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# A Review On Natural And Artificial Methods Of Fruit Ripening, Benefits & Hazards.

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## ABSTRACT-

Fruits are the part of healthy and balanced diet which play an important role in nutrition, metabolic activities and heath of individuals by supplying necessary and essential growth regulating factors. Fruits are also advised by physician as indicated or contraindicated in different health condition or disorders. It is widely described as a part of *Ahara varga* under *Phala varga* in all *Ayurvedic* literatures where quality and indications of ripened and un ripened fruits and vegetables are

described. There are various natural and artificial methods available for ripening, out of which some are safe. Commercial artificial ripening of fruits by ethylene are considered safe to eat. It allows the picking of many fruits raw and shipping them globally whereas artificial ripening by Calcium carbide is legally banned worldwide may cause many of health hazards. In this paper, a review study on fruits and their ripening methods is presented to develop understanding about different procedures, ripening agents, and their effects on health.

**Keywords :** *Ayurveda*, Fruits, Fruit ripening, Heath Hazard, *Phala Varga.*

## INTRODUCTION:

Fruits are the part of healthy and balanced diet which play an important role in nutrition, metabolic activities and heath of individuals by supplying necessary and essential growth regulating factors. Fruits constitute a commercially important and nutritionally indispensable food commodity.[1]

Fruits are also advised by Physician as indicated or contraindicated in different health condition or disorders. It is also widely described as a part of *Ahara varga* under *Phala varga* in all *Ayurvedic* literatures like *Chraka Samhita*,[2] *Sushruta Samhita,*[3] *Ashtanga Samgraha, Ashtanga Hridaya, Bhavprakasha*[4] etc., where quality and indications of ripened and unripened fruits and vegetables are described. In *Ahara Krama* meal should be started by some fruits which are a part of *ahara vidhi vidhana* told by almost all *Ayurvedic* texts as we know. At the time of meal it is directed to take Pomegranate etc. fruits first, then liquids, thereafter various soft and hard edibles.[5,6] But *Mochphala (*Banana) and *Karkati (*Cucumber) etc. are contraindicated at beginning.[7] In beginning, middle and end of meal *Amalaka* fruit is commended which is free from complications and alleviates *Doshas*.[8]

It is also a part of *Pathya - apathya* in various diseases. *Paravata* (Guava fruit) is just an example of *pathya* advised in case of *Atyagni,* which is slightly sweet, relishing and alleviates excessive digestive power.[9,10]

According to *Acharya Sushruta*, almost fruits, the fully ripe one is regarded as possessing good quality except *Bilva* which is superior in quality when unripe.[11] Ripened fruits are indicated to take as meal mentioned by *Acharya Charaka*[12], *Vagbhatta* and *Bhavprakasha*[13] too. On other side *Bilva, Haritaki* and *Draksha* (Grape fruit) etc. are

advised to take *Apakwa* and *Shushka Avastha (*in unripened & dried state).[14]

*Acharya Charaka* told about proscribed fruits that, The fruits which are old, unripe/ immature, damaged by insects, snake or animals, cold (cold waves) or heat (of sun), grown over other than its normal place and in unnatural time or unseasonal and moisture (over ripe or putrefied) are not good or fit for use.[15] *Acharya Sushruta* stated the same.[16]

## NEED OF STUDY:

All the description regarding fruits or *Phala varga*, quality of *Pakwa* (Ripened), *Apakwa* (Unripened) fruits, prescribed or proscribed fruits, Naturally ripened on trees or artificially ripened fruits and their indication and contraindications as *Pathya-Apathya*, show the importance of fruits in our life according to *Ayurvedic* views.

A very clear reference of *Acharya Bhavprakasha* which is the inspiration of this review study regarding ripening of fruits, through which we can say that there are methods of artificial fruit ripening available in our ancient community life. *Acharya Bhavprakasha* differentially mentioned the quality of Naturally ripened and Artificially ripened *Amra phala* (Mango),[17] and Artificially ripened mango has more quality than naturally ripened on tree.[18]

Fruits are widely distributed in nature. One of the limiting factors that influence their economic value is the relatively short ripening period and reduced post-harvest life. In the era of commercialization it is also understandable point that people would get fresh and good quality of fruit in their area where fruits are not cultivated. Recent advances in molecular biology have provided a better understanding of the biochemistry of entire ripening process.

## AIMS & OBJECTIVE:

- A review study on fruits and their ripening methods is planned to develop understanding concerning the procedures, ripening agents, and their effects on health.
- To understand ancient and modern methods of ripening of fruits.

Some basics of fruits like its classifications, parts, life cycle etc. are necessary to grasp for higher understanding.

**Fruits:**

A fruit is sometimes any sweet-tasting a part of plant[19]. In botany, a fruit is that the seed-bearing structure in flowering plants also known as angiosperms shaped from the ovary when flowering[20]. Vegetables are any savory

or less sweet plant products like roots, leaves and stems etc. By those standards, seedy outgrowths like apples, squash and, tomatoes, all are fruits, whereas roots like beets, potatoes and turnips, leaves like spinach, kale and lettuce, and stems like celery and broccoli are all vegetables[21]. There are many plants usually classified as vegetables because of their taste, however they are technically fruits. Tomatoes are the foremost well-known and arguable example of this. another common examples of fruits that are mistaken for vegetables include: Winter squash, Avocados, Cucumbers, Peppers, Eggplants, Olives, Pumpkins, Pea pods, Zucchini[22]. However, a nut could be a variety of fruit and not a seed that is hard, oily, and shelled plant material[23]. Fruit that bears a prominent pointed terminal projection is said to be beaked[24]. In cooking, fruits ar thought-about to be sweet whereas vegetables ar additional savory[25]. In Ayurveda *Phala varga* is delineated one by one for fruits besides *Kanda, Shaka and Pushpa varga*[26]. They clearly mentioned that some fruits ar used as vegetables; thus the *Phala varga* (fruits) is described after *Shaka varga* (vegetables)[27].

**Parts of fruit**:

The outer, usually edible layer is that the *pericarp*, shaped from the ovary and close the seeds, though in some species alternative tissues contribute to make the edible portion. The pericarp is also delineated in 3 layers from outer to inner, epicarp, mesocarp and endocarp.[28].

**Fruit life cycle**:

**Post-harvest lifetime of fruits:**

Despite being detached from the plant, fruits & vegetables stay as living organs when harvest. Like all living tissues, harvest product continuous to breathe throughout its post-harvest life. throughout the lifetime of respiration, carbohydrates are countermined to their constituent elements to provide energy to run cellular process, so keeping the cells & organism alive. Throughout this process, oxygen is consumed & water, carbon dioxide & energy are released.[29]

**Types of fruit[30]:**

Fruits are divided into groups depending on the number of ovaries they need developed from. Here are a number of the key classifications of fruits to know about.

**Simple Fruits**: Simple fruits are those that are developed from the one ovary or one reproductive structure of a flower. They are further divided into dry and fleshy, wherever dry fruits are often dehiscent or indehiscent and fleshy ones are often semi covering or full. Examples of simple fruits embody fleshy fruits like apples, cherries, plums or dry ones like hazelnuts, walnuts etc.

**Aggregate Fruits:** These sorts of fruits are developed from multiple ovaries of one flower. they're classified into follicles, achenes, drupelets, berries and additionally referred to as compound fruits. Examples: dish Apple (Sitaphala), Raspberry, Blackberry etc.

**Multiple Fruits**: These fruits ar developed from a cluster of flowers, that merge to become one massive fruit. Examples: Pineapple, Breadfruit, Figs, Mulberry etc.

**Accessory Fruits**: Accessory fruits also are referred to as pseudo fruits or false fruits, because the edible flesh isn't solely developed from the ovary of the flower, however additionally from a non-ovarian tissue residing adjacent to the carpel. Examples: Strawberry, Fig, Apple, drupe etc.

**Fruits are once more classified as climacteric and non-climacteric fruits**.

**Climacteric:** Climacteric fruits are outlined as fruits that enter 'Climacteric phase' when harvest i.e. they still ripen. throughout the ripening process the fruits emit ethylene along side raised rate of respiration. Examples are: Mango, Banana, Apple, Apricot, Kiwi Fruit, Peach, Tomato, Blueberry, Persimmon, Plum, fig, Papaya Guava Apple edible fruit[31] etc.

**Climacteric time**: period of time within the development of some plant organs involving a series of biological changes associated with the natural respiratory rise & auto catalytic production of ethylene.

**Non-Climacteric:** Non-climacteric fruits once harvested don't ripen further. Non climacteric fruits produce terribly bit of ethylene and don't respond ethylene treatment. Non climacteric, within which respiration shows no dramatic modification and ethylene production remains at terribly low level[32]. Examples are: Orange, Mousambi, Grapefruit, Grapes, Litchi,Watermelon ,Raspberry , Blackberry, Kinnow, Cherry, Strawberry, Eggplant, Pineapple, Pomegranate , Cucumber etc.

**Fruit Ripening:**

Ripening is that the method by that fruits attain their fascinating flavor, quality, color, palatable nature and alternative textural properties. Ripening is related to modification in composition i.e. conversion of starch to sugar[33]. In general, fruit becomes sweeter, less green, and softer because it ripens[34].

**Senescence**: Senescence is that the amount once chemical synthesizing pathways settle to degradative processes that is that the natural progression of the fruit from maturity to death or decay whereas cell aging might seek advice from periodic advancement of the fruit cells toward death or decay[35]. Fruit development will typically be divided into 3 major stages: growth, maturation, and senescence. the amount of growth typically involves biological process and enlargement, that is to blame for increasing size of the fruit. Maturation is that the finish of growth and should embody flavor, development and increase in sugar content that is detectable as increasing sweetness[36].

**Science of ripening:**

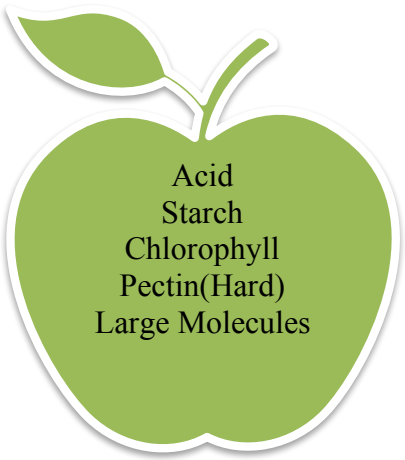
Fruit ripening may be extremely coordinated, genetically programmed, Associate in Nursingd an irreversible development involving a series of physiological, biochemical, and organoleptic changes, that finally results in the event of a soft edible ripe fruit with fascinating quality attributes. Carbohydrates play a serious role within the ripening process, by manner of de-polymerization resulting in bated molecular size with concomitant increase within the levels of ripening inducing specific enzymes, whose target disagree from fruit to fruit[37].

Fruit ripening is that the results of several advanced changes, some interactive however several freelance of one another. Early within

the ripening method, fruit synthesizes compounds, as well as alkaloids and tannins. Alkaloids act as a stimulant and might be harmful once eaten. Tannins square measure biomolecules with anti-bacterial, anti-inflammatory and antioxidant properties. These compounds fight infections and build style bitter and astringent. Under ripe fruits are fibrous, less juicy and have harder outer flesh than ripe fruits. These adaptations are an essential tool for the plants to prevent fruits and the undeveloped seeds from the eagerness of people to eat before they're ready[38].

The major classes of cell wall polysaccharides that undergo modifications during ripening are starch, pectins, cellulose, and hemicelluloses. Pectins are the common and major components of primary cell wall and middle lamella, contributing to the texture and quality of fruits.. Their degradation during ripening looks to be to blame for tissue softening of variety of fruits. Structurally pectins square measure a various cluster of heteropolysaccharides containing partly methylated D-galacturonic acid residues with facet chain appendages of many neutral polysaccharides. The degree of polymerization/esterification and therefore the proportion of neutral sugar residues/side chains square measure the principal factors causative to their (micro-) non uniformity. Pectin degrading enzymes like poly galacturonase, pectin methyl esterase, lyase, and rhamno galacturonase square measure the foremost concerned in fruit-tissue softening[39].

Combination of the processes that occur from the latter stages of growth and development through the first stages of senescence, results changes in composition, color, texture or alternative sensory attributes. Total thirty six sub processes of organic chemistry changes referred to as nowadays[40].




**Enzymes**
**Kinases**
**Amylases**
**Hydrolases**
**Pectinases**
**Hydrolases**


**Importance of artificial ripening:**

Ripe fruits are soft and too delicate to face up to transportation over long distance and repeated handling and should preferably be ripened near the consumption area. It takes loads of your time from the collection procedure and delivering to the customers. To draw in business. To attract commercial, To get desired nutritive value, To get desirable taste texture ,odor and flavor artificial ripening is most vital fruit process strategies in fruit and vegetable trade.

**History of ripening**: Ancient Egyptian harvesters slashed open the figs they collected to stimulate ripening, and Chinese farmers would depart pears in closed rooms with incense burning. Later analysis showed that wounding and high temperatures trigger plants to provide ethylene. In 1901 Russian scientist Dimitry Neljubow showed that ethylene might have an effect on plant growth Three decades later, researchers found that plants turn out olefin and production of the gas raised once the scientists cut the fruit with a knife. Special receptors in plant cells bind to the ethylene. The first known plant genes concerned during this method, *ETRI* and *CTRI*, were known in 1993; they keep the fruit ripening genes from activating till ethylene is created. Once the *ETRI* and *CTRI* close up, permits activates different genes that build numerous enzymes: pectinases to interrupt down cell walls and soften the fruit;

amylases to convert carbohydrates into simple sugars; and hydrolases to degrade the chlorophyll content of the fruit leading to color modification. Researchers later discovered that plants produce ethylene in several tissues in response to cues on the far side the strain from heat and injury. It is created throughout sure organic process conditions to signal seeds to germinate, prompt leaves to alter colours, and trigger flower petals to die. it's a alert to activate the suitable defense responses[41].

**History of Ethylene[42]**:

Cousins (1910) found that ripe oranges produce a volatile substance that hastened ripening of unripe bananas nearby. With the help of gas chromatography R. Gane (1934) found that the ripening inflicting volatile substance was ethylene. Ethylene was recognized as a growth regulator by Crocker (1935). ethylene is made in plants from the amino acid methionine. It is fashioned in most plant elements -roots, leaves, flowers, fruits, seeds.

**Uses of ethylene**: Ethylene regulates variety of physiological processes. the varied business uses of ethylene square measure as follows:

1. **Fruit Ripening**: Kerosene lamps and fodder were antecedently used for exciting color development and ripening of some fleshy fruits, e.g. Banana, Mango, Apple, and Tomato. The result is thanks to ethylene. ethylene lamps square measure currently specifically used for this purpose.

**2. Feminizing Effect**: External provide of terribly little amount of ethylene will increase the number of feminine flowers and therefore fruits in Cucumber.

3. **Sprouting of Storage Organs**: Rhizomes, corms, tubers, seeds (e.g., Peanut) and different storage organs will be created to sprout early by exposing them to ethylene.

4. **Thinning:** Excess flowers and young fruits are thinned with the assistance of ethylene, e.g., Cotton, Cherry, and Walnut. It permits better growth of remaining fruits.

**Ripening methods and technology**: Almost all methods of ripening, either conventional or the modern chemical methods come with their own merits and demerits, however fast and uniform ripening is that the major problem in fruit trade[43].

**Ancient methods/ Natural ripening:**

Ripening of mango and some other fruits in air tight rice bin and paddy straw we

can usually see in our villages nowadays too. Normally, the number of days taken for edible ripening varies for different fruits and prevailing climatic conditions. A simple technology practiced in households to trigger ripening is to keep unripened and ripened fruits together inside an air tight container. Since the already ripened fruits release ethylene, ripening will be faster. It takes about 5 to 6 days for mangoes and 6 to 7 days for sapotas to ripen. Spreading unripe fruits as layers over paddy husk or wheat straw for a week to ripen is another alternative. Another method is to place the fruits intended for ripening inside an air tight room through smoking inside smoke chambers. Smoke emanates acetylene gas. But the major drawback of this method is that the fruits do not attain uniform colour and flavor. In addition, the persistence of smoke odor on the product impairs its quality.[44]

**Modern methods / Artificial ripening:**

1. Fruit ripening using calcium carbide: Calcium carbide, also known as calcium acetylide, is a chemical compound with the chemical formula of $CaC_2$. Its main use industrially is in the production of acetylene and calcium cyanamide.[45] It was discovered by friedrich wohler in 1862. Calcium carbide, once dissolved in water, produces acetylene which acts as an artificial ripening agent. However, industrial grade calcium carbide is sometimes contaminated with traces of arsenic and phosphorous which is carcinogenic.[46] The Food Safety and Standards Authority of India (FSSAI) has banned calcium carbide under the Prevention of Food Adulteration (PFA) Act, 1954. Anyone using it can be imprisoned for three years along with a fine of ₹ 1,000. However, no effective action plan has been devised to implement it.[47]

**2.**The only safe and worldwide accepted method is using ethylene,[48] which is a natural hormone for ripening when done under controlled temperature at 18-21℃ for most fruits, and relative humidity conditions. Ethylene being a natural hormone does not pose any health hazard for consumers of the fruits. It is a de-greening agent, which can turn the peel from green to perfect yellow, orange or red and maintain the sweetness and aroma of the fruit, thus it looks more appealing. It has been known for a long time that treatment of unripe fruits with ethylene would merely stimulate natural ripening until the fruit itself starts producing ethylene in large quantities.

3. Another practice is that some farmers dip unripe mature fruits in 0.1 per cent solution

of Ethephon (2-chloroethyl-phosphonic acid) also called ethral and wipe it dry. The fruits are then spread over a newspaper without touching each other and a thin cotton cloth is covered over this. In this method, the fruits will ripen within two days. This water soluble compound is readily absorbed by plants , and breaks down to release ethylene above pH 4.6 .

4. In one of the simple and harmless techniques, 10 ml of ethrel and 2 gm of sodium hydroxide pellets are mixed in five litres of water taken in a wide mouthed vessel. This vessel is placed inside the ripening chamber near the fruits and the room is sealed air tight. About a third of the room is filled with fruits leaving the remaining area for air circulation. Ripening of fruits takes place in about 12 to 24 hours.

Use of diluted ethylene gas mixtures is safer than using pure ethylene, which is explosive and flammable at concentrations of 3% or higher.

**Table no. 1: Optimal ripening conditions for fruit ripening**

| | |
|---|---|
| Temperature | 18 to 25oC |
| Relative humidity | 90 to 95% |
| Ethylene concentration | 10 to 100 ppm |
| Duration of treatment | 24 to 74 hours depending on fruit type and stage of maturity |
| Air circulation | Sufficient to ensure distribution of ethylene within ripening room |
| Ventilation | Require adequate air exchange in order to prevent accumulation of O2' which reduces effectiveness of C2H4. |

**Table no. 2; Optimum storage and ripening temperatures for a few fruits are given below.**[49]

| Commodity | Ethylene conc.(ppm) | Ethylene exposure time (hr.) | Ripening temp. oC | Storate Temp.oC |
|---|---|---|---|---|
| Banana | 100-150 | 24 | 15-18 | 13-14 |
| Honey dew melon | 100-150 | 18-24 | 20-25 | 7-10 |
| Kiwifruit | 10-100 | 12-24 | 0-20 | 0.5-0 |
| Mango | 100-150 | 12-24 | 20-22 | 13-14 |
| Orange degreening | 1-10 | 24-72 | 20-22 | 5-9 |
| Stone fruit | 10-100 | 12-72 | 13-25 | -0.5-0 |

There are two main methods of exposing fruit to ethylene i) Trickle method and ii) Ripening chambers, out of these trickle method is widely used.

**De-greening:** In order to improve external skin colour and market acceptance, citrus like orange, lemon, mousambi and kinnow can be treated with ethylene as a de-greening agent to breaks down the green chlorophyll pigment in the exterior part of the peel and allows the yellow or orange carotenoid pigments to be expressed. De-greening is carried out in ripening rooms, with same ethylene concentrations as above. it is done by 2 methods , one by exposing to ethylene and another is artificial coloring. When weather is not conducive for the development for colour in orange; legally permitted dye (1-2(2,5-dimethoxy phenylazo)2-napththol) can be used to colour the peel of the fruits like orange, this process is called as 'Colour Add'. It is used on mature fruit which are not intended to processing. Dye is applied to fruit by dip at 490C for 4 min.[50]

**Chlorophyll degradation :** Chlorophyll degradation is vital during leaf senescence and fruit ripening, as it allows for recycling of nitrogen and other nutrients and for protection from buildup of phototoxic chlorophyll intermediates. The first steps in

chlorophyll breakdown are the removal of the phytol tail (dephytylation) and the central Mg atom. It has been thought that dephytylation typically occurs first, catalyzed by the enzyme chlorophyllase, which converts chlorophyll to phytol and chlorophyllide. Removal of Mg subsequently converts chlorophyllide to pheophorbide.[51] Chlorophyllide, which is the last precursor of chlorophyll biosynthesis, is most likely not an intermediate of breakdown. Therefore, chlorophyll synthesis and breakdown are metabolically separated during leaf senescence. Based on patterns of expression, chlorophyllase may play a role in chlorophyll breakdown during fruit ripening and response to pathogens and wounding.[52]

**Colour development**: Vegetables & fruits are strongly coloured because they contain a chemical compound named carotenoids. Carotenoids are organic pigments that are found in the chloroplasts & chromoplasts of plants .[53] There are over 1,100 known carotenoids which can be further categorized into two classes, xanthophylls (which contain oxygen) and carotenes (which are purely hydrocarbons and contain no oxygen).[54]

**Fruit Waxing :** Fruit waxing is a technique of coating fruits and vegetables with either natural edible wax or artificial wax which forms a thin shiny layer on the surface of fruit and vegetables in addition to or as a replacement of natural wax produced by the fruit itself. The main objective of fruit waxing is to provide a barrier to moisture loss, prevent bruising, prevent physical damage, and delay browning of fruits. It is also useful to improve post-harvest consumer appeal. Waxing materials may be either natural or petroleum based. It increases the shelf life of fruit by 100 % reduction in transpiration & respiration rate. The fruit wax coatings may be composed of polysaccharides, proteins, lipids, and composites. Additives such as plasticizers, antimicrobial agents, minerals, vitamins, colors, or flavors can be added in this process. The film solutions can be applied to fruits by several methods such as manual rubbing, dipping, spraying, brushing, and panning followed by drying.[55]

Carnauba wax is allowed under FSSAI**,** also called Brazil wax and palm wax**.** It is obtained from the leaves of the carnauba palm by collecting and drying them, beating them to loosen the wax, then refining and bleaching the wax as a food additive.[56] Natural wax is removed first before use usually by washing and brushing process .[57]

**Identification of ripened fruit:**

**The Starch Iodine Test[58] -** As fruit ripen, they lose starch. Change from starchy to

sweet is generally a good indicator of ripeness. The starch iodine test is a way to measure the percentage of starch in fruit flesh, which becomes apparent after staining the fruit with a 4% potassium iodide/1% iodine solution. As the apples lose starch and become riper, they go from a dark iodine staining to a lighter staining.

**Identification of artificially ripened fruits by Ca-carbide:** The presence of harmful impurities such as arsenic also remains a concern. When added to water, it reacts vigorously creating Acetylene , which is highly flammable that creates its distinguished smell. Artificially ripened fruits Once ripened, they're virtually indistinguishable from naturally ripened fruits. Some device and software are also designed by some Bio-engineers to claim the differential identification of naturally and artificial ripened fruit[59]

**Chilling Injury:** Due to Wrong storage or transit temperature chilling injury affects many fruits & vegetables. Most crops of tropical & subtropical origin are sensitive to chilling injury Chilling injury occurs at temperatures well above freezing point 32°F (0°C). The tissue becomes failure to ripen normally and increased susceptibility to decay organisms such as *Alternaria*. The second type of injury is frost/freezing injury and it can occur in a field when temperatures drop to or below 32°F (0°C). It can also occur during cold storage if temperatures were below the freezing point of the product. When chilling stress is prolonged , these alterations & dysfunctions will lead to the development of a variety of chilling injury symptoms such as surface lesions ,internal discoloration , water soaking of the tissues , blocking of peel & failure to ripen normally.[60]

**Table no.3: Optimal storage temperature & chill point of some fruits:**

| Products | Optimal storage temp. | Chill point | Chill sensitive stored at |
|---|---|---|---|
| Apple | $5^0$ C | - | 2-$4^0$ C |
| Banana green | 17-$23^0$ C | $13^0$ C | $13^0$ C |
| Banana ripened | 13-$16^0$ C | $12^0$ C | $12^0$ C |
| Orange | 4-$6^0$ C | $3^0$ C | $3^0$ C |
| Papaya | $13^0$ C | $7^0$ C | - |

**Hazards of artificial ripening:** Industrial-grade calcium carbide usually contains traces of arsenic and phosphorus, is possibly carcinogenic .Acetylene is believed to affect the nervous system by reducing oxygen supply to brain. Arsenic and phophorus are toxic and exposure may cause severe health hazards. The symptoms of arsenic and phosphorous poisoning include vomiting, diarrhea with or without blood, weakness, burning sensation in the chest and abdomen, thirst, the problem in swallowing, burning of eyes, permanent eye damage, ulcers on the skin, mouth, nose and throat. Other symptoms include throat sores, cough, wheezing and shortness of breath. It damages the mucosal tissue in the stomach and disrupts the intestinal function, can cause peptic ulcers. According to studies, calcium carbide can also affect the neurological system by inducing prolonged hypoxia and causes symptoms like headache, dizziness, high sleepiness, memory loss, cerebral oedema, numbness in the legs and hands, general weakness, cold and damp skin, low blood pressure and seizure. Pregnant women particularly need to be very careful and should not consume such fruits and vegetables.[61]

## CONCLUSION :

*Acharya Charaka , Sushruta , Vagbhatta ,Bhavprakaash* described the *Phala varga* in which they elaborate the quality of ripened / unripened fruits and classified them according to *Rasa, Guna , Virya, Vipaka*. All fruits should be collected according to *Ritus* as literatures directed but in era of commercialization it is quite difficult as fruits are cultivated in unripe state and transported to the consumption area. Then fruits and vegetables are stored in appropriate storage where controlled artificially ripening processes are done to make them edible. As a part of healthy diet, *Pathya- Apathya*, and remedies of various of diseases, Fruits are very important part of individuals, society, Business community and health care professionals .Fruit ripening is wonderful biochemical & physiological process. It involves many of bio-chemical changes which we discussed in this review. However, an artificially ripened fruit comes into the question of safety. Shoddy and cheap people or businessman looking to make more profit only, they do not care for the health of people and often use unethical or illegal practices of fruits ripening. Calcium carbide is such a form of malpractices which is legally prohibited worldwide may cause many of health hazards as mentioned above

under headings. Contamination of harmful chemicals and carcinogens can occur, rendering the fruit unsafe for human consumption. The ripening is very important process for humanity to understand the commercial impact & nutritional impact on fruits & vegetable industry. It is already proved that ethylene is only responsible in ancient methods of ripening too which are safest if the fruits are going to be consumed at home or local surroundings. Commercial Artificial ripening of fruits by ethylene are considered safe to eat. It allows the picking of many fruits raw and shipping them globally. Being a physician one more important noticeable point is that there are no any reference of difference of Glycemic index or Glycemic load between Naturally or Artificially ripened fruits. It only depends on state of ripeness. Worker or employee of fruit industry must be taken care of from hazards of ripening occupations. Understanding about this title related areas are also beneficial to us in all prospects which will create new research fields for *Ayurveda* as well as other health professional, leading to considerable benefits of society.

1

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