to longevity, vitality, life force, good health, more energy, clarity of mind, and wellness.<sup>[1]</sup> The main function of *Agni* pertains to digestion, absorption, assimilation, and conversion of food into energy.

Deranged *Agni*, causing impaired digestion and metabolism, leads to the availability of incompletely processed food components and metabolites in the system. These substances which bear a threat to the health of a person are designated as *Ama*. The majority of the endogenous diseases actually begin with the formation of *Ama*, which has a tremendous capacity to vitiate the *Doshas*, thus disturbing the homeostasis (*Dhatu-Samya*). In addition to hypo functioning of *Agni*, caused due to abstinence from food, indigestion, overeating, irregular diet habits, consumption of cold substances, ill effects of *Panchkarma*, wasting of tissues, suppression of natural urges and mental stress such as anger, grief and hunger etc. may also give rise to *Amadosha*.

The disease has been referred to as *Vyadhi* in Ayurveda. Nearly all diseases as per the Ayurvedic view have their origin from *Amadosha*. Even one of the synonyms of *Vyadhi* is *Amaya* which indicates it.<sup>[2]</sup>

*Ama* can be considered as an undigested or partially digested metabolised substance that requires further *Parinamana* and if retained as such, it may produce impairment in the micro and macro channels of the body. It ultimately creates the condition of *Srotavaigunya* or the seat for the accumulation of the provoked *Doshas* converting it into the form of any disease. It may be the cause why Ayurveda has given much importance to the concept of *Ama* than *Amaya*. *Ama* both at acute, sub-acute or chronic conditions appear to relate to the gastrointestinal as well as met-

abolic disturbances engender due to impairment of *Antaragni*.

The *Ama* thus formed manifests itself either locally (Gastrointestinal Tract) or systemically by obstructing the macro and microchannels. The disease thus produced, clinically manifests itself in form of various signs and symptoms. These signs and symptoms are the principal tools used by a physician to diagnose the disease and treat it promptly.

*Ama* and various diseases produced by it may be identified or diagnosed by looking for a number of subjective symptoms, which have been described in various Ayurvedic classics. But with the recent trends of thinking, the latest approach to the study of the physiological as well as pathological states of human beings has been directed more to the parameters which are better understood either by direct cognition or inference based on laboratory investigations done in vitro.

Just as to confirm diabetes mellitus by increased blood glucose level or jaundice by increased bilirubin level or malaria by seeing the malarial parasite in the peripheral smear, similarly we should be able to elicit a specific moiety in vitro which could confirm the prevalence of *Ama* in the body. Thus, if an objective Parameter that could measure the severity of *Ama* is searched for, it will prove to be a boon for the physician, who could then catch the culprit (*Ama*) and save their patients from this detrimental disease moiety.

Keeping this approach of the modern view in mind, the review is carried out to understand *Ama* from Ayurvedic and modern perspectives.

## REVIEW OF LITERATURE

### **NIRUKTI OF AMA: -**

According to *Shabdakalpadruma*:<sup>[3]</sup>

The word *Ama* refers to substances subjected to digestion.

According to *Vachaspatyam*:<sup>[4]</sup>

The word *Ama* is derived from “Am” *Dhatu* with the suffix “a”, which means improper or partially digested matter.

So, a substance that harms the normal healthy state of the body, or any part of the body can be considered as

*Ama*. Therefore, depending upon etymology *Ama* can be described as - raw, uncooked, unripe, immature, undigested or incompletely oxidised/metabolised or similar to a poisonous substance.

**DEFINITION OF AMA: -**

Though the diseases associated with *Ama* have been described by authors like Caraka and Susruta; but Vagbhata is the first author to define *Ama* as a separate entity. According to him Due to the hypo function of *Ushma (Agni)*, the food, which is not completely or properly digested, yields immature *Rasa* in *Amashaya* and due to its retention, undergoes fermentation or putrefication.<sup>[5]</sup>

An impaired *Vatadidosha* after mixing up with each other produce *Amavisha* like the *Visha* produced after the fermentation of *Kodrava*. As prior to fermentation in *Kodrava* there was no *Visha* similarly prior to the vitiation of *Vatadi Dosha* there was no *Ama*.<sup>[6]</sup>

There is no direct definition of *Ama* available in Carak Samhita but in the fifteen<sup>th</sup> chapter of *Chikitsa sthana* while describing *Samprapti of Grahani Roga* indirect reference of *Ama* is available. i.e., due to *Nidana Sevana* when *Agni* is vitiated, it becomes incapable of digesting the ingested food, and this undigested food after getting fermented turns into a poisonous substance.<sup>[7]</sup>

The definition of *Ama* given by Bhavamisra in the 16<sup>th</sup> century is if food is not digested properly due to hypofunction of *Agni* gets the name *Ama* and becomes the root cause of many diseases.<sup>[8]</sup>

Due to the weakness of *Kayaagni*, the *Ahara rasa* is not properly formed in the *Amashaya* and this state, it is known as *Ama*. In another sense, it is also told that the first *Dhatu* i.e. *Rasa Dhatu*, if not formed properly, then this first unconverted *Rasa dhatu* is termed as *Ama*.

Again, the next definition of *Ama* Acahrya Vijayaraksita stated that due to the feebleness of *Agni* a residue of *Ahararasa* is still left as undigested. It is then known as *Ama*, which is the root cause of all diseases.

Here are the three different opinions about *Ama* which are compiled by Vijayaraksita.

The first view is about the improperly digested food, the second describes the accumulation of *Malas* in the different parts of the body termed as *Ama*. The third view is about the stages of *Dosha Dushti* or disease, which says the first stage of *Dosha Dushti* or disease is *Ama*.<sup>[9]</sup>

**SYNONYMS OF AMA: -**

The varieties of meaning according to different classics: incomplete digested matter, partially digested matter, unprocessed matter, a matter which requires further digestion, Matter which is subjected to *Parinamana*.

**NIDANA OF AMA:**<sup>[10]</sup>

It can be categorized into following criteria:

1. *Aharajanyanidana*
2. *Viharajanyanidana*
3. *Manasikanidana*
4. *Mithyopacharajanha nidana*.

Other causative factors for *Ama* formation:-The quantum of food is not the only cause of the formation of *Ama* (undigested and non-metabolized food) in the body but also the use of diet and drinks which are heavy to digest, and with properties like dry, cold, dehydrated, disliked by the consumer, constipation-causing, causing a burning sensation, unclean, incompatible, and/or consumed untimely. Intake of food while the mind is afflicted with passion/desires, anger, greed, infatuation, envy, bashfulness, grief, conceit, excitement and fear are also the cause of the formation of *Ama*.

**Table 1:** Showing *Nidana* leading to *Ama* formation

<i>Aharajanya Nidana</i>	<i>Viharajanya Nidana</i>	<i>Manasika Nidana</i>	<i>Mithyopacharajanha Nidana</i>
1. Intake of <i>Atimatra Ahara</i> , 2. Fasting for a long time. 3. Untimely ingestion of <i>Annapana</i>	<i>Vega Sandharana</i> , <i>Swapna Viparyaya</i> (day sleep and awak-	If a person, afflicted with <i>Irshya, Bhaya, Krodha, Lobha, Shoka, Dainya</i> ,	Incorrect management of <i>Vamana, Virechana</i> or <i>Snehapana</i> , incompatibil-

<p>4. Excessive drinking of water 5. Excessive intake of <i>Guru, Ruksha, Sheeta Ahara</i> 6. <i>Dvishta, Vishtambhi, Vidahi, Ashuchi, Viruddha Ahara. Asatmya Ahara</i></p>	<p>ening at night)</p>	<p><i>Dvesha, Kama, Moha, Lajja, Mana, Udvega</i> etc. takes food, his <i>Agni</i> cannot digest it properly and produces <i>Ama</i>.</p>	<p>ity of the season may produce <i>Ama</i></p>
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#### TYPES OF AMA: -

The main causative factor for the production of *Ama* is *Mandagni* at different levels. So *Ama* can be classified into the following types: -:

- Jatharagnimandya janit ama*
- Dhatwagnimandya janit ama*
- Doshadushya sammurcchana janit ama*
- Malasamchaya Janya ama*.
- Krumi vishjanya ama*.

a. ***Jatharagnimandya janit ama***: - Acharya Vagbhata explained that when the normal functioning of *Jatharagni* gets impaired due to any cause, it leads to indigestion of food and formation of improper *Ahara Rasa Dhatu* which gives rise to *Ama*.

b. ***Dhatwagnimandya janit ama***: *Dhatwagni* is that part of *Pachakagni* or *Jathragni*, which is present in *Dhatus* and helps in their formation. Each *Dhatu* has separate *Dhatwagni*. Any disturbance in *Jathargni* also affects the *Dhatwagni*. This causes improper formation and functioning of *Dhatus* and production of *Ama*.

c. ***Dosha dushya sammurcchana janit ama*** or Interaction or amalgamation between vitiated *Dosha* and *Dushya*: - Every *Dosha* has certain qualities, which are antagonistic to the qualities of other *Doshas*. e.g., the dry and light qualities of *Vata* are antagonistic to the oily and heavy qualities of *Kapha*. Similarly, the hot quality of *Pitta* is antagonistic to the cold quality of *Kapha* and *Vata*. Therefore, when two or three *doshas* become severely vitiated they produce interaction between them. In such conditions opposite qualities, instead of nullifying each other interact and produce a toxic substance. The amalgamation of *Dosha* and *Dushya* gives rise to the production of *Ama*.

d. ***Malasamchaya Janya Ama***: According to Madhavakara, *Ama* is an accumulation of *Mala* in the body. As per the Ayurveda concept, *Mala* are of

two types i.e *Sthula Mala* and *Sukshma Mala*. The excess quantity of these *Malas* causes adverse effects on digestion and metabolism and may be acclaimed as *Ama*.

e. ***Krumi vishjanya ama***: - In this category, the *Ama* is produced by ingestion of poisonous substances and produced due to external factors. Even the endotoxins produced by some bacteria or micro-organisms can be termed as *Ama*.

**Effect of Ama**: - Acharya Vagbhata has explained that *Sama* is the term rendered to afflicted *Tridosha, Sapta Dhatus* and *Mala* by *Ama*.<sup>[11]</sup> Diseases that arise in consequence are also termed as *Sama* type of disease. *Ama* is capable to vitiate *Dosha, Dhatu Mala* and producing diseases. *Sama Dosha* can spread to all *Rogamarga* and can move from *Shakha* to *Koshtha* and vice versa. *Ama* circulates in the body along with *Rasa Dhatu* and accumulates in a place where *Kha Vaigunya* is present and produces the disease.

#### SWAROOPA OF AMA: - [12]

In this definition, the nature and symptoms produced by *Ama* have been described. *Ama* is the substance that remains *Avipakva* (undigested), *Asamyukta* (disintegrated), *Durgandhi* (foul-smelling), *Bahu* (excessive in quantity), *Picchala* (slimy) and causes *Sadana* (stiffness) of the whole body.

The above properties can be classified in the following ways -

- Properties which can be felt by touch: - *Dravatva, Picchilatva and Snighdhta*
- Properties which can be perceived by eyes: - *Tantumatta, Avipakvata, Asamyuktata, Aneka-varnayuktat and Picchilata*
- Properties that can be perceived by smell: - *Durgandha*
- Properties which can be known by questioning: - *Guruta and Avipakvata*

**VIKRUTA SAMAVASTHA:** - Due to Agni Dushti at the level of Jatahragni, Bhutagni or Dhatwagni, Ama is produced. This is the condition when Ama produced in the body gets adhere to normal Dosha, Dushyas and Malas and impairs their normal func-

tioning or when Ama produced in the body gets associated with Vata then it is termed as Samavata. Though there is no structure-wise deformity in the Dosha-Dushya and mala due to the Ama, they are unable to perform normal functions and show a state of Vikruti.

**Table 2:- Samadoshadi lakshana**

Dosha	Lakshana	Co-relation
Vata	Agnimandya, Vibandha, Tandra, Antrkunjana, Angamarda, Angashotha, Angatoda, Adhmana, Angagraha, Staimitya, Gaurava, Aruchi, Alasya, Shaitiyata, Katuruksabhilashi, Arti, Balanasha, Varananasha, Sukhanasha, Ayunasha. Along with these increases in the symptoms of Vata after Snigdhadhi Upkramas, during sunrise, cloudy atmosphere and night are described as the symptoms of Samavata. <sup>[13]</sup>	Some of the above mentioned Symptoms can be seen in patients of Sama Jwara.
Pitta	Haritavarna, Ishatkrishnavarna, Shyava Varna, Amlarasa, Sthiratva, Sandrta, Amlodgara, Kanthdaha, Hruddaha, Durgandha, Katukatva, Bahalatva, Ghanata, Daha, Trushnabahulata, Mukhpaka <sup>[13]</sup>	When due to the presence of Ama in the gastrointestinal tract normal digestive juices are not able to digest food.
Kapha	Avilta, Tantumana, Picchilata, Sandrata, Durgandhita, Kanthaliptata <sup>[13]</sup>	In Rheumatoid arthritis, Ama produced in the body goes to the site of Sleshaka Kapha i.e., in Sandhis (joints) and adheres with Sleshaka Kapha present there and thus impairs its functions.
Rasa	Ashradha, Aruchi, Mukhvairasyata, Arasagyata, Trupti, Hrullasa, Gaurava, Tandra <sup>[14]</sup>	Stage of Sama Rasa can be seen clinically in the case of lymphadenitis in which due to any infection, exo- or endotoxins are produced in lymph and filtered by lymph nodes and as result lymphadenitis is produced. Due to swelling and excessive filtration in lymph glands, further flow of lymph is obstructed and fever, anorexia, malaise etc. symptoms are produced in the body.
Rakta	Kustha, Visarpa, Pidika, Raktapitta, Asrugdara, Gudapaka, Medhrapaka, Mukhapaka, Plihavruddhi, Gulma, Vidrdhi, Nilika, Vatarakta, Arsha <sup>[14]</sup>	Introduction of unwanted substances in the blood like endotoxins can be considered as Samarakta Dhatu Avastha in which actions of blood becomes disturbed due to additional substances present in it.
Mansa	Mansarbuda, Adhimansa, Keela, Granthi, Adhijivha, Taluvikara, Upajiwaha, Kantha Roga, Upakusha <sup>[14]</sup>	When much amount of lactic acid is accumulated in Mansa the condition can be considered as Samamansa Dhatu because in this case there is no deformity in Mansa Dhatu but because of the presence of lactic acid, severe pain and loss of function is produced.
Meda	Presence of prodromal signs of Prameha, Sthaulya, Gaurava, Atisweda, Arbuda. <sup>[14]</sup>	High levels of cholesterol, Triglycerides, LDL, stones in the gall bladder can be considered as Sama Meda Dhatu Avastha
Asthi	Various diseases that can occur due to it are	Porous condition of bones i.e., Osteoporosis, osteophyte

	<i>Adhyasthi, Adhidanta, Asthitoda, Asthishula</i> , increase in <i>asthimala</i> , <sup>[20]</sup>	formation. Osteomyelitis, pagets disease are the conditions in which accumulation of <i>Ama</i> is seen in <i>Asthidhatu</i>
<i>Majja</i>	<i>Netrabhisyaanda, Angalalima, Gaurava, Arushika, Parvaruka, Tamodarshana, Murcha, Bhrama</i> and loss of normal functions. <sup>[14]</sup>	Acquired Bone marrow depression which is caused by the deposition of toxins liberated from certain infections are an example of <i>Sama Majja Dhatu</i> .
<i>Shukra</i>	<i>Klaibya, Aharshanam, Garbhajanakatvam, Alpayushtvam, Garbhasrava</i> etc. <sup>[14]</sup>	A condition like pyospermia shows its association with <i>Ama</i> .
<i>Purish</i>	<i>Atidurgandhita, Shuksha mala pravrutti, Guru mala (sinks in water), Ajirna, Vishtambhkara, Atipicchila, Kuksi-Shulkara, Atopakara, Sashula Pravrtti, Gauravakara</i> and other disorders of <i>udara</i> may be found. <sup>[14]</sup>	Association of mucus in stool can be termed as <i>Sama Purisha</i> .
<i>Mutra</i>	<i>Bastipidana, Atyadhika Mutra Nirharana, Avilamutrata</i> , etc. <sup>[14]</sup>	It can be seen in Diabetes as a disorder where excessive sugar is removed through the urine.
<i>Sweda</i>	<i>Kandu, Twakruksta, Durgandhta</i> etc. are produced due to its <i>Samavastha</i> . <sup>[14]</sup>	

## DISCUSSION

Ayurveda elaborated different concepts related to disease pathogenesis and *Ama* is one of them. Vagbhata was the first author to define *Ama* as a separate entity, but all Acharyas were having the same opinion that *Ama* is the root cause of many diseases. After analysing the definitions about *Ama* following facts become clear about *Ama*.

1. Feeble action of *Agni* is the root cause for its production, but the *Agni* is not specified by most of the Acharyas. So, it is quite clear that anywhere in the body, if *Agni* is not working properly the *Ama* will be produced.
2. *Ama* is produced from *Ahara Rasa* when it is not properly digested. In the case of *Jatharagnimandya*, this *Ahararasa* is the undigested food but in the case of the rest of *Agnis*, it is the metabolites that are undergoing a process of metabolism by these *Agnis*.
3. Place of origin of *Ama* is given as *Amashaya*. But considering the presence of *Agni* at different levels *Ama* can be produced at different levels at different sites in the body.

Due to inhibition of *Jatharagni* if the ingested food is not properly digested and the products which arise out of such impaired digestion are being retained in the stomach, they undergo changes and yield toxic substances i.e., *Ama*. Also, the impaired *Vata, Pitta*

and *Kapha* when mixed with one another lead to the formation of *Ama Dosha*. Another type of *Ama* is the *Ama* produced by ingestion of poisonous substances and produced due to external factors. Even the endotoxins produced by some parasites, bacteria etc. could be termed as *Ama*. *Ama* is not a single entity but is a generalised term that refers to various substances produced in the body which are harmful, in a way or another, to the body. Disturbed dietary habits, improper sleeping patterns, unethical conduct, excessive sexual indulgence, daytime sleep and lack of disciplinary living regimen, etc. are some factors that can lead to *Agnimandya* followed by the production of *Ama*. *Ama* generally affects *Dosha, Dhatu* and *Mala* by combining with them and causing diseases. Various properties like *Asamyuktam, Avipakvam* etc. are found in *Ama* which makes it the pathogenic factor. *Ama* not only clogs the digestive flow but because of its obstructive nature, clogs bodily channels (*Strotas*) and disrupts physiology including the formation and excretion of waste and it adversely influences the formation and functions of the tissues (*Dhatu*). At a cellular level, *Ama* may disrupt cellular movement, change cell membrane composition, inhibit shedding of membrane vesicles, disrupt cellular communication and membrane functions, and alter antigen-antibody interaction and leads to improper antigen

presentation causing derangement of the immune system resulting in autoimmunity or autoimmune like symptoms. According to Modern physiology, a variety of transforming and transmuting substances are present in the body like enzymes, hormones, catalysts, etc. When these are unable to function properly or entirely, different metabolites are formed which are not acquired by the body. On further process these go on accumulate in different systems, affecting the normal mechanism of that respective system. These may be considered as *Ama*. Also, endo or exotoxins of bacteria can be considered as *Ama*. On the basis of relation with *Ama*, *Vikrtavastha* of all *Dosha*, *Dhatu* and *Mala* are of two types viz. *Samavastha* and *Amavastha*. *Ama* has a great potential to vitiate all *Dosha*, *Dushya* and *Mala* to produce *Samavastha*. While due to metabolic defects caused due to *Ama*, the malformed *Dosha*, *Dhatu* and *Mala* are themselves termed as *Ama*. Stage of *Sama Rasa* can be seen clinically in the case of lymphadenitis in which due to any infection, exo- or endotoxins are produced in lymph and are filtered by lymph nodes and as result lymphadenitis is produced. Although the production of many diseases depends upon this pathogenic factor, still there is no objective parameter to identify the entity, *Ama* in the laboratory. Many scholars of Ayurveda have proposed the theory of free radical as an important tool in evaluating the prevalence of *Ama*. Here this can also be said that *Ama* is not a single entity but is a group of substances that are harmful to the body. The relation of *Ama* with *Dosha*, *Dushyas* is very important in the context of the development of disease. It is seen that *Dosha*, *Dhatu* and *Mala* can be of two types of viz. *Sama* and *Nirama*. In *Samavastha* *Dosha*, *Dhatu* and *Mala* have no defects in their constitution, but they produce various diseases and symptoms due to their association with *Ama*. Whereas in *Amavastha*, the *Dhatu mala* and *Dosha* have constitutional defects in them and so they produce *Rogavastha* in the body. Various symptoms are produced in the body due to the prevalence of *Ama*. On the basis of these symptoms, all diseases can be classified in *Samavastha* and *Niramavastha*

and the treatment of the disease depends upon these two stages.

## CONCLUSION

*Ama* is generated at various levels in the body, which is at *Jatharagni* level, *Bhutagni* level, *Dhatwagni* level and also at the cellular level. *Ama* can be classified in various ways depending upon its action, *Agni*, site of production etc. *Ama* has no direct correlation in modern science but can be described as toxins or antigens which can trigger diseases pathogenesis. A definite line of treatment of *Ama* can be drawn after considering the causes, symptoms and severity of the condition.

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**Source of Support: Nil**

**Conflict of Interest: None Declared**

How to cite this URL: Archana Arun Kulkarni & Rashmi Arvindkumar Dohare: Ama From Ayurvedic And Modern Perspective. International Ayurvedic Medical Journal {online} 2021 {cited December 2021} Available from: [http://www.iamj.in/posts/images/upload/3055\\_3062.pdf](http://www.iamj.in/posts/images/upload/3055_3062.pdf)