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A REVIEW ON MODERN ASPECTS OF AWASTHA PAK AND AAHAR PACHAN KRIYA

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ABSTRACT

Ayurveda is the oldest system of medicine in the world. *Ayurveda* holds that human bodies, like all other stuff in the universe, are made up of the *Panchamahabutas* (five basic elements). Different processes are always taking place in this *Panchabhautika Sharira*, resulting in the loss of various components. In order to be replaced, one must take the proper amount of Ahara (food). According to *Acharya Charaka*, the body is the result of food, and *Agni* (the digestive component) is crucial to the correct digestion and metabolism of Ahara (food). In *Ayurveda*, the term Aaharapaka denotes the applicability of *Ayurveda* to contemporary literature as well. After years of study, this theory has been shown to be scientifically sound even today. The digestive process is divided into three phases according to *Ayurveda*. They're known as the pachan *Avasthapaka*. Because food is so important to survival, it is referred to as *Pranam*, which translates as vital for life. After that, the meal is digested for the purpose of extending one's life expectancy and split into two categories: *Rasa* and *Mala*. *Avasthapaka* is the term used to describe the process by which all food particles move through the body during digestion. It entails altering the texture, flavour, and consistency of the consumed substance. This process is known as *Avastha paka* and is divided into three stages: *Madhur Avalavastha Pak*, *Amla Avalavastha Pak*, and *Katu Avalavastha Pak*. Final stable absorbable products are generated after full digestion and is referred to as *Vipaka*. You may choose from *madhura vipaka*, *amla vipaka*, or *katu vipaka*, which are all subtypes. A procedure known as *Sara kitta vibhajana* is carried out by *Jatharagni* in the gastrointestinal tract and by *Dhatwagni* in the *srotamsi of dhatu*.

Keywords: *Aahar Pachan Kriya, Avastha paka, madhura avastha pak, amla avastha paka and katu avastha paka*

1. INTRODUCTION

A healthy diet, known as *Ahara*, is critical to human well-being. Health maintenance and illness treatment are the goals of *Ayurveda* science. *Ayurveda* views health as a condition of homeostasis in which *dosha*, *Agni*, *dhatu*s, waste products, and all physiological processes are in a state of equilibrium, and in which the soul, sense organs, and mind are in a state of complete wellbeing. A person's *Ahara* (diet) is critical to their health, and *Acharya charak* said that eating the correct things in the proper amounts gives them vigour, a healthy complexion, joy, and long life without disrupting their regular routine. A person's digestive power should be maintained by consuming the appropriate amount of food in the right proportions. How much food a person consumes is determined by the *Gurutava* and *laghutava* of the meal they're eating. Approximately one-fourth of the stomach should contain water, according to *Acharya Vagbhata*. The remainder of the stomach should be left empty to allow *doshas* to function normally and promote proper digestive physiology [1].

Several food regimens have been recommended by *Acharya charak* in order to stay healthy. It has to do with what you eat and how much you eat. In order to get the most out of one's stomach, it should be divided into three sections: one third should

be used for solid food items, one third for liquid food substances, and one third should be reserved for *vata*, *pitta*, and *kapha*'s natural movement. *Acharyas* has recommended a number of food-habit-related regimens that everyone should adhere to in order to be healthy. This has no negative consequences due to an imbalance in the diet. It's also critical to eat the appropriate things in the right amounts at the right times of day (*kalabhajanam*) [2].

Consumption in excess (*Atimatrāsana*) leads to indigestion or *Ama* development, while consumption in accordance with the ability to digest (*Agni sandhukshnanam*) leads to proper *pachana*. A healthy lifestyle is one that includes eating the appropriate foods at the proper times (*kalabhajana Arogyakaranam*). Indigestion and delayed digestion are caused by eating large amounts of heavy food (*guru bhajana*) (*durvipaka*). *Ahoratra* (*ekashanbhajana*) is the best time to eat since it allows for simple digestion and absorption (*sukha parinama karanam*). Reducing lifespan via fasting or deprivation of nourishment (*anashana*) (*ayusho hrasakaranam*). Insufficient or decreased food intake (*pramitashanam*) results in weight loss or emaciation in people [3].

When a meal is consumed before the preceding meal has been digested (*ajirna adhyashana*), an assimilation problem or

grahani impairment results (*grahani dushana*). When you eat irregularly (*vishamashana*), your digestive power may get weak. (*agnivaishamyakaranam*). There are eight concomitant illnesses caused by eating foods with mutually antagonistic properties (*viruddha viryashana*) (*nindita vyadhikaranam*). Stronger muscles are gained by regularly taking in a diet that includes all of the flavours of the world (*balakaranam*). Foods with just one flavour (*eka rasabhyas*) that are consumed on a regular basis lead to weakness [4].

Digestion is the process by which ingested food goes through a series of biochemical reactions in the human gastrointestinal system before becoming a useful source of energy. Under the ideal pH conditions, this procedure enables the meal to interact with different secretions and enzyme-producing substances as well as emulsifying agents and acids or alkalis. According to *Ayurvedic* literature, the gastrointestinal system also contains *Jatharagni*. As soon as food is converted into nutrient fluid, the digestive process may begin (*ahara rasa*). Food undergoes three digestive phases, namely *madhura*, *amla*, and *katu awastha paka*, during the conversion of *ahara* into nutritive fluid, and three biological components, namely *kapha*, *pitta*, and *vata*, are generated in turn [5].

2. Importance of *Aahara* in *Ayurveda*

Since the time of the *Vedic* civilization, *aahara* (food) has been accorded paramount significance. According to *Upanishad* and *KashyapaSamhita* texts, it is known as *Brahma*, and *AcharyaCharaka* counts it among the *Trayaupstambha*. Food is essential for the survival of all living creatures. Food is a need for all living things on the planet. If you want a healthy complexion or clear thinking or a nice voice or longevity or comprehension or ease and pleasure fulfilment (contentment), you must have *Aahara* as a foundation. It is important to recognise the role of *Aahara* as *AcharyaCharaka* does in his teachings. Food has an effect on one's *sharira* (body). Even yet, illness is a direct result of the things we eat. Healthy diet or a lack thereof causes the difference between ease and illness, respectively [6].

Among humans, *Aahara* maintains and nourishes the *Deha-Dhatus* (tissue elements), *Ojas* (the factor of resistance to illness and decay), *Bala* (the ability to do physical labour), and *Varna* (the colour of one's skin). *Aahara's* body is entirely dependent on *Agni* for its sustenance. Without appropriate digestion by *Agni*, food cannot be adequately fed and developed for the *Sharira Dhatus*, the body's components. Drugs, chemicals, or specialised treatments are not the secret to good health; rather, it is the foundational elements on which our life and energy are

built. The *Aahara* increases a person's energy, strength, and durability. It boosts a variety of positive qualities, including elation, memory recall, *Agni*, *Ayu*, and *Teja* (shine). *Satvika Ahara*, or pure food, helps to cleanse the mind. Memory strength increases when the mind is clear of imperfections [7].

3. *Agni* and *Pitta*

Agni and *Pitta* (one of the three physiological doshas responsible for digestion and metabolism) are concepts from *Sharira* that must be understood before we can comprehend digestion and metabolism in *Ayurveda*. Aside from the fact that biological *Agni* is linked to living organisms, there are no essential differences between physical *Agni* and it. When *Agni* is present, numerous chemical processes in nature are accelerated, decomposed, and disintegrated. *Agni's* primary job in the body is to break down or dissolve food into its simplest components so that it may be absorbed and used. These processes are referred to as digestion and metabolism in medical terminology. There are two passages in *Charak Samhita* that describe biological *Agni*: (a) *Agni* and (b) *Pitta*. It's no coincidence that *Agni's* activities are ascribed to enzymes, which conduct a wide range of tasks in the body. Only the *Agni*, which is housed in *Pitta*, has the power to produce good or bad outcomes, depending on whether anything

is normal or aberrant. It was thought that *Pachak Pitta (Kosthagni)* referred to certain secretions produced by the *Agnidharakala* in the *Grahani* (which corresponds to the mucosal glands of the duodenum) that were internal [8].

4. Process of digestion

With its power of attraction, the eaten food is drawn into the *Kotha* according to Acharya *Charak Prana Vayu* (a kind of *Vata dosha* responsible for breathing and swallowing) (alimentary tract). The unctuous material first softens the meal, and then the liquid (saliva) splits it apart. After that, *Samana Vayu* stimulates the *Agni* (enzymes) in the *Udara* (stomach) (one type of *Vata dosha*, performs function like receiving, digestion and division of food). In order to promote lifespan, *Agni* (enzymes) activated by *Vayu* aids digestion by consuming the correct amount of food at the right time and at the right place. Rice and water are cooked in a vessel over a fire, much as *Agni* (enzymes) aids in the digestion of food in the *ashaya (amashaya)*, i.e., stomach, for the formation of *Chyle (chyle)* and *Mala* (waste product) [9].

Avasthapaka or the change in the condition or form of food material in the *Amashaya* and *Pakwasaya* during digestion has been characterised as *Jatharagni paka*, i.e. gastrointestinal digestion of food. The *paka* is divided into two parts: the *prapaka* and

the vipaka. *Chakrapani* Dutta describes the word "Prapakā" as meaning "Prathampakā" or "the first alteration." For his part, he defines "Vipakā" as the

transformations that food has gone through. *Prathampakā* undergoes new transformations as a result of *Jatharagni's* influence.

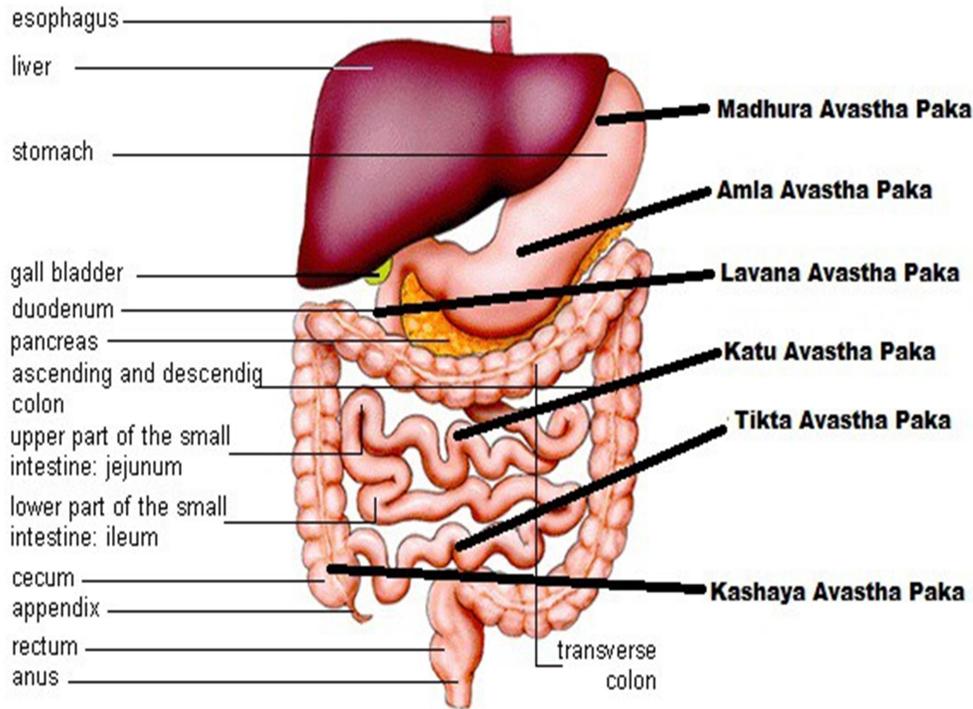


Figure 1: Stages of digestion according to *Ayurveda*.

The alimentary tract provides a continuous supply of water, electrolytes, vitamins and nutrients. This requires:

- *Prana vayu* helps in ingestion of food into the esophagus and *samana vata* facilitates the peristaltic movement in alimentary tract.
- Secretion of digestive juices and digestion of food can be compared with the action of *samana vayu* and *jathragni*. *Samana vayu* intensifies

the action of *jathragni* and *pachakpitta*.

- Absorption of water, various electrolytes, vitamins and digestive end products which can be compared with the *vivechan* action of *samanavata*.
- Circulation of blood through the gastrointestinal organs to carry away the absorbed substances, this process is facilitated by the action

of *samana vayu* which takes the nutrient fluid (*Ahara rasa*) to the heart and brought to the systemic circulation by the action of *vyana vayu*.

- The process of excretion of waste product out of the body is felicitated by *apana vayu* [10].

5. Avastha-paka

Avasthapaka, or the change in the condition or form of food material in the *Amashaya*, *Pachyamaanaasaya*, and *Pakwasaya* during digestion, describes *Jatharagni paka*, i.e., gastrointestinal digestion of food. The paka is divided into two parts: the *prapaka* and the *vipaka*. Commentator

Chakrapani Dutta interpreted the word "*Prapaka*" as "*Prathampaka*," which means "first alteration." *Vipaka*, the ultimate changed condition of the meal after its contact with *jatharagni*, is what the word means. *Prathampaka* undergoes new transformations as a result of *Jatharagni's* influence. This is a three-stage food digestion process in the gastro-intestinal tract that involves biochemical and physical change. *Madhur*, *amla*, and *katu* become prominent in various stages of digestion throughout the process of digestion. These findings led to the discovery of the *Madhura*, *Amla*, and *Katu* stages of digestion (i.e. avastha, amla and katu) [11].

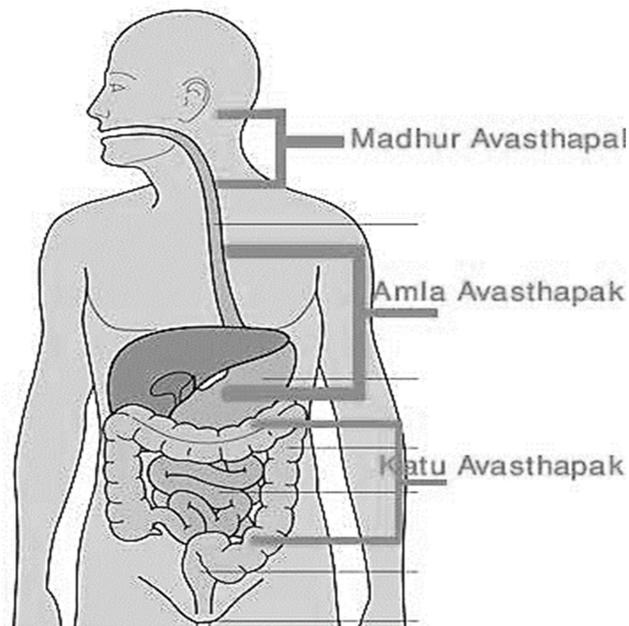


Figure 2: Phases of Avasthapak

I. Madhura avastha-paka

After consuming food containing various compositions of either *panchbhautic* type,

or four food types (*peya*, *lehya*, *bhakshya*, and *bhojya*), or two types of *veerya*, or various qualities or six *rasas*, *madhur*

(sweetness) appears during the first stage of *avastha-paka*, leading to the production of thin and frothy *kapha*. *Madhur bhava* understands this element of digestion, which occurs in *amashaya*. The combined effect of *kledaka kapha*, *samana vayu*, *Agni*, and the pH of the stomach produces *madhura awastha paka*. According to *Ayurveda*, a scientific knowledge of physical, physiological, and psychological processes underpins the practise. Because carbs are sugar-like molecules, it seems that salivary secretions begin carbohydrate digestion in the buccal cavity, where *kapha* is supposed to be produced in the initial stage. If you have eaten anything, your mouth cavity will begin to secrete saliva and mucus. The parotid, submandibular, and sublingual glands are the most important salivary glands. The submandibular and sublingual glands produce both serous secretion and mucus, while the parotid glands emit mostly serous secretion. In saliva, you'll find -amylase (ptyalin), water, and ionised bicarbonate. The pH of saliva ranges from 6.0 to 7.0, making it ideal for ptyalin's digestive activity. The mouth cavity is the starting point for digestion, particularly for carbohydrates. When you're spinning your meal around in your mouth, Ptyalin is doing 5 percent of the carbohydrate breakdown. Saliva in the mouth performs *pachana* and *kledana* on carbohydrate-rich

foods. By deglutition, *prana vayu* assists in the stomach of chewed food, and *samana vayu* aids this process [12].

Before chewed food combines with gastric secretions, starch breakdown proceeds in the stomach for up to an hour. Chewed food stimulates the pyloric gland's gastrin cells, which then release gastrin and transfer it to the stomach's ECL cells. The histamine is then released by the ECL cells. Following this, the histamine rapidly causes hydrochloric acid to be released. Because of this, food is vigorously mixed with acidic secretion, and the stomach's pH begins to decline below 4.0. Salivary amylase activity is subsequently inhibited by the acid secreted by the stomach. Food and gastric secretions combine to create chyme, a semi-fluid substance. This is similar to the process of making *phenbhut* (a semifluid combination), which is used in the synthesis of the neurotransmitter *kapha*. However, before the meal and saliva accompanying it mix fully with the acidic secretions, 30-40% of the starches will have been hydrolysed primarily to produce maltose. Before leaving the duodenum and upper jejunum, carbohydrates are almost completely metabolised into maltose, sucrose, and lactose. Because these glucose polymers have a sweet taste, the digestive process is known as *madhur avasthapak* [13].

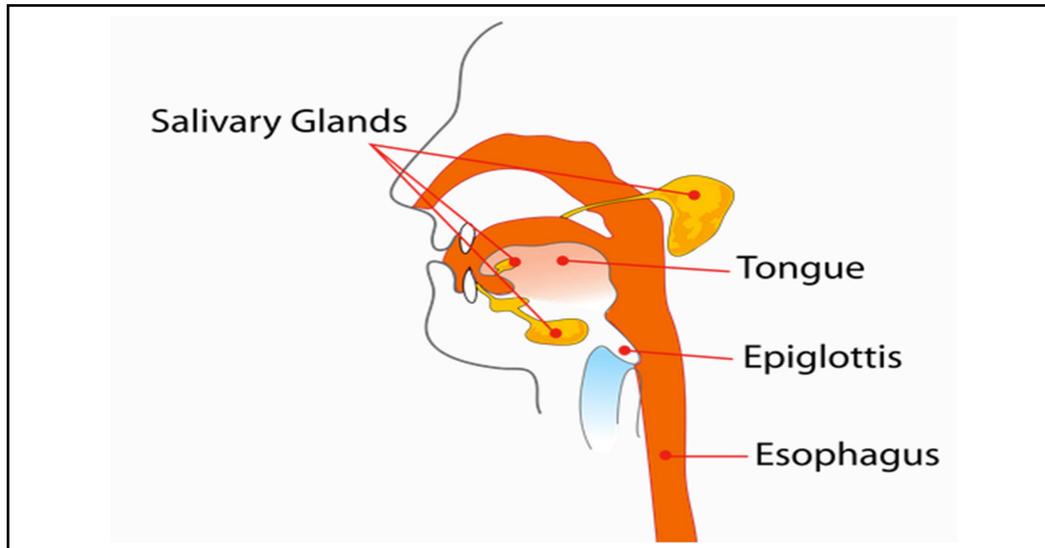


Figure 3: *Madhura avastha-paka*

II. Amla Avastha-Paka

Only in the *amasaya* does the majority of *ahaar* go through the *madhur avastha paka* process. Chyme, the result of this procedure, is what makes it to *pachmanasaya*. Within 15-30 minutes, pancreatic amylase/-amylase finishes digesting the remaining carbohydrates in the *pachmansaya*. Even though *madhur avastha paka's* primary location is *amasaya*, a portion of it also occurs in *pachmanasaya*, thus a portion of it is also subject to *pachmanasaya's* wrath. To some extent, the *Madhur Avasthapaka* is brought to a close by the stomach's parietal cells secreting hydrochloric acid (HCl). When the pH of the medium drops below 4.0, the activity of salivary amylase is inhibited. *Amla avastha pak* (amla means "half digestion") occurs when the stomach is empty, according to Acharya Charaka. *Amlabhava* (sourness) occurs as a

consequence of the chyme's acidic medium (pH 2-3). During this time, *amlabhava* officially begins. During this phase, partly digested food is completely digested. Agni produced in the form of pancreatic digesting enzymes, which work together at *grahni* as *pachak pitta*. The seat of *Agni*, according to *Acharya Charaka*, is *grahani*, which is situated above the umbilical area. *Samana* *vayu* aids in the absorption of *Sara bhag*, and the undigested food is pushed forward by the peristaltic action of *grahani*, which retains the undigested food that *Agni* activates and aggressively digests [11]. According to *Acharya Sushruta*, *grahni* is located between the *amashya* and the *pakvashya chakras*, which is also known as the *pachya manashya chakra*. *Pittadharakala*, the internal membrane that covers it, is where *Agni* resides. Different *ashaya*, such as the pancreas, gut, and liver, produce various secretions. Gall bladder

contracts when cholecystokinin is released from duodenal and jejunal I cells, and this helps to release bile when it's released from sphincter of oddi cells (*achchhapitta*). *Achchha pitta* is critical in ensuring that the pH of the small intestine (*Agni*) is optimal so that enzyme secretions from the gut may work on partly digested foods. Following this meal becomes *viddha* and keeps the amla rasa characteristics thus it is termed *amlavastha* because end products like peptone and proteoses are produced, as well as fatty acids and glycerol and glycerol. To absorb *ahararasa*, the mucosal membranes of the duodenum and jejunum (*pittadharakala*) are used, and the leftover apakva food is ejected into the *pakvashaya* by the action of *samana vayu*. Pepsinogen is the contemporary physiology term for the digestive enzyme produced by the stomach's peptic cells. When it comes into touch with HCL, it gets activated and begins to produce pepsin. Pepsin is active between a pH of 2.0 and 3.0 and inactive above a pH of 5. Proteins in the stomach are partially digested by activated pepsin, creating acidic chyme. Only 10-20% of protein is digested by pepsin [12].

Proteolytic enzymes from pancreatic secretions aid in protein digestion in the *pachmanasya* (duodenum and jejunum). *Grahni* (the duodenum) is stimulated by the acidified chyme to release a wide range of

digesting enzymes and digestive fluids. As a result of this stimulation, bile and pancreatic juice are secreted into the duodenum, where they help finish digesting the partly digested chyme. Some research suggests that eating *pachhmansaya* stimulates the production of *achcha pitta* because it contains *Vidagdha Ahara* (partially digested meal). Fats, proteins, and carbs are all broken down in the body by the bile and pancreatic secretions that make up *Accha Pitta*. Protein digestion and fat digestion take place during amla avastha pak, according to contemporary physiology. Only 10-20% of protein digestion occurs in the stomach, where the enzyme pepsin (which is active at pH 2-3) is present. Using pepsin as a catalyst, the protein is broken down into peptones, proteoses, and a few small polypeptides. Proteolytic enzymes from pancreatic secretions, such as chymotrypsin, trypsin, carboxypolypeptidase, and elastases, are responsible for the majority of protein digestion in the small intestine. Almost little protein is digested to its individual amino acids because of this. In its dipeptide and polypeptide forms, most protein is preserved.

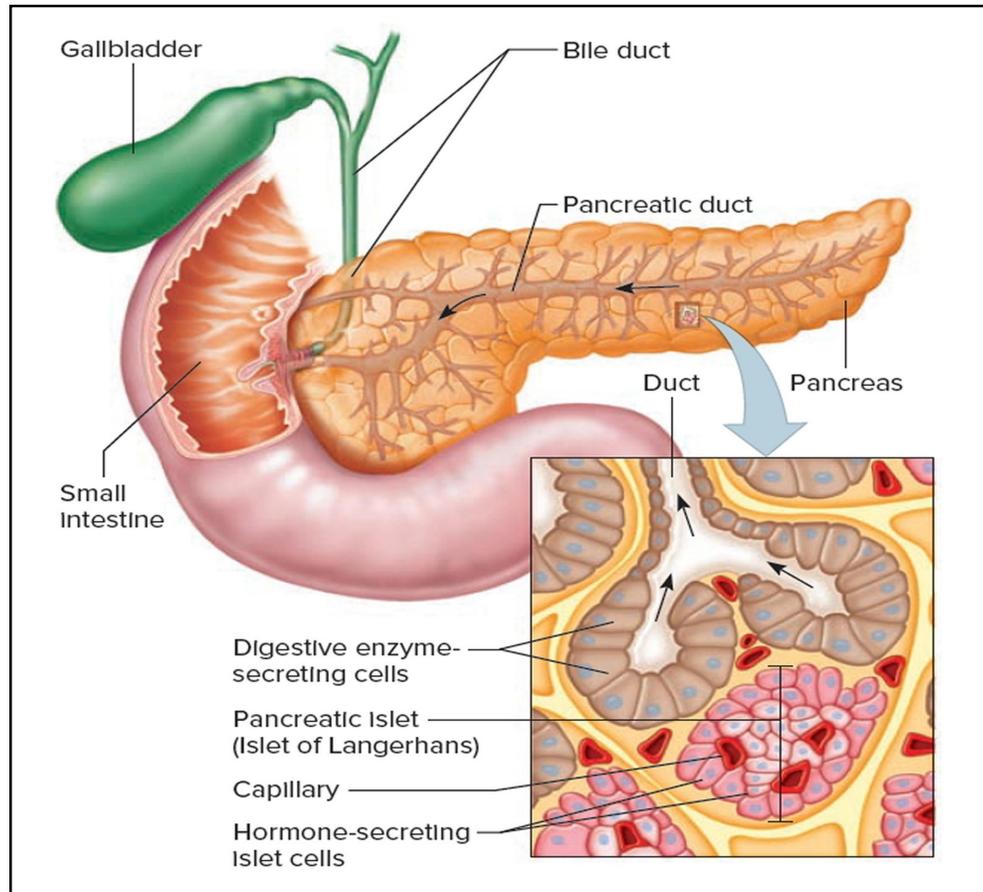


Figure 4: *Amla Avastha-Paka*

Amino acids are formed in the small intestine during the last step of protein digestion by peptidases. Finally, dipeptides, tripeptides, and single amino acids are digested from big polypeptides. The duodenum is where fat is emulsified by the action of bile. In addition to the phospholipids, bile includes significant amounts of bile salts, both of which are critical for fat emulsification. Pancreatic lipase splits dietary triglycerides primarily into two monoglycerides and two free fatty acids [13].

III. *Katu avastha-paka*

Digested food reaches *pakvashaya* in the third *avasthaphka*. Food residues undergo fermentation in the intestines thanks to intestinal microorganisms. As a result, the body's ability to produce *vayu* is stimulated. As soon as the digested food moves from the stomach to the intestines, it becomes *shoshymanasya*, or drying out due to water absorption. After then, due of *Agni's* drying action, waste items like faeces take on a bolus shape. A bolus of faeces is referred to as a *Pari pindita Pakwasya*, or PPP for short. Production of pungent gases and odoriferous compounds is known as *Vayusyat Katubhavatah*. Modern

physiology says that the small intestine is where the majority of the digestive and

absorption processes are accomplished.

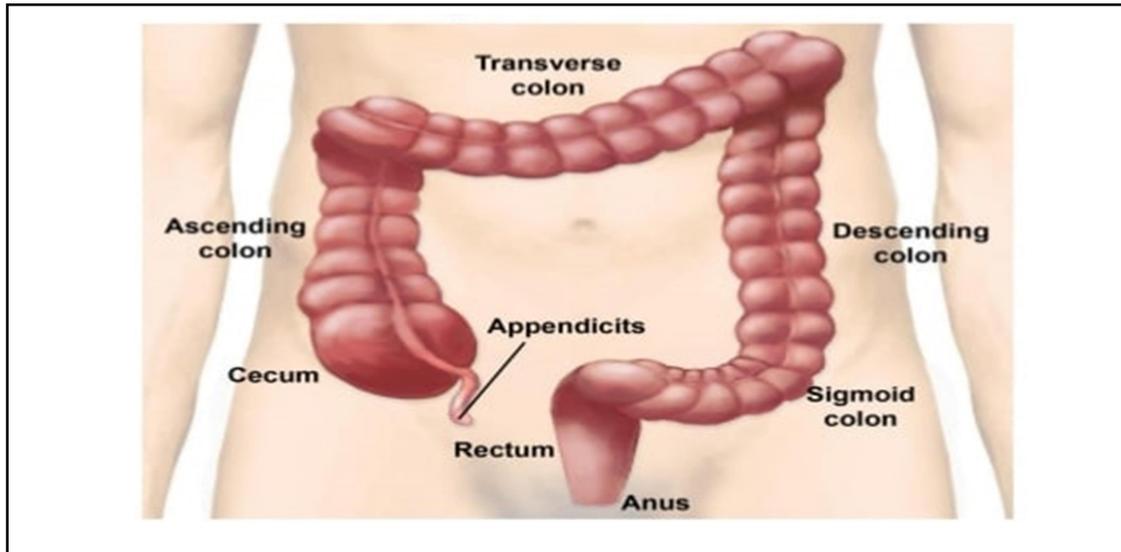


Figure 5: *Katu avastha-paka*

As soon as the food reaches the large intestine, the water and electrolytes that are still in it begin to be absorbed. The large intestine has a daily fluid and electrolyte absorption capacity of 5-8 litres. In *pakvashaya*, bacteria are at work (colon). In this manner, they may provide the body with a few additional calories of nutrients by digesting a tiny quantity of cellulose. Further products produced by bacterial action include the nutrients vitamin K (as well as B vitamins) and B12 (as well as B vitamins), thiamine (as well as B vitamins), and riboflavin (a B vitamin). Poultry excrement has an unpleasant odour because it contains many odoriferous (*katu bhava*) compounds, including indole, skatole, and mercaptans. For the first time, contemporary science confirms and

amplifies the old Ayurvedic theory about what goes on in the large intestine and the creation of foul-smelling Vayu when faeces form. Inhaled air, gases produced in the stomach by bacterial activity, and gases that diffuse from the blood all reach the gastrointestinal system through different routes. The large intestine produces 7 to 10 litres of gas each day on average (*vayusyaat*). Usually, just 0.6 litres are evacuated via the anus. Other than that, it's taken into the bloodstream through the intestinal mucosa and exhaled out of the lungs. Bacterial activity produces the majority of the gases in the large intestine, namely carbon dioxide, methane, and hydrogen. Beans, cabbage, onion, cauliflower, maize, and vinegar are known to produce more flatus to be expelled via

the anus than other foods. These meals, particularly unabsorbed fermentable carbohydrates, serve as an ideal growth substrate for bacteria that produce gas. Beans, for example, have an indigestible carbohydrate that makes its way to the colon where it feeds the colonic bacteria. Irritated large intestine produces excessive gas ejection, promoting fast anus peristaltic gas expulsion prior to absorption [13].

6. CONCLUSION

Ancient Indian sages left us the gift of *Ayurveda* science as one of their greatest legacies. Diet is as important to survival as breathing, and both are provided by food. *Agni* is often used in the digestive and metabolic processes of food, as well as in the determination of whether or not the food is suitable for human consumption. Digestive process in *Ayurveda* includes three phases: *Madhura*, *amla*, and *katu*. *Madhura* is the first phase of digestion, while *amla* is the second phase. It's possible to relate the phases of *avastha paka* to those of modern physiology. Stage one of *avastha-paka* digestion continues in the *amasaya* until pH 4 is reached by salivary amylase digesting carbohydrate-type meals. Food and gastric secretions combine to create chyme, a semi-fluid substance. This is similar to the process of making phenbhut (a semifluid combination), which is used in the synthesis of the neurotransmitter *kapha*. There's no full

digestion in the *pachmansaya* during *amla avastha pak*, thus the food is left in its raw state. *Amlabhava* is caused by the stomach releasing very acidic HCL (pH 0.8). Sourness comes from the acidic chyme entering the *pachmanasya* (pH 2-3). During this time, *amlabhava* officially begins. When fatty food enters the *pachmanasya*, the gall bladder begins to evacuate *achhapitta* (bile). During this phase, partly digested food undergoes rapid digestion and absorption. The digested meal reaches *pakvashaya* in the third *avasthapka*. Food residues undergo fermentation in the intestines thanks to intestinal microorganisms. Every day, approximately 7-10 litres of gases are produced as a result of this action when the faecal substance has been fully absorbed, the bolus is known as *Pari pindita Pakwasya*. Production of pungent gases and odoriferous compounds is known as *Vayusyat Katubhavatah*. In other words, the idea of *Aaharapaka/avastha paka* in Ayurvedic sciences indicates its connection with contemporary physiology of digestion and metabolism in the current situation.

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