

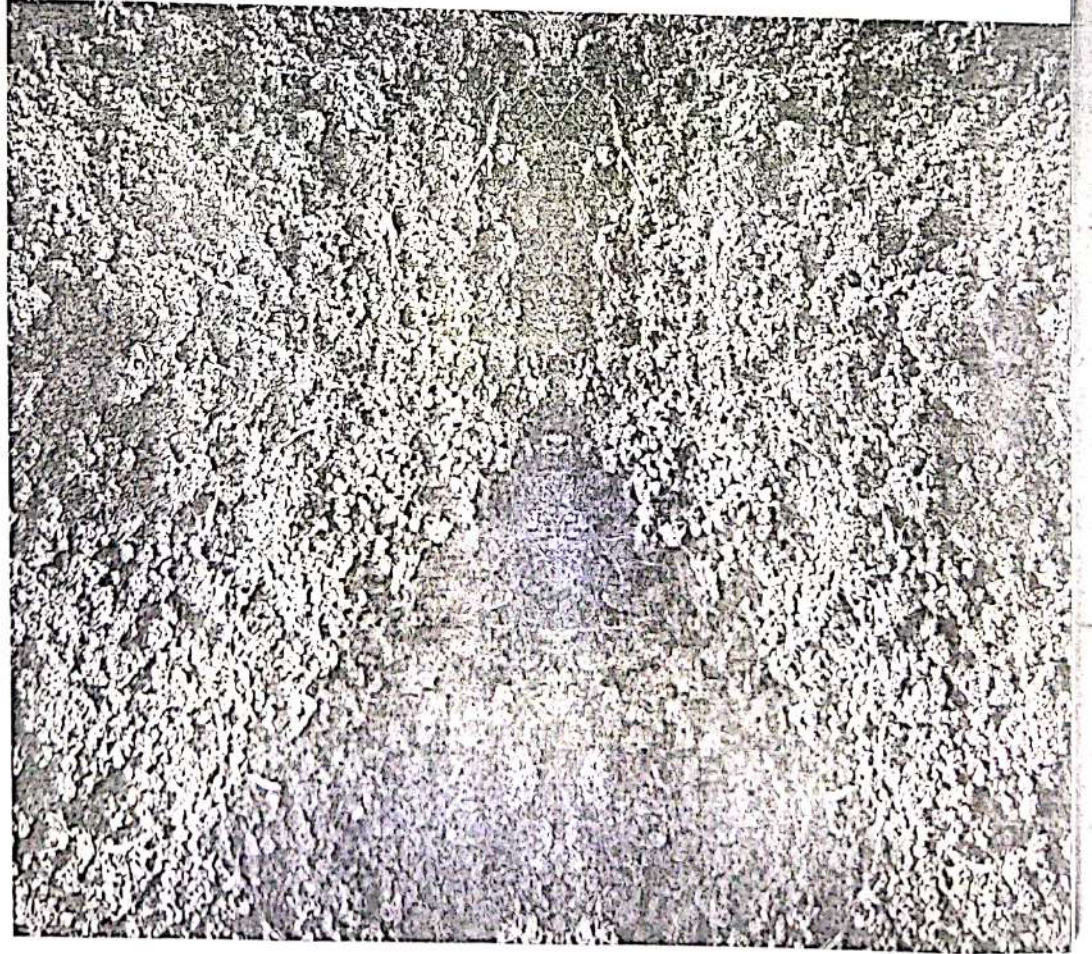
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अक्षरवाङ्मय प्रकाशनाच्या पंधराव्या वर्धापनदिनी
प्रकाशित होत असलेली जनआवृत्ती...

ग्रामीण साहित्य संकल्पना आणि समीक्षा

केदार काळवणे



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Kedar Kalwane

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प्रकाशक

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मनोगत । नऊ
प्रस्तावना । तेरा

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६. ग्रामीण साहित्य समीक्षेची वाटचाल । १२५

मराठी साहित्यातील साठोत्तर काळ हा प्रायः 'साहित्यप्रवाहांचा काळ' म्हणूनच महाराष्ट्राच्या सांस्कृतिक इतिहासात नोंदवला जाईल, एवढा प्रचंड दाब या प्रवाहांनी मध्यवर्ती साहित्यावर टाकला होता. कृतिशील चळवळ, साहित्यनिर्मिती, समाजप्रबोधन, प्रस्थापित आशयसूत्रे-आकृतिबंध यांची मोडतोड, पर्यायी संमेलनसंस्कृती अशा अनेक कृतियुक्त उपक्रमांमधून एकंदर मराठी साहित्य संस्कृती या प्रवाहांनी वृद्ध आणि समृद्ध केली. मात्र जागतिकीकरणोत्तर काळात बहुराष्ट्रीय कंपनीकरणाचा रेटा वाढल्यामुळे या प्रवाहांची बहुसांस्कृतिकता पुन्हा परिघाकडे सरकायला लागली. परिणामी आज या प्रवाहांच्या अभ्यासाची कधी नव्हे; इतकी तातडी निर्माण झाली आहे. या प्रवाहांच्या समर्थनार्थ निर्माण झालेल्या साहित्य चळवळींमध्ये अलीकडे थांबलेपण, कुठितता आली आहे. म्होरक्यांची प्रवाहपतितता, व्यवस्थाशरणता, आशयाचे आवर्त-साचेवद्धता या साऱ्यांची चिकित्सा, मूल्यांकन एका व्यापक परिप्रेक्ष्यातून होणे गरजेचे आहे. हे मूल्यांकन करण्याची जबाबदारी आता नव्या अभ्यासकांवर आहे. केदार काळवणे हे समकाळातील एक महत्त्वाचे अभ्यासक, विमर्शक आहेत. ग्रामीण वाङ्मयाचा लेखाजोखा ते या प्रस्तुत ग्रंथातून घेऊ पाहताहेत. काळवणे हे जागतिकीकरणोत्तर काळातील ग्रामसंस्कृतीची स्थित्यंतरे प्रत्यक्ष अनुभवणारे, ग्राम जगण्याचे नीट आंतरिकीकरण झालेले तरुण अभ्यासक आहेत. या ग्रंथातून ते ग्रामीण साहित्याचे तात्विक अधिष्ठान पुन्हा एकदा तपासून पाहताहेत. या प्रवाहातील लेखकांच्या प्रेरणा, प्रवाहाचा विकासक्रम, समवृत्तीच्या प्रवाहांशी तुलना, ग्रामीण साहित्य समीक्षेची वाटचाल, भाषा-शैलीविचार या अंगाने केलेले पुनर्मूल्यांकन हे नक्कीच महत्त्वपूर्ण आहे.

- प्रा. केशव तुपे

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केदार काळवणे



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कल आणि कस ■ ४

‘कल आणि कस’ या साहित्यविषयक स्फुट लेखांच्या पुस्तकात केदार काळवणे यांच्या वाङ्मयीन जाणिवा तर व्यक्त होतातच; त्यासोबत त्यांच्या जीवनविषयक निष्ठाही प्रकट होतात. परिवर्तनशील, सम्यक दृष्टीच्या या लेखकाचा नवनव्या सांस्कृतिक-सामाजिक गोष्टीत मनापासून सहभागी होणे हा स्वभाव आणि अवलोकन-आकलनाच्या पातळीवर मूल्यात्मक सुसंगती साधणे हा स्थायिभाव आहे. पुस्तकातील पहिल्या भागातून हे आपल्याला जाणवत राहते. आपल्या म्हणण्याला संदर्भाचे तपशील पुरवताना ते पुरते सावध असल्याचे लक्षात येते. साहित्य आणि संस्कृती, साहित्य आणि समाज, साहित्य आणि परिवर्तने यांचा अनुबंध स्पष्ट करताना त्यांची प्रगतीशील भूमिका कुठल्याही मर्यादा उत्पन्न करित नाही; किंबहुना ती त्यांच्या भाष्याला सरूप करते. विविध संदर्भाचे तपशील देताना स्वतःचे त्यांचे ‘म्हणणे’ बाजूला पडत नाही किंवा वाटही चुकत नाही. ललित साहित्याचे स्वरूप विशद करताना त्यांनी भाषा, अनुभव, सामाजिक संदर्भ आणि सौंदर्य यासंबंधी अतिशय समतोल भाष्य केले आहे. ‘मानवी जीवनाचे दर्शन घडविणे’ हे साहित्याचे मुख्य प्रयोजन असल्याची स्पष्ट जाणीव त्यांना आहे. म्हणूनच विविध प्रवाहांच्या साहित्यासंबंधी त्यांनी मांडलेले आकलन एकांगी आणि उथळ होत नाही. ते ग्रामीण साहित्याचे चिकित्सक अभ्यासक आहेत. ग्रामीण साहित्याच्या कक्षेत अन्य साहित्य संकल्पनेच्या अनुबंधांची जी चर्चा त्यांनी केली, ती अत्यंत वाचनीय आहे. कविता हा साहित्यप्रकार त्यांच्या विशेष आवडीचा दिसतो. मराठवाड्यातील ग्रामीण कवितेचे स्वरूप व तिचे वेगळेपण मांडताना त्यांनी परंपरा आणि नवता यांचा संबंध उजागर केला आहे. मराठी साहित्यात आपली नाममुद्रा उमटविणाऱ्या काही लेखकांच्या साहित्य योगदानावर त्यांनी केलेले आत्मीय लेखन हे एकाचवेळी त्यांच्या अभ्यासाला आणि व्यक्तिमत्त्वाला ठळक करणारे आहे. दुसऱ्या भागात समाविष्ट असलेले पुस्तकांवरील परीक्षात्मक लेख देखिल अभ्यासपूर्ण आणि साहित्यकृतींचे नेमके आकलन मांडणारे असेच आहेत. त्यांनी उत्तरोत्तर अधिकाधिक सकसपणे लिहीत राहावे आणि सामाजिक-साहित्यिक क्षेत्रात आपले योगदान देत राहावे, यासाठी त्यांना मनःपूर्वक शुभेच्छा!

- डॉ. यशपाल भिंगे



मूल्य ₹ 390

About the Book

The book basically delivers the health benefits of vegetables. The book contains many chapters. These chapters provide the information about vegetables and its health benefits on human health like health benefits of carrot, tomato, cauliflower, bitter gourd, radish, drumstick, cabbage etc.

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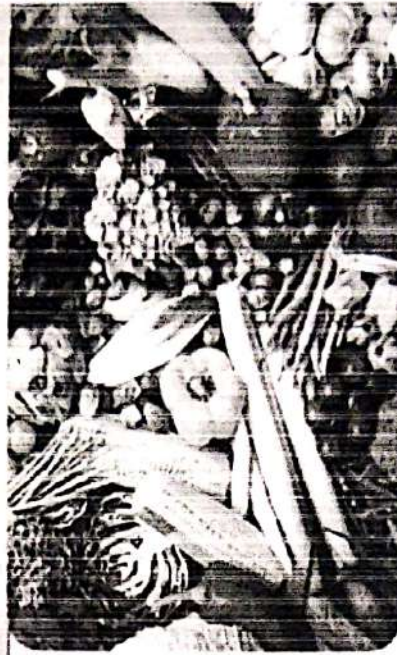


Vegetables & its Health Benefits

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2020

Vegetables & its Health Benefits







Editors

Mr. P. A. Dhanalakshmi
Mr. D. B. Shrivastava
Dr. S. A. Shrivastava
Dr. K. E. Rao

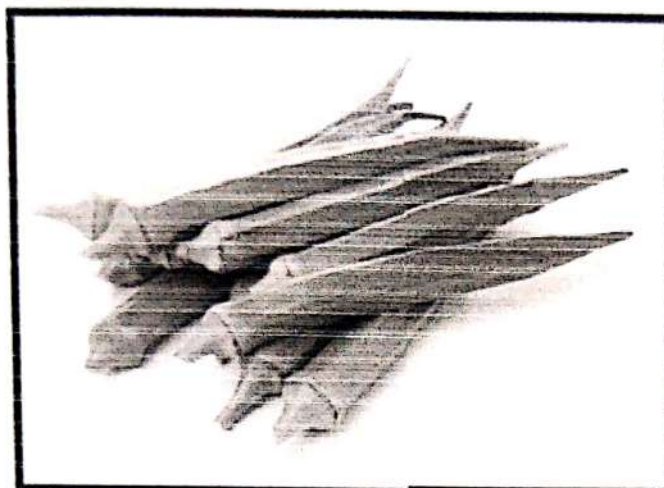


Authors' details

Name of the Authors	Name of the topics	Authors' details
1. Dr. Hemant Chandore 	Lady finger (Okra)	Assistant Professor,(9 years Experience) Dept.of Horticulture,Shikahan Maharashtra Dnyandeo Mohekar Mahavidyalaya Kalamb,Dst,Osmanabad
2. Mr. R. A. Dagadkhair 	Capsicum	Scientist (Food Technology) from six years (Food Technology) at ICAR's Directorate of Cashew Research, Puttur, and Karnataka, India.
3. Dr. Gurunath Mote 	Cluster beans	He is presently working as Assistant Professor in Department of Technology (Food Technology Division), Shivaji University Kolhapur. He is awarded Ph. D. in (Chemical Technology-Food Technology) from University Institute of Chemical Technology (UIC), Kavayitri Bahinabai Chaudhari, North Maharashtra University, Jalgaon, Maharashtra, India.
4. Dr. Murli Ingale 	Broccoli	Ph.D. with specialization in Food Science and Technology from MPKV Rahuri in 2017. He joined Food Technology College, Sangamner as Principal in charge and had total 6 years of experience in same field. Thereafter in 2019, he joined JNKVV Krishi Vigyan Kendra, Balaghat.

HEALTH BENEFIT OF OKRA

Dr. Chandore H.D.



Okra	
Scientific classification	
Kingdom:	Plantae
Clade:	Tracheophytes
Clade:	Angiosperms
Clade:	Eudicots
Clade:	Rosids
Order:	Malvales
Family:	Malvaceae
Genus:	<i>Abelmoschus</i>
Species:	<i>A. esculentus</i>
Binomial name	
<i>Abelmoschus esculentus</i> (L.)	

Introduction

Okra is most important vegetables of Indian diet. Botanical name of this plant is *Abelmoschus esculentus* and family is Malvaceae. Although in previous times it was included in Hibiscus genus which now distinguished as from hibiscus as

Abelmoschus genus .Origin of okra is Ethiopia which later on planted in North Africa, in the Mediterranean, in Arabia and India bythe 12th century BC.

Okra has different names like ladies finger in England, gumbo in the United States of America, guino-gombo in Spanish, guibeiro in Portuguese and bhindi in India, Kenkase (Berta), Andeha (Gumuz), Bamia (Oromica/Amharic) in Ethiopia . The name of Okra derives from the Niger-Congo Group languages where in Twi languages is refred as nukuruma but in real sense name okra was used by English in late 18th century . Some other names are Okro in Caribbeans, Qui-qui in China, Quibao in Europe, Guigambo in Portuguese.

India is the largest producer of okra with 3.5 million tonnes (70% of the total world production) of okra produced from over 0.35 million-hectare land (FAOSTAT, 2008). Other important countries are Nigeria, Pakistan, Ghana, Bennis and Egypt.

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Dr. Veena Pani
Srivastava

Co-editor
Dr. A.D. Ashok



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Chief Editor

Dr. Veena Pani Srivastava

Senior Scientist & Head, JNKVV, Krishi Vigyan Kendra, Chhatarpur,
Madhya Pradesh, India

Co-editor

Dr. A.D. Ashok

Assistant Professor (Horticulture), Institute of Agriculture, AEC & RI
Campus, TNAU, Kumulur, Tamil Nadu, India

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Chapter - I

Advanced Packaging Systems in Fruits and Its Processed Products

Authors

H.D. Chandore

Assistant Professor, Department of Horticulture, S.M.
Dnyandeo Mohekar Mahavidyalaya Kalamb, Osmanabad,
Maharashtra, India

Sanchita Ghosh

Subject Matter Specialist (Horticulture), KVK, Samastipur, Dr.
Rajendra Prasad Central Agricultural University, Pusa, Bihar,
India

Chapter - 1

Advanced Packaging Systems in Fruits and Its Processed Products

H.D. Chandore and Sanchita Ghosh

Abstract

Packaging is an important operation of the post harvest management of fruits and their processed products. The packaging industry now changing their pattern with respect to different kinds of innovations. Various advanced packaging systems like antimicrobial packaging, smart and intelligent packaging, thermally sensitive packaging, modified atmospheric packaging etc are playing major role in horticultural industry. However, still we are lacking to meet export standards in advanced level of packaging as compared to the foreign countries. Enormous quantity of produced are being wasted every year during transport due to improper packaging. An attempt has been made to make detail review on the traditional as well as advanced packaging systems in this chapter.

Keywords: packaging, antimicrobial packaging ethylene, CO₂, O₂ scavengers, smart and intelligent packaging, robotics, automation etc.

1. Introduction

In fruits and vegetable production, India secures second rank followed by china^[1]. Although India produces good amount of fruits and vegetables, still huge quantity is being wasted every year due to improper post harvest handling which included appropriate packaging of the material. Post harvest management of fruits and vegetables is important pillars of Indian economy as Indian food industry facing post-harvest losses (35-40%) due to improper handling, storage, packaging and other post-harvest management practices which is worth of Rs. 2.40 lakh crore^[2, 3]. The Ministry of Food Processing Industries (MFPI) estimated losses of 23 million ton of grain, 12 million of fruits and 21 million tons of vegetables of wroth Rs. 4.4 billion USD with total food loss of 10.6 billion USD in the year 2017-2018 of India^[4] (NAAS Report, 2019). These losses could be overcome by adopting modern technologies and process among which appropriate packaging is most

important^[5]. As per the reports of ASSOCHAM & EY, India, packaging is the fifth largest sector in India's total economy, which will reach its growth of 73.6 billion dollar by 2020^[6]. The packaging industry in India is rapidly growing reach 32 billion dollar in 2015 to 73 billion dollar in 2020 as per FICCI and Tata Strategic Management Group (TSMG) report of 2016. The Indian packaging industry contributed 4% of global packaging industry but, per capita consumption is very low (4.3kg) as compare to Germany (42kgs and Taiwan (19kg)^[2]. Trends shows that Indian packaging industry is moving from use of rigid plastic materials to flexible packaging as these products are visually appealing, cheaper and durable. Some new technologies like IML (In Mould Labeling) MAP, nano-structured multilayered films etc. are gaining importance gradually due to excellent packing quality.

2. Benefits of packaging

Packaging has various benefits in overall production and marketing of produce. It not only deals with the reduction of postharvest losses but also effective for increasing consumers acceptability. Following are the benefits or importance of packaging.

- i) It assembles the produce in convenient way so that it may reach consumer without any damage to the products. It protects internal products from tampering or any other kinds of damage such as hitting, shocking, vibration, compression, wetting, bruising, etc, It also acts as barrier for oxygen, water or its vapors, dust etc., that are the agents of microbial contamination
- ii) It helps to maintain internal and external quality of produce including its freshness by avoiding contact with the external environment
- iii) It prevents physiological, biochemical and any other environmental changes
- iv) It reduces transport cost by palletization method as compared to bulky transport system
- v) It helps in maintaining quality standards as per export norms and regulations
- vi) It is helpful to sellers, buyers, and consumers by providing all necessary information on their packing material
- vii) It acts helps to maintain nutritional components at optimum level and hygienic condition

- viii) It helps in transport and shipping by increasing its durability and handling capability
- ix) Some advanced packaging tools like use of barcode, QR code, anti-theft devices such as dye packs, RFID tags, electronic article surveillance tags, that can be activated or detected by devices at exit points which are useful to prevent retail loss

3. Packaging methods/types/levels

Generally, there are four methods/types/levels of packaging, which are as follows:

i) Primary packaging or sales packaging

Primary packaging is the first level of packaging where the product is in immediate contact with the thin layer. It means the first layer of product and any other secondary layer existed in that, e.g. a beverage can, candy wrapped in a pouch, mesh bag for fruit etc. The main function of this layer is to protect the product from external environment. This product directly goes in the hands of consumer hence also known as sales packaging. Mostly these kinds of packaging can wrap the product for end level consumer. Labelling and other cap fitting operation can be carried out for the sales unit [7].

ii) Secondary packaging or group packaging or display packaging

The major function of this level of packaging is not only the product protection but also better visibility of the product at retail store while displaying. These kinds of packaging allow better handling of bulk product. These kinds of packaging is mostly used for beverage, food and cosmetic sector for display of primary packs in group in shelves or racks hence also referred as display packaging. The most common examples of these types of packaging are cardboard cartons, the card cereal box that holds the inner bag, cardboard boxes and cardboard/plastic crates [7].

iii) Tertiary packaging or transport or distributive packaging

Tertiary packaging intended for mostly transporting of the bulk packages in container. This kind of packaging is generally not available directly to the consumer but can be used by retailer, wholesaler for displaying in their shop. These kinds of packaging handle large amount of packages during handling, storage and transportation. Mostly for export point of view, this kind of packaging minimises handling, transporting losses at individual level due to less exposure of individual unit to the environment [7]. It contains number of secondary packages, which are packed and stacked together in warehouses and later transferred in large shipping containers for

further transport. These kinds of package are also termed as distribution package as these kinds of packaging generally used for distribution of large number of products in different area. Example of tertiary packaging includes brown cardboard boxes, big corrugated cardboard box, wood pallets, wrapped pallet and shrink-wrap.

iv) Unit load

These kinds of packaging are generally loading or unloading of big containers or consignments. It also called as Unit because most of the secondary or tertiary materials have repacked on the pallette using stretch film.

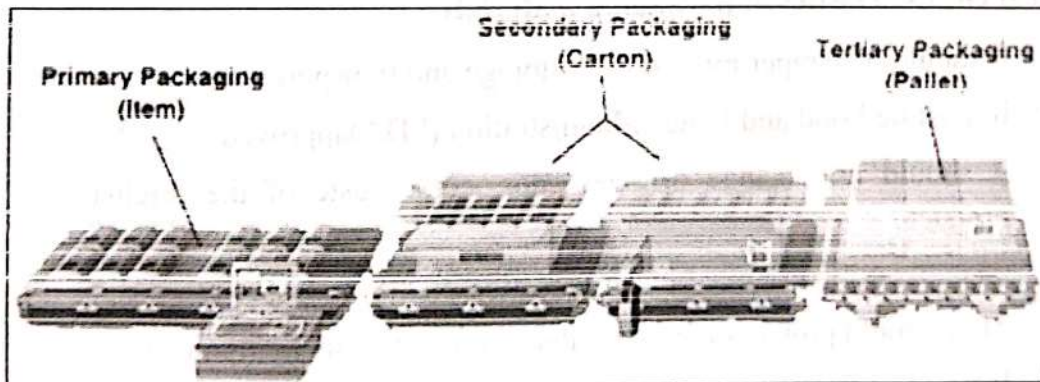
v) Other types

a) Consumer packaging

The packaging, which ended with consumer distribution or sales, called as consumer packaging. Major aim of this packaging is to display or sales the product for consumer. This packaging starts from the commercial sales point and arrives at consumer level.

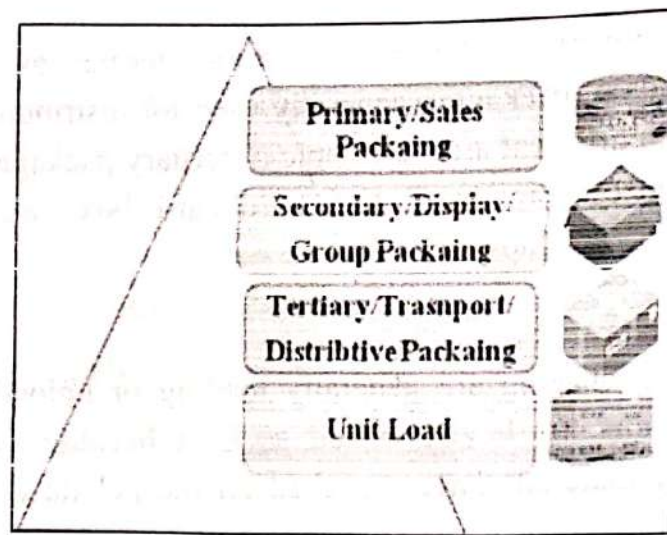
b) Industrial packaging

The packaging, which used to deliver goods from producer to consumer with all intermediate level of packaging i.e. transporting of packaging. Major aims of this packaging are to handover or transfer the goods from production level to next or consumer level.



Methods/types/levels of packaging

Source: <https://www.theodorou.gr/en/products/products-smartcode.html>



4. Sustainable packaging

With advancement of technologies, there is numerous packaging materials which are not environment friendly. Traditional packaging materials in one side has eco-friendly biodegradable but they required large quantity of raw materials for its production such as paper industry, wooden board industry etc which deplete forestation. But in another side use of plastic, and other artificial materials not only saves these resources in one hand but non biodegradable nature of the materials causes severe threat to environment. Therefore, it is quite difficult to understand the selection of proper materials for packaging industry. So answer is four R approaches that is Reuse, Recycle, Reduce, Resale approach with integrated packaging in optimized for environment sustenance^[8].

5. Ideal characteristics of packaging materials

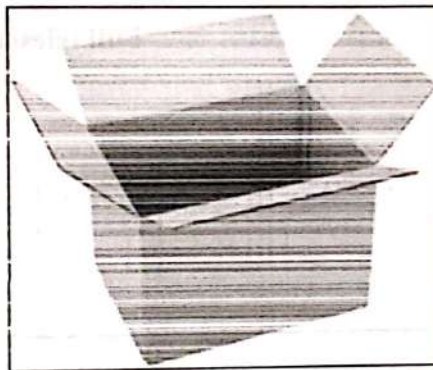
- i) It should be tamper proof during storage and transport
- ii) It must be Food and Drug Administration (FDA)approved
- iii) It should not change original odor, color, taste of the original product.
- iv) It should not make any kinds of reaction on the packed product.
- v) They should protect internal product from external environment
- vi) It should hold the material in firm condition without any excessive gap
- vii) It should have adequate compulsive strength, capacity to bear pressure during palletilization, handling and transport system.
- viii) It should be non toxic to product, handlers, and if possible environment
- ix) It should be recyclable or reusable for sustainable environment

- x) For processed product, they should be grease proof, temperature and light resistant with ability to protect from microbial contamination, leak proof etc.

6. Packing containers for fruits

a) Corrugated fiberboard boxes

Corrugated fiberboard boxes also referred as CFB boxes are most widely used in packaging industry. In USA more than 90% products packed in CFB boxes [9]. It has various types, shapes and forms but mostly square and rectangular boxes are preferred. Now most of the CFB boxes are thinly wrapped with plastic film, which increase their durability, moisture and dust resistant ability. Several layers in the box act as a shock absorber due to flow of air inside the box, which gives protection against vibration, jerks and shocks.



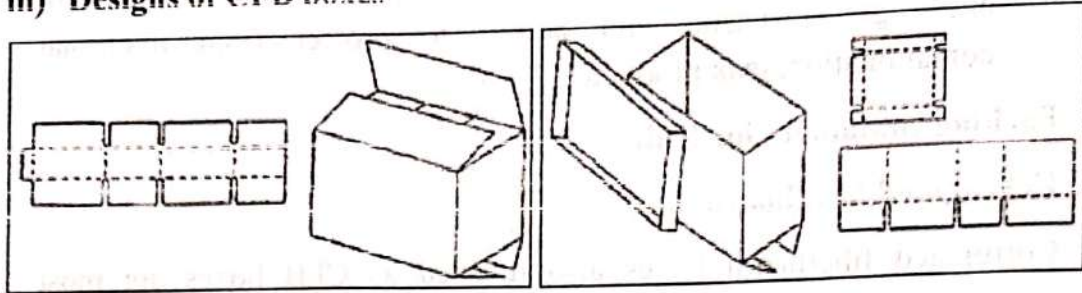
i) Advantages of corrugated boxes

- They are easily available in market at various sizes and shapes
- They are environment friendly and biodegradable in nature
- The boxes can be reused and recycled again if in well condition
- They can easily stackable or palletized
- It has tear resistant qualities, pilfer proof, and this is helpful in keeping the packaging intact
- They can be easily punched, printed, packed with tape etc.

ii) Disadvantages of corrugated boxes

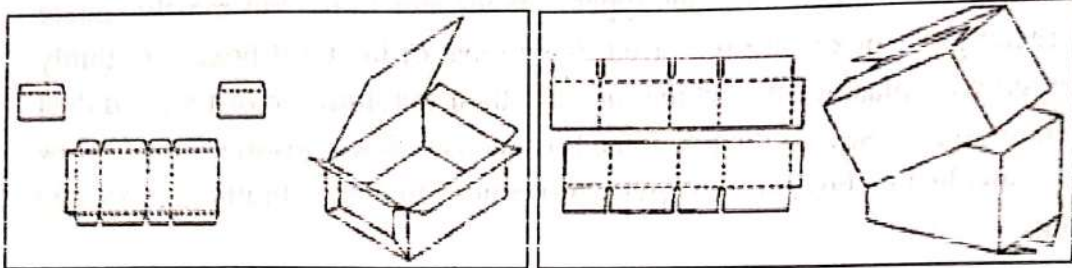
- Deformed or damaged with excessive pressure during handling and transportation with high temperature and pressure
- This is not good option for heavy items due low mechanical stress ability
- They also not good option for liquid products

iii) Designs of CFB boxes



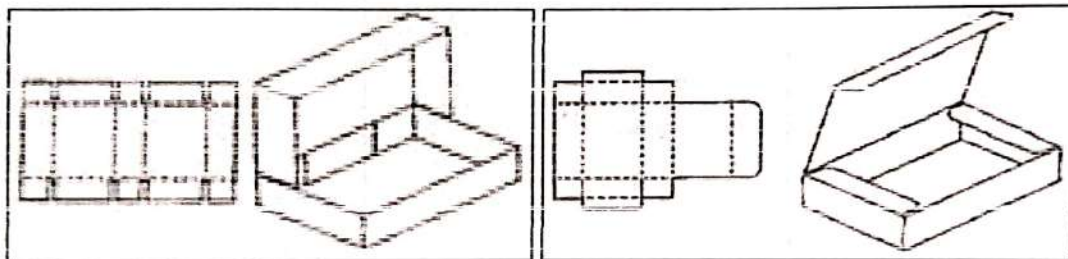
One piece box

Two piece box with cover



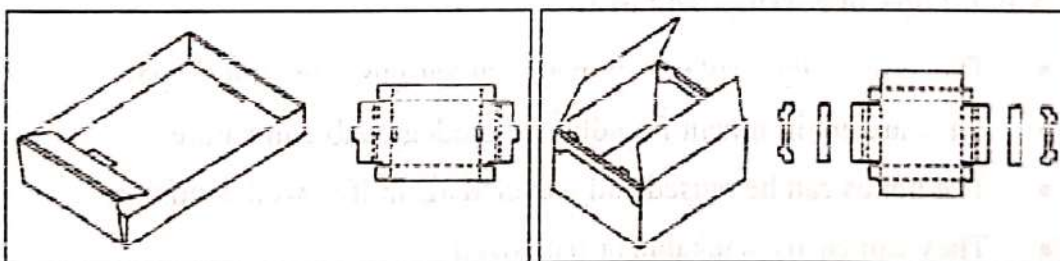
Bliss Style Box

Full telescoping box



One-piece telescoping box

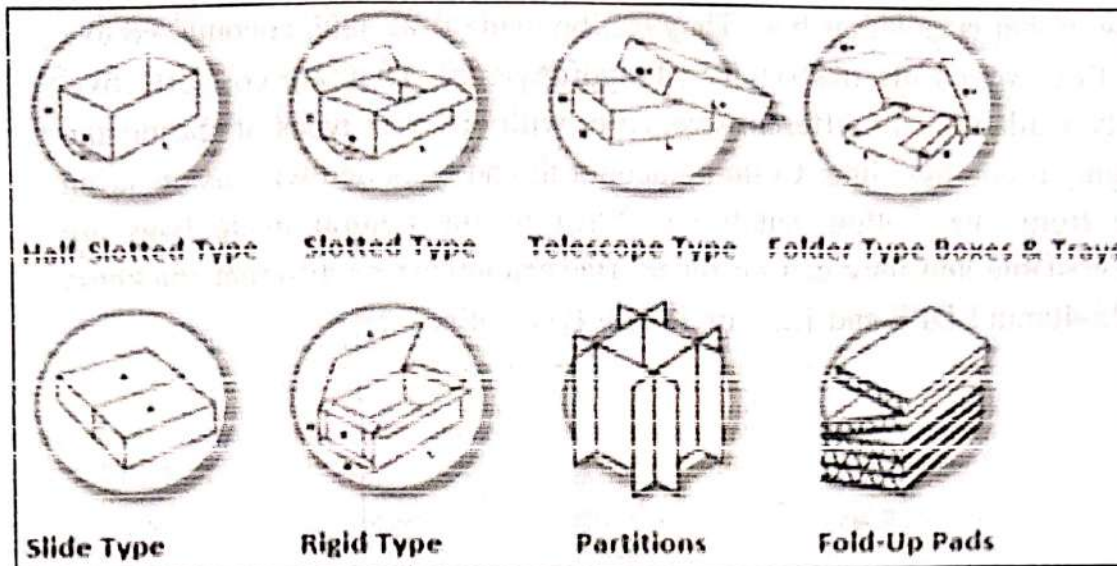
One-piece tuck-in cover box



Self-Locking tray

Inter Locking tray

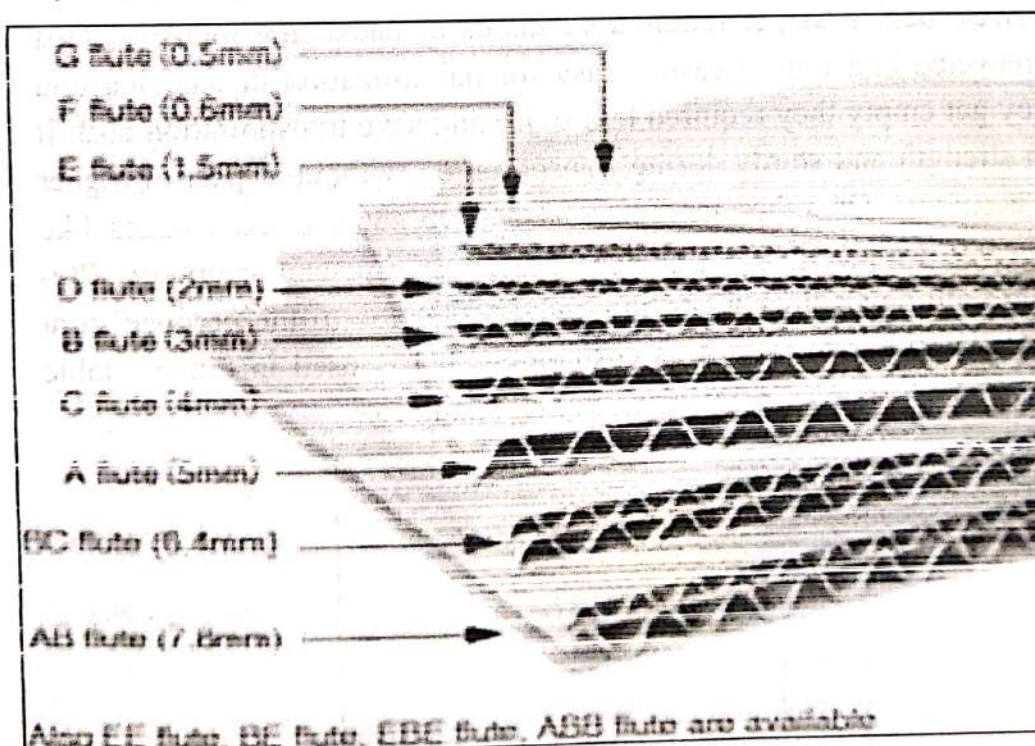
Source: McGregor, B. 1987. Tropical Products Transport Handbook. USDA, Office of Transportation, Agricultural Handbook Number 668.



(Source: <https://www.ipack.com/solutions/packaging-101-the-corrugated-box/>)

iv) Corrugation flute

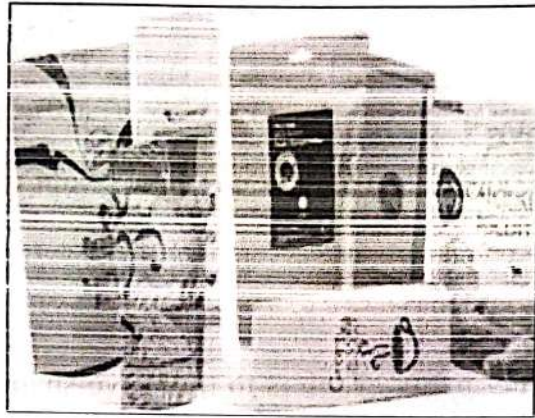
This type of packaging material refers to the wave shapes or ridges that are pressed into a sheet material that has been softened by steam. The flutes serve as cushioning materials to give more strength to the box. It has various types according to the thickness A (4.7mm), B (3mm), C (3.6mm), D (2mm), E (1.5mm), F (0.6mm) F, (0.5mm) flute (www.pinterest.com).



b) Sacks/bags

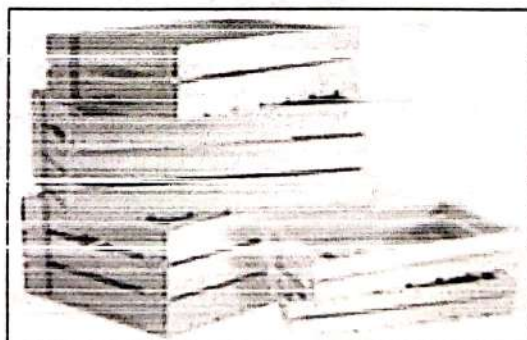
Sacks are the flexible materials used for shipping various products. If the weight of the packaging material is more than 10kg it called as sacks and

below of that is called as bag. They can be made from jute, coconut, cotton, flax, flex, woven plastics (HDPE, Polypropylene). They are cost effective, readily available with different size, color with different types of tearing and snagging properties. Jute, Cotton, coconut thread bags tied with using string made from jute, cotton, sutali etc. Most of the natural made bags are biodegradable and they can be reuse. Bags might be of different thickness like 25-40mm LDPE and 12.5mm HDPE types of bags.



c) **Wooden containers**

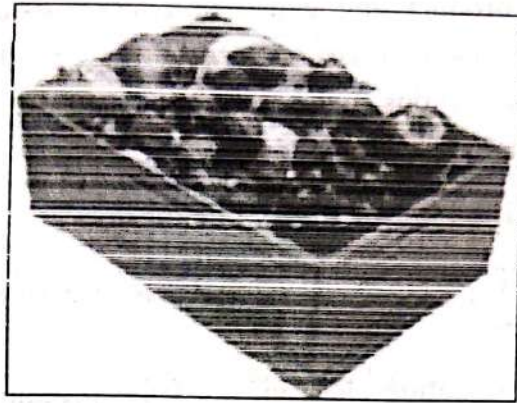
Use of wood as packaging materials has very long history. These are easily available in market and environment friendly. They are available in various sizes, design as per required standards of packaging industry. This can be recycled and reused easily, easy for palletization or stacking and when they get empty they required less space and save transportation cost. It has high strength and sturdy during transportation without impact of higher relative humidity. On other side, they also have some disadvantages like bulky, heavy weighted, lack of water or dust resistant property. Pre-packaging with paper liner gives additional protection to the produce form internal bruising injury or acts as cushioning. It has used in tomato, table grapes, mangoes, oranges, citrus fruit, pomegranate etc.



d) **Use of plastics-plastic crate, plastic corrugated boxes**

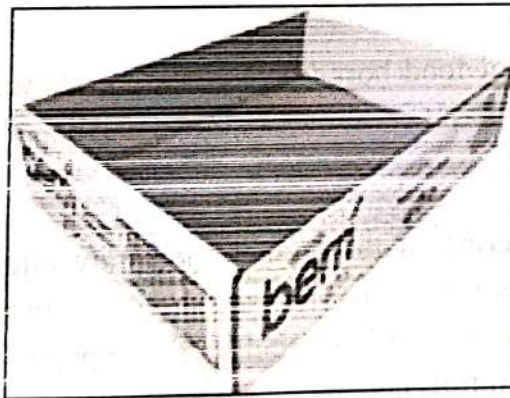
Plastic crates majorly used in local fruit markets. Plastic crates generally made from high quality HDPE or polypropylene materials. It has high

strength and palletization. Now the crate has been replaced with the wooden crates and wire crates due to high resistant capacity for moisture and ultraviolet degradation.



e) Paper and paperboard container

Apart from Corrugated fiberboard box (CFB) some other paperboard containers are also made from Kraft paper, bleached Kraft paper, virgin paper mostly made from bamboo or grass material or crop residues etc. This biodegradable waste like, paddy, wheat straw, maize husk, baggase etc can be recycled into various types of paper and paperboard. One of the best examples is use of cotton stalk for the Kraft pulp preparation developed by CIRCOT, Mumbai ^[10], use of banana stalk or stem for preparation of various paper etc are among them.



f) Modified atmospheric packaging (MAP)

Fruits are highly perishable in nature, where most of the nutritional composition starts getting depleting after harvesting. MAP can maintain all optimum conditions inside the package thereby extending shelf life by reducing deterioration ^[11]. Modified atmosphere packaging (MAP) is a procedure, which involves replacing air inside a package with a predetermined mixture of gases (CO_2 , O_2 , or N_2) prior to sealing it. In these packaging the products has packed in plastic film bags and kept in a packaging container especially in CFB box. The modified atmospheric

condition is maintained by increasing CO₂ concentration (bacteriostatic and fungistatic and antimicrobial^[12]) and N₂ level (neutral in action and acts as cushioning material to prevent packs collapse) and decreasing O₂ level (which breakdown the product and cause rancidity) inside the package. Along with these three gases traces of carbon monoxide, nitrous oxide, and ozone, argon, and ethanol vapor and sulphur dioxide are also used. The optimum temperature range during storage is 0-5 °C^[13].

g) Advantages of modified atmospheric packaging

- It increases shelf life allowing lesser frequency of loading of retail display in shelves
- It improved presentation-clear view of the product and all round visibility
- It acts as a hygienic stackable pack, sealed and free from product drip and odor
- Reduction in production and storage costs due to better utilization of labor, space and equipment

h) Disadvantages modified atmospheric packaging

- Capital cost of gas packaging machinery is high
- Increased pack volume increases transport costs and retail display space
- Potential growth of food borne pathogens due to non-maintenance of required storage temperature by retailers and consumers.

i) Wrapping

Wrapping means covering of the fruit immediately after harvest with any type of materials. It increases post harvest shelf life. In market various types of wrapping materials are available such as tissue papers, waxed paper, cellophane paper, aluminum foils and alkathene paper etc.



Following are the benefits of wrapping

- It reduce the risk of post harvest losses and contamination
- It prevents moisture loss and shrivelling of the products
- It increases consumer acceptance quality
- It reduces bruises, scratches, pest and diseases attack
- It reduce damages during transit, storage etc.
- It makes fruit more attractive

7. Packing containers for processed fruit products

Processed products have different properties compared to the fresh product hence requires special care and practices during operations. Mostly in India metal containers used for packaging of processed products and wide mouthed glass bottles for semi-processed product (Jam, Jellies, pickles etc). Liquid products or beverage like RTS, Syrups, etc., are generally packed in glass bottles.

i) Tin containers

Tin cans are highly costly hence, now being replaced by aluminum can or chromium coated steel plate also referred as TFS (Tin free Steel). Some FDA approved coating such as Fruit enamel, C-enamel, citrus enamel and beverage can enamel coatings are preferred for protection of respective food materials from corrosion.

ii) Aluminum cans

Aluminum cans are now a day's replacing the tin containers due to low cost and easily availability. It is lightweight, recyclable and less corrosive with the food materials. It extensively used for packaging of various fruit products.

iii) Collapsible tubes

Collapsible tubes made from the metal or plastic materials are most flexible item for packaging. Most of the products are made from aluminum metal but thermoplastic materials are also used as these are cost effective than aluminum. Collapsible tubes made from thermoplastic are having some demerits such as collapsibility, permeability for moisture, oil and acts as a plasticizers. It also creates some gaseous composition inside the container if kept for longer period.

iv) Glass containers

Glass materials are being used as packaging material since ancient times. It is easily available, reliable, non-corrosive, non-permeable and transparent materials. Most of the products like jam, jelly, marmalade, pickles, juices, and squashes are packed in these containers. Beverage product already started to use glass material in large quantity for its processing. These materials are recyclable hence environment friendly.

v) Plastic containers

Plastic containers are made from various types of polymers and petroleum product. Different types of plastic materials are LDPE, HDPE, Polypropylene, Poly Vinyl Chloride, Polystyrene, Biodegradable and photodegradable plastic. They are lightweight, easily available with different size, shape, color. But these containers are not eco-friendly.

vi) Coextruded films

Coextruded film has made by multilayer extrusion process. In juices and beverage three to five, layer films are used. Other examples are Stand-up pouches made of polyester/foil/poly and tetra packs made form paper/ foil/ poly are used in packing of juices.

vii) Dried or dehydrated products packing

Mostly plastic materials (LDPE/HDPE) are used for packaging of dried and dehydrated products, e.g. dehydrated slices of ripe papaya in 250 gauge PE bags, Banana chips in 300 HDPE or 400 gauge LDPE, Potato in HDPE with titanium oxide and brown light absorbing pigment or in metalized PE bags (AT + PE) ^[14] etc. Powdered dehydrated products like fruit juice powders, soups, custard powders etc are packed in heat sealable laminate containing aluminum foil layer etc. In some packages calcium oxide or silica gel has also used in package to absorb excess moisture.

viii) Accelerated freeze dried (AFD) food packaging or frozen products packing

Accelerated freeze-dried (AFD) products must be saved from oxidative changes like enzymatic browning, flavor and odor changes, loss of ascorbic acid etc due to oxygen hence required O₂ tight packaging and plastic wrappers for palletization of frozen food. Some examples are packing of deep freeze mango pulp paper aluminum- polyethylene laminated pouches ^[12], PE bags for black currant, plastic cartoons for frozen cut onion etc.

8. Labeling

Labeling and printing in the product is nowadays not only essential for the branding but also for disseminating information's regarding dos and don'ts during the handling, transporting and using of the product to handlers, retailers, wholesalers, consumers. Following information provided on the containers.

- Common name of the product
- Brand name of the product
- Net weight, count or volume of the product
- Name, address contact details or helpline numbers of the company, packers, shipper
- Country or region of making or origin
- Size, grade
- Recommended storage condition such as temperature, RH, etc.
- Special handling and storage instructions
- Nutritional status of the products
- Manufacturing, packaging and expiry date of the products
- Names of the added preservatives, approved waxes or pesticides etc used in the product
- Quality standards and approved agencies logo such as BSI, ISI, ISSO, Agmark, FDA etc.

9. Cushioning materials

Cushioning materials used to give protection to the products from brushing injuries. It absorbs extra pressure, shock, dissipate heat of respiration reduce spoilage, retains products original colour, flavour, taste etc. Dry grass, paddy straw, leaves,, saw dust, paper shreds, cassia leaves, bamboo mat board boxes, moulded pulp tray, honey comb portion, cell pack, air bag, bubble films, rubberized fibre cushioning, coconut fibre or its mat, plastic foam cushioning materials, polystyrene, polyurethane, air cellular cushioning, foam, polyethylene foam, quicksilver laminates, tissue paper, buffered tissue paper etc are wide examples of cushioning materials.

10. New technologies in packaging

i) Thermally sensitive packaging

Thermally sensitive packaging is those kind so packaging materials, which have the capability to change the properties with respect to

temperature changes. Side Chain Crystallisable (SCC) Polymers technology has the ability to effectively and reversibly melt with increase temperature fostering gas transmission through them. The SCC polymer becomes molten fluid, which has high gas permeability properties. This permeability can have the capacity to change or maintain carbon dioxide and oxygen ration which is the main determining factor for all kinds of biochemical action. The oxygen level maintained at very low level without going in anaerobic condition. The SCC materials has manufactured by Landec Corp Menlo Park California^[16].

ii) Ethylene scavengers

Ethylene is the ripening hormone naturally produced in plant, which causes rapid deterioration, decomposition thereby retards shelf life^[17]. The most widely used ethylene-scavenging packaging technology is based on a sachet that contains either potassium permanganate or activated carbon with a metal catalyst. Several ethylene-removing plastic film-based products consisting of PE impregnated with finely dispersed minerals like clays, zeolites and carbon have been developed

Examples of ethylene scavengers: 1-methylcyclopropene, Silver thiosulfate (STS), Aminoethoxy vinyl glycine (AVG), aluminium alumina, vermiculite, silica gel, with potassium permanganate, activated charcoal etc.

iii) CO₂ scavengers

Role of CO₂ especially in Modified Atmospheric Packaging of foods is very important to increased shelf life. Nevertheless, sometimes-excess CO₂ leads to detrimental factors for the quality of product. For that reason, CO₂ scavengers are advantageous to maintain equilibrium in quality. General mechanism behind this is CO₂ absorption in food packages are chemical reactions and physical absorptions. These scavengers are use along with the layer of various packaging materials. High level of CO₂ (10-80%) inhibits microbial growth and extends shelf life^[18].

Examples of CO₂ scavengers: Ferrous carbonate, mixture of ascorbic acid and sodium bicarbonate, Ageless G, Topaan C, Vitalon VMA etc.

iv) Oxygen scavengers

Oxygen not only accelerates spoilage but also causes rancidity, off flavor, color change and nutrient loss among other degradation [19]. Therefore, oxygen scavengers can absorb this excess oxygen and delays oxidation. By using this technology sachet packed with oxygen absorbent where the scavenging materials is usually finely divided iron oxide. E.g.

Ferrous compounds, catechol, ascorbic acid, glucose oxides, unsaturated hydrocarbons and polyamides etc.

v) Humidity regulators

Moisture content in the product leads to growth of microbes. These materials acts as water vapor barrier. Some times when packaging materials sealed and airtight it leads to suffocation, condensation due to evaporation of fruits and vegetables. Mostly this problem arises when product is stored in low temperature like freezing etc. The use of humidity control concept in packaging minimizes all such problems eliminate high water content without drying the fruit materials. Moisture sensitive humidity of the tray is control by using following factors like presence of sodium chloride. Overwrap materials by using two layer technology external layer eliminates water films and internal layer allow only water vapor permeability (not water) called as duplex technology. Another sandwiched packaging technology consists of two sheet of polyvinyl alcohol (PVA) film selling along its edge within which propylene glycol humidifying agent is sandwich for water resistant. Multilayer packing technology consist of layer of PVOH or cellulosic fiber like paper sandwiched between PE films, sheet made of aluminum metalized film with nonwoven fabric on the reverse side are also available in market [20].

vi) Use of robots in packaging and automation

Advanced level of packaging includes use of robots. Mostly robots have found to use in welding and assembly lines [21, 22, and 23]. Use of robots can be a help in ever increasing labour crisis worldwide. They has faster operation, with less error low contamination, high carrying, packaging and processing capacity, to work day and night without asking payment are the main pros. FANUC robotics, Inc. has developed several models of pick-and-place articulated robot for the food industry that meet stringent hygiene requirements [24]. KUKA Robotics is one of the world's leading manufacturers of industrial robots [25]. Many food-processing plants are constantly automating their final product with the palletizing robot due to the demand for increased productivity [21]. The sophisticated control system with a built-in palletizing function makes it possible to load and unload the objects with high precision and accuracy. To increase safety, liability, reducing cost of operations, consistent working etc most of the food and packaging industries now wanted automation system. Some disadvantages are high maintenance cost, requirement of technical expertise lack of availability of spare parts, etc. PLC (Programmable Logic Controller)-based

architecture has been commonly used in the food industry^[21, 26]. They also articulated with peripheral devices such as sensors, actuators, and drive to minimise static operations.

vii) Smart or Intelligent packaging

Technological innovation is now in that stage where we can control most of the inbuilt environment of packaging by using smart and intelligent packaging. Some sensors have developed which can sense the condition of various parameter according to which we can make precautions of practices in future^[27, 28]. The smart or intelligent packaging also use artificial intelligence concept where users get in details information of the product quality during storage, packing, and transit. It helps to monitor the product at each level. Some innovations like self-heating cans or cooling cans^[29], can automatically start heating or cooling the product. Several segregated compartments are prepared in the container, which gives exothermic or endothermic reactions to maintain optimum condition of environment. Radio Frequency Identification chips (RFID), Time-temperature indicators (TTI) are also available in the market which used to track the package or consignment in transit, storage or retailer shops^[19]. These labels are called as smart label. Electronic article surveillance for checking counter shoplifting, security holograms, microwave technology, shock detectors for etc developed for smart packaging.

11. Summary

A specific packaging practice not only minimizes huge post harvest losses but also has tremendous scope to enhance export of quality produce and to gain foreign exchanges. The recent advances in packaging sector helps to minimizes post harvest losses, increasing quality of the consumer product by proper supply chain management. The automatic and robotic packaging, smart and intelligent or active packaging will help to increase the efficiency for better transport, handling and sales in the market. Various innovation, technologies, and new kinds of packaging materials and methods are need to be popularizing to satisfy the consumer demands.

References

1. http://apeda.gov.in/apedawebsite/six_head_product/FFV.htm
2. FCCI Report. A Report on Plastic Industry. 2nd National Conference Plastic Packaging-The Sustainable Choice, 2016.
3. TOI, 22 March. Reducing post-harvest losses the main challenge: Researchers, 2019.

4. NAAS Report. Saving the Harvest: Reducing the Food Loss and Waste. Policy Brief No.5, National Academy of Agricultural Science, New Delhi, 2019, 10.
5. Olsmats, Carl, Bo Wallteg.. Packaging is the answer to world hunger. World Packaging Organization (WPO) and International Packaging Press Organization (IPPO), 2009. <http://www.worldpackaging.org/uploads/paperpublished/6.pdf>.
6. <https://www.propackindia.com/country-overview>
7. Nagang Perez. Lecture Notes for Packaging and Branding. Pan African Institute for Development -West Africa (PAID-WA) Buea.
8. Preuss L. The Green Multiplier. A study of Environmental Protection and the supply chain. Springer Publication. 2005, 84-85.
9. <https://www.packingupply.in/blog/8-advantages-of-corrugated-boxes/>
10. Anonymous. Central Institute for research on Cotton Technology, Mumbai. Final Report of Adhoc Scheme on Kraft Paper from Cotton Plant Stalks for Use in the Production of Corrugated Fibre Board Boxes for Packaging of Fruits, 1997.
11. Caleb OJ, Opara UL, Witthuhn CR. Modified atmosphere packaging of pomegranate fruit and arils: A Review. Food Bioprocess Technol. 2012; 12:78-86.
12. Sandya, Modified atmosphere packaging of fresh produce: Current status and future needs. Food Sci. Technol. 2010; 43:381-392.
13. Benjamin Cabellero, Paul Finlas, Fidel Toldra. Encyclopaedia of Food and Health, Academic Press, 2015, 21.
14. Kubic CI., Austin JA, Lindsey RC. Influence of package construction on stability of potato chips exposed to florescent lightening. Journal of Food Protection. 1982; 45(9):801
15. Thakur BR, Arya SS. Relative suitability of plastic films for the frozen storage of mango pulp. Journal of Food Processing Preservation. 1988; 12(3):171
16. Matche RS. Packaging aspects of Fruit and Vegetables. Food Packaging Technology Department Central Food Technological Research Institute, Mysore
17. Terry LA, Ilkenhans T, Poulston S, Rowsell L, Smith AJ. Development of new palladium-promoted ethylene scavenger. Postharvest Biology Technology, 2007; 45:214-220.

18. Aravind Dasari, James Njuguna. Functional and Physical Properties of Polymer Nanocomposites. John Wiley & Sons, pub. 2016, 41.
19. Prasad, Priyanka, Kochhar. Anita. Active Packaging in Food Industry: A Review. IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT). 2014; 8(III):01-07. www.iosrjournals.org
20. Katharina Kaiser, Markus Schmid and Martin Schlummer. Recycling of Polymer-Based Multilayer Packaging: A Review. Recycling. 2018; 3(1):1-26. Doi: 10.3390/recycling3010001.
21. Nitaigour Premchand Mahalik. Advances in Packaging Methods, Processes and Systems. Challenges, 2014; 5:374-389, Doi:10.3390/challe5020374
22. Pantelidis IS. High Tech Foodservice; an Overview of Technological Advancements. In Proceedings of the Annual Research Conference, Eastbourne, UK, 13-15 May, 2009.
23. Robots Improve Manufacturing Success & Create Jobs. Available online: <http://www.ifr.org/news/ifr-press-release/ifr-robots-improve-manufacturing-success-create-jobs-469/> (accessed on 30 June 2014).
24. <https://www.fanucamerica.com/industrial-solutions/manufacturing-applications/picking-and-packing-robots>
25. <https://www.kuka.com/en-in>
26. Manuel Pineda-Sanchez, Marina Pérez-Vázquez, Ángel Sapena-Bañó, Javier Martínez-Román, Juan Pérez-Cruz, Rubén Puche-Panadero, Víctor Pérez-Vázquez. Programmable Logic Controllers (PLC) in the packaging industry: An object oriented approach for developing control programs. 9th International Microsystems, Packaging, Assembly and Circuits Technology Conference, 2014. (IMPACT).DOI: 10.1109/IMPACT.2014.7048381
27. Han JH, Ho CHL, Rodrigues ET. Innovations in Food Packaging. Elsevier Science & Technology Books; Winnipeg, MB, Canada: 2005
28. Heising JK, Dekker M, Bartels PV, Van Boekel MA. Monitoring the quality of perishable foods: opportunities for intelligent packaging. Critical Review of Food Science and Nutrition. 2014; 54(5):645-54.
29. Joseph Kerry, Paul Butler. Smart Packaging Technologies for Fast Moving Consumer Goods. John Wiley, Sons, Publication 23-May, 2008.

30. <http://eagri.org/eagri50/HORT381/lec10.html>
31. National Institute of Agricultural Engineering. Preparing vegetables for supermarkets. Field Vegetable Department, Silsoe, Bedford: NIAE, 1979.
32. McGregor B. Tropical Products Transport Handbook. USDA, Office of Transportation, Agricultural Handbook Number 668, 1987.
33. <https://www.ipack.com/solutions/packaging-101-the-corrugated-box/>
34. Saraswathy S, Preethi TL, Balsubramanyan S, Suresh J, Revathy N, Natrajan, S. Post Harvest Management of Horticultural Crops. Agrobios Publication, 2010.

Chapter - 3
Physiological and Biochemical Factors Governing
Post Harvest Life of Flower Crops

Authors

Sanchita Ghosh

Subject Matter Specialist (Horticulture), KVK, Samastipur, Dr.
Rajendra Prasad Central Agricultural University, Pusa, Bihar,
India

H.D. Chandore

Assistant Professor, Department of Horticulture, S.M.
Dnyandeo Mohekar Mahavidyalaya, Kalamb, Maharashtra,
India

Chapter - 3

Physiological and Biochemical Factors Governing Post Harvest Life of Flower Crops

Sanchita Ghosh and H.D. Chandore

Abstract

The major challenges of post harvest technology of flower crops are to delay the senescence and promoting the longevity in order to fetch high market price as well as to make it more attractive in a flower vase for a longer period. Several physiological factors like water relations, membrane integrity, carbohydrate metabolism, nitrogen metabolism, pollination, plant growth regulators etc and biochemical factors like ethylene biosynthesis, changes in the antioxidant compounds governs the post harvest life of flowers. This book chapter makes an effort to give detail about the reason and the methods to overcome and to prolong the vase life.

Keywords: senescence, post-harvest technology, biochemical factors, metabolism

1. Introduction

Flower is a complex morphological unit and there are several physiological and biochemical factors which govern the post harvest life of flowers. Flower senescence is a distinguished stage indicating the terminal phase of developmental processes that leads to the end of its life span. Postharvest senescence is a major limitation to the marketing of many species of cut flowers and considerable effort have been devoted to develop postharvest treatments to extend the marketing period [1]. The implementation of appropriate storage and postharvest techniques will add value to the produce and will increase the farmer's income. The floral, more specifically petal senescence, is accompanied by dramatic changes in cellular morphology, biochemical processes and gene expression [2]. Several physiological factors like water relations, membrane integrity, carbohydrate metabolism, nitrogen metabolism, pollination, plant growth regulators etc and biochemical factors like ethylene biosynthesis, changes in the antioxidant compounds governs the post harvest life of flowers.

2. Senescence and post-harvest life of flowers

A flower's lifespan and post-production quality has determined by senescence, a genetically controlled stage of flower development that culminates in the wilting or abscission of the corolla [3]. Senescence is the integral part of the normal developmental cycle of plants and can be view on a cell, tissue, and organ or organization level. Senescence is a highly regulated final event of flower development that bears hallmarks of programmed cell death (PCD), resulting in colour changes, petal wilting, abscission of whole flower and flower parts with various physiological, biochemical and ultra-structural changes [4]. Peroxidase enzyme activity in senescing petals are directly associated with respiration and increased levels of free radicals and peroxides [5].

Recent studies evidenced that flower senescence includes controlled disassembly of cells of corolla probably by a mechanism homologous with apoptosis, vacuolar and necrotic PCD [6] and transport of nutrient to other parts of inflorescence. Flower senescence is the terminal phase of developmental processes that lead to the death of flower, which include, flower wilting, shedding of flower parts and fading of blossoms. Since it is a rapid process as compared to the senescence of other parts of the plant, it therefore provides excellent model system for the study of senescence. Petals are the main floral organs, which primarily determine the commercial longevity of flowers, and therefore, it becomes necessary to study the physiological, biochemical and genetic processes that occur during petal senescence [7]. During flower senescence, developmental and environmental stimuli enhance the up-regulation of catabolic processes causing breakdown and remobilization of cellular constituents.

3. Post-harvest changes associated with senescence

3.1 Ultra-structural changes

There is a three-stage theory of senescence in case of flowers like those in leaf. First is the initiation of senescence followed by degradation and disassembly, which lead to third stage of death [8], which is due to decline in rate of anabolic processes and increase in rate of certain catabolic processes [9]. Characteristics of the last phase involve ultra-structural disorganization of tissues or cells and increased fluid filled extra spaces which lead to halted down of metabolic activities in all tissues or organs of plant though some organelles are still slightly visible [10]. Delicacy of petal cells and their rapid collapse during senescence are a challenge to study ultra-structural changes during senescence and showed dramatic changes in ultra-structure [11]. Ultra-

structural events during senescence include increase in vacuolar size, loss of organelles, eventual collapse of tonoplast ^[12] and nuclear fragmentation ^[13]. With reference to the chloroplast ultra-structure, a higher level of thylakoid disorganization (especially of granal membranes) observed during senescence ^[14]. The loss of non-cellulosic natural sugar and the increase in soluble pectin, uronic acid and cellulose ^[10] lead to alternation in cell wall and initiation and increase in the loss of membrane integrity resulting in phase changes due to decrease in membrane fluidity and increased permeability.

3.2 Colour fading and change in pigmentation

Chlorophyll is the most prominent photosynthetic pigment in higher plants and the decreasing trend in photosynthetic rate and pigment level is generally due to the involvement of oxygen radicals and singlet oxygen ^[15]. Chlorophyll breakdown becomes a mandatory phenomenon for the remobilization of nitrogen from chlorophyll-binding proteins to proceed during senescence. Colour fading and discoloration are major reasons for termination of vase life in many cut flowers and important factors in determining display quality of cut flowers. Major three types of pigments contributing to the colour of flowers are anthocyanins, carotenoids, and betalains. Anthocyanins are the largest and most diverse group of plant pigments derived from the phenylpropanoid pathway, ranging in colour from red to violet and blue. Anthocyanins give red colour under low pH and blue colour under high and neutral pH, reflecting a phenomenon termed as 'blueing' where a shift from red to blue occurs with ageing ^[16]. In flowers, degradation of anthocyanins during senescence possibly related to oxidative process. A significant increase in antioxidant activity correlated with the rate of anthocyanin degradation ^[17].

3.3 Lipid peroxidation and loss of membrane integrity

Flower senescence was found to be related to the enhanced lipid peroxidation which in turn decreases the membrane stability index. This increase in the lipid peroxidation is most probably initiated by increased lipoxygenase activity just prior to the increase in lipid peroxidation. Lipid peroxidation generates a range of reactive oxygen species, including singlet oxygen (1O_2), the alkoxy radical ($RO\cdot$), hydroxyl radical ($OH\cdot$) and hydroperoxyl radical ($HO_2\cdot$), and the peroxy radical ($ROO\cdot$) which amplify the lipid peroxidation with further degradation of released fatty acids affecting membrane permeability ^[18]. All the enzymes required for phospholipid degradation are apparently present in membranes. The main phospholipid degrading enzymes, including

- i) Phospholipase D
- ii) Phospholipase C
- iii) Lipolytic acyl hydrolase
- iv) Lipxygenase

Which degrade fatty acids were reported to be upregulated during petal senescence [19]. A marked deterioration of the plasma membrane and loss of water are associated with lipid peroxidation with the senescence of chrysanthemum and *Hemerocallis* petals [7]. Therefore, membrane degradation may be a central step in the process of senescence that leads to mass lipid degradation during senescence and collapse of the tonoplast, which results in executing the death sentence.

3.4 Loss of cellular protein

Proteins are the key molecules that play important roles in various structural and functional aspects of plants. Senescence in tepals, stamens and carpels results in an increase in total protease activity and a decrease in total protein content. In many species of plants, protein degradation and remobilization are mediated through protein ubiquitination and the action of specific proteases [13]. An increase in amino acid content in phloem exudates from flower opening to petal wilting in *Ipomoea*, *Hemerocallis* and *Sandersonia* petals observed due to protein degradation. Actinomycin D, an inhibitor of transcription, if given 4 h prior to opening, suppressed the onset of visible senescence, which occurred at about 9 h after flower opening by downregulation of senescence associated genes in petals of morning glory [20]. In proteasomes dependent degradation, proteasome system involved in degradation of specific proteins was apparently up-regulated during petal senescence in *Hemerocallis* [21] and daffodil [22]. Expression of a homologous gene encoding a RING zinc finger ankyrin repeat protein (MjXB3), a putative E3 ubiquitin ligase, in petals of senescing *Mirabilis jalapa* flowers highly increased during the onset of visible senescence like that in *Petunia* [23]. Silencing of this gene also resulted in extension of flower life. Petal senescence accompanied by bulk non-proteasomal protein degradation, mainly in vacuoles. This process of protein degradation shows accumulation of considerable amount of amino acids during senescence.

3.5 Change in water relations

Due to decrease in water absorption and increase in water loss through transpiration, the stem develops water deficit conditions results in wilting of flowers [24]. The decrease in water uptake by the stem is mainly due to

plugging of xylem vessels caused by growth of microbes mainly bacteria in the vase water or on the dipped portion of stem. Exposure of cut flower to water stress condition, for a short periods lead to the earlier appearance of senescence. Water deficit conditions are reported to cause physiological disorders in the cut stems such as stem break in gerbera and bent neck of rose [25]. Adverse water relations are also reported to cause changes in hormonal balance [26]. During senescence, the rate of water flux through vessels, tracheids and fibres get reduced and tylose formation was often shown to result in reduced water and oxygen availability for the respiration causes imbalance in water relations of flowers. The rate of water uptake of a cut flower depends on hydraulic conductance of the water conduits in the stem, water potential difference between the vase water and the cut flower tissue [27]. (Van Doorn, 2001).

3.6 Membrane integrity

Membrane deterioration is an early and characteristic feature of plant senescence, which leads to several structural and functional changes including the vesiculation of vacuolar and cytosolic compartments etc. In daylily flowers, during senescence the degeneration of vacuolar membrane of epidermal cells was reported [28]. It was revealed that in ethylene- insensitive *Alstroemeria* flower, during senescence, the loss of membrane function was not related to lipoxygenase activity [29]. In the ethylene- sensitive category, lipoxygenase activity may promote senescence through oxidative membrane damage as seen in rose and carnation. However, in some ethylene- sensitive plants such as *Phalaenopsis*, the lipoxygenase seems not to play any apparent role. At the biochemical level, senescence is associated with changes in membrane fluidity and leakage of ions in several different flowers. The loss of differential membrane permeability in morning glory flower [30]. The important changes in the membrane include decrease in all classes of membrane phospholipids and increase in neutral lipids, mainly due to increased action of phospholipases and acyl hydrolases. Analysis of phospholipid levels in petals of ornamentals like *Tradescantia* during senescence has shown that the increase in membrane permeability is accompanied by a massive loss of phospholipids. The activity of phospholipase D declines during senescence whereas that of acyl hydrolase remains essentially constant [31].

3.7 Carbohydrate and other macromolecules

Sugars are an important energy source and structural components. Sugar accumulation is a mechanism to reduce petal water potential-promoting

water influx-cell enlargement and flower opening. Petal senescence accompanied by a loss of dry matter. Sugars or carbohydrates increased the vase life of cut flowers by reducing the sensitivity to ethylene [32]. It has suggested that maintenance of osmotic pressure might be the reason for the delay in senescence. It was also reported that exogenous application of sugars increase vase life by delaying proteolysis, promoting protein and amide synthesis, maintaining osmotic potential, delaying membrane integrity and maintaining mitochondrial structure and function [33].

3.8 Protein metabolism

There is a decline in protein content during senescence. The senescence of both climacteric and non-climacteric flowers have been associated with a loss of protein. The protein content is reduced due to little *de novo* synthesis and considerable protein degradation. It is understood that free radicals attack amino acid residues of proteins causing conformational changes in proteins causing them to be recognized by specific proteases for degradation. In *Dendrobium cv. Khao Sanan* Treatment with ethylene resulted in an early increase in the transcript abundance of a senescence-associated cysteine peptidases in the petals, in an early rise in peptidase activity, and in a later decrease in water-insoluble protein levels which promote senescence [34].

3.9 Pollination regulation of flower senescence

Pollination regulates a syndrome of developmental responses that contributes to successful sexual reproduction in higher plants. Pollination-regulated developmental events collectively prepares flower for fertilization and embryogenesis while bringing about the loss of floral organs that have completed their function in pollen dispersal and reception. Components of this process include changes in flower pigmentation, senescence and abscission of floral organs, growth and development of ovary and in certain cases, pollination triggers ovule and female gametophyte development in anticipation of fertilization [35].

Pollination regulated development is initiated by the primary pollination event at the stigma surface, but because developmental processes occur in distal floral organs, the activity of inter organ signals that amplify and transmit the primary pollination signal to floral organs is implicated. Inter organ signalling and signal amplification involves the regulation of ethylene biosynthetic gene expression, inter organ transport of hormones and their precursors. This stimulation of ethylene biosynthetic pathway results in enhanced ethylene production and thereby triggering flower senescence in ethylene sensitive flower. In carnation (*Dianthus caryophyllus*) the

senescence of flowers is characterized by the in rolling of the petal margins, this process is accelerated by ethylene and pollination [34]. Pollination of orchid flower induces a dramatic increase in ethylene production, which subsequently causes a rapid petal wilting, whereas the longevity of intact unpollinated flowers may reach as long as several months [36].

4. Role of plant growth regulators in accelerating and alleviating flower senescence

Plant Growth Regulators can delay as well as can also accelerate the senescence. PGRs, which promote senescence, include ethylene, abscisic acid, jasmonate, methyl jasmonate, salicylic acid and brassinosteroids; whereas cytokinins, auxins, gibberellins, polyamines cause retardation of senescence [37, 38]. Abscisic acid (ABA) has observed to enhance ethylene production and hastened petal wilting. It is reported that, If gynocia are removed, induction of ethylene no longer occurs, therefore, it is proved that ABA acts as an inducer of ethylene only through gynoecium [39]. Stimulatory effect of GA₃ in retarding senescence is reported in cut gladiolus spikes [40]. It has been reported that PAs have the positive effects on the post harvest life of flower crops like gerbera [41] and carnation [41]. In gladiolus cut spikes, improved vase life was reported after use of PAs by improving membrane stability [42].

4.1 Ethylene

Ethylene is the major promoter of flower senescence in ethylene sensitive flowers, coordinating senescence pathways and floral abscission [43], while in ethylene- insensitive flowers abscisic acid (ABA) has thought to be primary regulator. Visible sign of senescence in ethylene sensitive flower has accompanied by sudden, transient increase in respiration resulting in burst of endogenously produced ethylene, coordinating the senescence pathways and upregulation of genes for enzymes required for senescence [44]. Ethylene imposes considerable problems in the postharvest handling of ornamentals, which cause a range of effects, including early wilting of flowers, yellowing or necrosis (death) of leaves, and shattering of leaves, buds, petals and flowers. Ethylene has been reported to be a signal to induce senescence of flowers [36]. Petal senescence accompanied with the concentration and duration of ethylene exposure [45]. In petal tissue, ethylene found to be responsible for inducing various biochemical processes leading to programmed cell death, including the activation of senescence-related gene transcription [46]. Polyamines inhibit ethylene production by regulating the activity of 1-aminocyclopane-1-carboxylic acid synthase and oxidase [47],

while ethylene alters the formation of PAs by reducing the activity of arginine decarboxylase and SAM decarboxylase. Both theory and practices revealed that there are several other factors like age-specific factors, external stress, and nutrient status, which combined cause changes in gene expression and activation of senescence-related biochemical and cellular processes [2]. In climacteric or ethylene sensitive flowers, senescence is accompanied by sudden, transient increase in ethylene production and respiration (e.g. Carnations, Petunia, Gypsophila, Orchids etc.), whereas in non-climacteric flowers (e.g. Gladiolus, Tulip, Iris etc.) generally there is no increase in ethylene production and respiration during senescence. Molecules block ethylene receptors such as cyclopropene (CP), 1-methylcyclopropene (1-MCP) and 3,3-dimethylcyclopropene (3,3-DMCP) and that block ethylene biosynthesis α -(2-aminoxyvinyl Glycine) (AVG) and aminoxyacetic acid (AOA) have been used to prolong the vase life of ethylene-sensitive flowers [48].

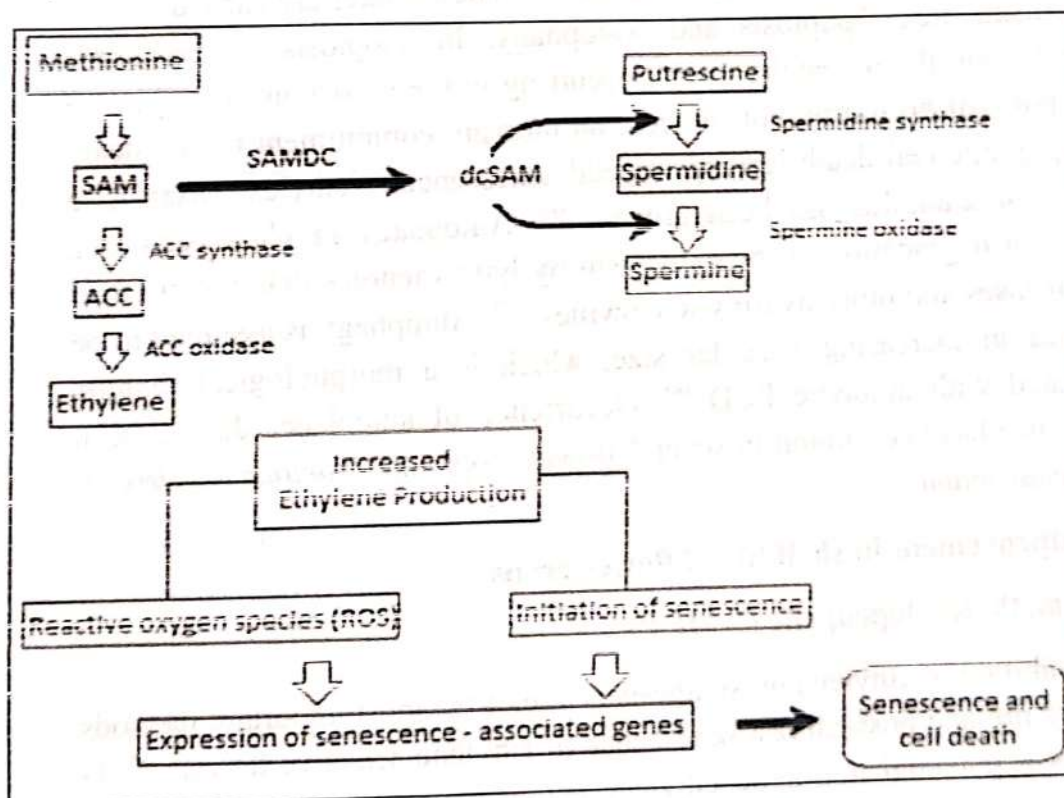


Fig 1: Polyamine and ethylene pathways and their interrelationships [49] and increasing ethylene production through key events regulating floral senescence in ethylene-sensitive species [2]

4.2 Abscisic acid

Abscisic acid while applied exogenously accelerates petal senescence in cut carnation and flower petals treated with ABA were more sensitive to exogenous ethylene [50]. Along with it, there was a decrease in total protein

content and increased RNase activity. However, in attached system, the effects were reversible, probably because of closure of stomatal aperture [51].

Exogenous applications of ABA accelerate the symptoms of flower senescence in carnation, rose and daylily flowers [52]. Endogenous content of ABA increased during senescence in several flowers [22]. ABA presumably induces senescence independently of ethylene action, as the senescence of the flower known to be ethylene independent-Day lily [52].

5. Programmed cell death

Programmed Cell Death refers to any process by which cells eliminated as a part of a developmental or adaptive event in the life cycle of organisms [53]. Petal senescence is one type of programmed cell death (PCD) in plants which is a genetically controlled sequence of events during its final developmental stage. These changes include chromatin condensation, DNA fragmentation and nuclear fragmentation [54]. The changes are carried by two mechanisms i.e., Apoptosis and Autophagy. In apoptosis, the principle theory is that, the molecular events occurring in the mitochondria appear to be a "point of no return" for the cell, an ultimate commitment to cell death [55]. Apoptotic cell death leading to petal senescence in ethylene-insensitive flowers of gladiolus has been proven [56]. Autophagy in plant cells is a process of degradation of the cytoplasm by lytic vacuoles that contain acid phosphatases and other hydrolytic enzymes [57]. Autophagy is assumed to be involved in increasing vacuolar size, which is a morphological feature, associated with autolytic PCD [6]. Occurrence of autophagy during petal senescence has been found in several flower crops like *Ipomoea* [30], *Iris* [11] and *Dendrobium* [58].

6. Improvement in shelf life of flower crops

6.1 1-methylcyclopropene (1-MCP)

Inhibition of ethylene biosynthesis is one of the most important methods to retard pre-and post-harvest senescence of ethylene-sensitive flowers [4]. 1-MCP is a potential non-toxic ethylene action inhibitor, which has a high binding affinity to ethylene receptors suppressing the ethylene response pathway [59]. It used with cut flowers (carnations, roses, narcissus, orchids etc), potted flowers, and bedding, nursery and foliage plants to prevent premature wilting, leaf yellowing, premature opening and premature death [21, 22]. The gaseous nature of 1-MCP makes application to cut flowers difficult during cold storage [60]. Therefore, consecutive research lead to development of liquid formulation of 1-MCP which can be applied as pre-harvest spray [61, 62].

6.2 Nitrous oxide

Nitrous Oxide is diffusible and ubiquitous gaseous bioactive molecule, which participates in the broad spectrum of path physiological and developmental processes of living organisms. It was reported that NO is a natural senescence-delaying plant growth regulating agent acting primarily, but not solely, by down regulating ethylene emission. A Study revealed that the vase life of flowers was extended by NO with an average extension of about 60% with the range being about 200% for gerbera to 10% for chrysanthemum compared with flowers kept in water, suggesting that NO appears to have widespread applicability to cut flowers and offers a simple technology to extend vase life [63]. Although NO has been reported to extend the vase life of cut flowers [64], the precise function of NO as signal molecule involved in cut flower senescence is still unknown.

6.3 Kinetin

Cytokinin increases flower longevity by reducing respiration rate [65]. Some studies indicated that, in rose petals kinetin increases net water uptake of expanding rose petals and delays wilting of petals especially when flowers are subjected to heat (28 °C) and low relative humidity (40-50%) [66]. They also reported that Kinetin had no effect on protein content of rose petals under these stressful conditions, but kinetin retarded the increase in RNase activity normally seen in rose flowers at the onset of senescence. Kinetin proposed to increase rose flower longevity by improving water balance and delaying senescence processes.

6.4 Polyamines

Polyamines (PA's) have been reported as effective anti-senescence agents that have ability to retard chlorophyll loss, membrane deterioration and increase in RNase and protease activities which help to slow the senescence process [66]. The major polyamines comprises putrescine, spermidine and spermine, which occur either naturally or as free bases or bound to phenolics or other low molecular weight compounds. It has been reported that PAs have the stimulative effects on enhancing vase life of different flower crops like gerbera [41] and carnation [67, 41] mainly by improving membrane stability. Exogenous application of spermidine has been found to transiently delay senescence of *Dianthus caryophyllus* and *Petunia hybrida* flowers, which has been implicated to be due to the ability of free spermidine to bind to the main intracellular constitutive molecules such as DNA and stabilizing their structures [68].

7. Summary

Senescence is the integral part of the normal developmental cycle of plants and can be viewed on a cell, tissue, and organ or organization level. Several physiological factors like water relations, membrane integrity, carbohydrate metabolism, nitrogen metabolism, pollination, plant growth regulators etc and biochemical factors like ethylene biosynthesis, changes in the antioxidant compounds governs the post harvest life of flowers. There are some PGRs, which can delay as well as can also accelerate the senescence. PGRs, which promote senescence, include ethylene, abscisic acid, jasmonate, methyl jasmonate, salicylic acid and brassinosteroids; whereas cytokinins, auxins, gibberellins, polyamines causes retardation of senescence. Further studies are needed to understand the mechanism as well as to find cost effective way to enhance the post harvest life of flower crops.

8. References

1. Bowyer MC, Wills RBH. Delaying postharvest senescence of cut flowers using nitric oxide. A report for the Rural Industries Research and Development Corporation. 2003; 3:51.
2. Rogers HJ. Is there an important role for reactive oxygen species and redox regulation during floral senescence? *Plant Cell Environ.* 2012; 35:217-233.
3. Borochoy A, Woodson WR. Physiology and biochemistry of flower petal senescence. *Horticultural Reviews.* 1989; 11:15-43.
4. Dertinger U, Schaza U, Schulze ED. Age-dependence of the antioxidative system in tobacco with enhanced glutathione reductase activity or senescence-induced production of cytokinins. *Physiologia Plantarum.* 2003; 119:19-29.
5. Leopold AC. Aging and senescence in plant development, in *Senescence in Plants*, edited by K.V. Thimann, CRC Press, Boca Raton, FL, 1981, 1-12.
6. Van Doorn WG. Classes of programmed cell death in plants, compared to those in animals. *Journal of Experimental Botany.* 2011; 62:4749-4761.
7. Chakrabarty D, Verma AK, Datta SK. Oxidative stress and antioxidant activity as the basis of senescence in *Heimerocallis* (day lily) flowers. *Journal of Horticulture and Forestry.* 2009; 1:113-119.

8. Yoshida K, Toyama-Kato Y, Kameda K, Kondo T. Sepal color variation of *Hydrangea macrophylla* and vacuolar pH measured with a proton-selective microelectrode. *Plant Cell Physiology*. 2003; 44:262-268.
9. Galston AW, Davies PJ. Control mechanisms in plant development. Englewood Cliffs New Jersey: Prentice Hall, 1970.
10. Smith MT, Saks Y, Van Staden J. Ultra-structural changes in the petals of senescing flowers of *Dianthus caryophyllus* L. *Annals of Botany*. 1992; 69:277-285.
11. Van Doorn WG, Balk PA, Van Houwelingen AM, Hoeberichts FA, Hall RD, Vorst O *et al.* Gene expression during anthesis and senescence in iris flowers. *Plant Molecular Biology*. 2003; 53:845-863.
12. Van Doorn WG, Woltering F. Senescence and programmed cell death: Substance or semantics? *Journal of Experimental Botany*. 2004; 55:2147-2153.
13. Battelli R, Lombardi L, Rogers HJ, Picciarelli P, Lorenzi R, Ceccarelli N. Changes in ultrastructure, protease and caspase-like activities during flower senescence in *Lilium longiflorum*. *Plant Science*. 2011; 180:716-725.
14. Spundova M, Popelkova H, Ilik P, Skotnica J, Novotny R, Naus J. Ultrastructural and functional changes in the chloroplasts of detached barley leaves senescing under dark and light conditions. *Journal of Plant Physiology*. 2003; 160:1051-1058.
15. Tripathi SK, Narendra Tuteja. Integrating signaling in flower senescence. *Landes Bioscience*. 2007; 2(6):437-445.
16. Avila-Rostant O, Lennon AM, Umaharan P. Spathe color variation in *Anthurium andraeanum* Hort. and its relationship to vacuolar pH. *Hort. Science*. 2010; 45:1768-1772.
17. Mazza G. Anthocyanins and heart health. *Annali dell'Istituto Superiore di Sanita*. 2007; 43:369-374.
18. Edwards KD, Humphry M, Sanchez-Tamburrino JP. Advances in plant senescence. In: Nagata T, editor. *Senescence*. UK: Advanced Technologies (Cambridge) Ltd., 2012, 117-136.
19. Van Doorn WG, Woltering EJ. Physiology and molecular biology of petal senescence. *Journal of Experimental Botany*. 2008; 59:453-480.

20. Yamada T, Takatsu Y, Kasumi M, Ichimura K, Van Doorn WG. Nuclear fragmentation and DNA degradation during programmed cell death in petals of morning glory (*Ipomoea nil*). *Planta*. 2006; 224:1279-1290.
21. Müller R, Stummann BM, Andersen AS, Serek M. Involvement of ABA in postharvest life of miniature potted roses. *Plant Growth Regulation*. 2004; 29:143-150.
22. Hunter DA, Yi MF, Xu XJ, Reid MS. Role of ethylene in perianth senescence of daffodil (*Narcissus pseudonarcissus* L. 'Dutch Master'). *Postharvest Biology and Technology*. 2004; 32:269-280.
23. Xu X, Jiang CZ, Donnelly L, Reid MS. Functional analysis of a RING domain ankyrin repeat protein that is highly expressed during flower senescence. *Journal of Experimental Botany*. 2007; 58:3623-3630.
24. Voleti SR, Singh VP. Physiology of flower senescence in floricultural crops. *Advances in plant physiology*. 2000; 3:423-439.
25. Halevy AH, Mayak S. Senescence and postharvest physiology of cut flowers-part 2. *Horticultural Reviews*. 1981; 3:59-143.
26. Van Doorn WG. Effects of pollination on floral attraction and longevity. *Journal of Experimental Botany*. 1997; 48:1615-1622.
27. Van Doorn WG. Categories of petal senescence and abscission: a re-evaluation. *Annals of Botany*. 2001; 87:447-456.
28. Stead AD, Van Doorn WG. Strategies of flower senescence-a review. In: Scott RJ, Stead AD, eds. *Molecular and cellular aspects of plant reproduction*. Cambridge: Cambridge University Press, 1994, 215-238.
29. Leverentz MK, Wagstaff C, Rogers HJ, Stead AD, Chanasut U, Silkowski H *et al.* Characterisation of a novel lipoxygenase-independent senescence mechanism in *Alstroemeria* floral tissue. *Plant Physiology*. 2002; 130:273-283.
30. Phillips HL, Kende H. Structural changes in flowers of *Ipomoea tricolor* during flower opening and closing. *Protoplasma*. 1980; 102:199-215.
31. Suttle Jeffrey C, Kende Hans. Ethylene Action and Loss of Membrane Integrity during Petal Senescence in *Tradescantia*. *Plant Physiol*. 1980; 65:1067-1072.
32. Mayak S, Dilley DR. Regulation of senescence in carnation (*Dianthus caryophyllus*). *Plant Physiology*. 1976; 58:663-665.

33. Halevy A, Abouhamoud H, Wayak Shimun. Senescence and Postharvest Physiology of Cut Flowers. In Book: Horticultural review. 1979; 1:490.
34. Laksawan Leksakwong, Saichol Katsa, Wouter G, Van Doorn. Protein degradation and peroxidase activity during petal senescence in *Dendrobium* cv. Kinnu Saman. Postharvest Biology and Technology. 2009; 52:84-90.
35. Poni R, Reiss N, Auzorn R, Halevy AH, Borochov A. Examination of the possible involvement of lipoxygenase and jasmonates in pollination-induced senescence of *Phalaenopsis* and *Dendrobium* flowers. Physiologia Plantarum. 1995; 94:205-210.
36. O'Neil SD. Pollination regulation of flowers development. Annual Review of Plant Physiology and Plant Molecular Biology. 1997; 49:547-574.
37. Gan S. The hormonal regulation of senescence, in Plant Hormones: Biochemistry, Signal Transduction, Action, 3rd edition, ed. By Davies PJ. Springer, Dordrecht The Netherlands. 2004. 561-581.
38. Schippers JH, Jing HC, Hillie I, Dijkwel PP. Developmental and hormonal control of leaf senescence. In: Gan SS, editor, ed. Senescence processes in plants. Oxford: Blackwell Publishing Ltd., 2007, 145-170.
39. Nishimura H, Kato S, Yamashita A, Satoh S. Repressed ethylene production in the gynoecium of long-lasting flowers of the carnation 'White Camille': role of the gynoecium in carnation flower senescence. Journal of Experimental Botany. 2004; 55:641-650.
40. Costa LCD, Araújo FFD, Lima PCC, Pereira AM, Finger FI. Action of abscisic and gibberellic acids on senescence of cut gladiolus flowers. Horticultura Brasileira. 2006; 25(4):377-385.
41. Doga N, Karsanli A. The role of polyamines in relation to flowering senescence. Horticulture, Ornamental and Plant Biotechnology. 2006; 1:39-45.
42. Demireli NSR, Misra RL, Singh VP. Effect of polyamines on post harvest life of gladiolus spikes. Journal of Ornamental Horticulture. 2009; 11(3):166-171.
43. Woltering EJ, Van Doorn WGG. Role of ethylene in senescence of petals: morphological and economical relationships. Journal of Experimental Botany. 1998; 39:1615-1616.

44. Ichimura K, Shimizu-Yumoto H, Goto R. Ethylene production by gynoecium and receptacle is associated with sepal abscission in cut *Delphinium* flowers. *Postharvest Biology and Technology*. 2009; 52:267-272.
45. Woltering EJ, Somhorst D, De Beer CA. Roles of ethylene production and sensitivity in senescence of carnation flower (*Dianthus caryophyllus*) cultivars White Sim, Chimera and Epomeo. *Journal of Plant Physiology*. 1993; 141:329-335.
46. Lawton KA, Raghothama KG, Goldsbrough PB, Woodson WR. Regulation of senescence-related gene expression in carnation flower petals by ethylene. *Plant Physiology*. 1990; 93(4):1370-1375.
47. Lee MM, Lee SH, Park KY. Effects of spermine on ethylene biosynthesis in cut carnation (*Dianthus caryophyllus* L.) flowers during senescence. *Journal of Plant Physiology*. 1997; 151(1):68-73.
48. Rattanawisalanona C, Ketsa S, Van Doorn WG. Effect of aminooxyacetic acid and sugars on the vase life of *Dendrobium* flowers. *Postharvest Biology and Technology*. 2003; 29:93-100.
49. Walden R, Corodeiro A, Tiburcio AF. Polyamines: small molecules triggering pathways in plant growth and development. *Plant Physiol*. 1997; 113:1009-1013.
50. Ferrante P, Vernieri F, Tognoni, Serra G. Changes in abscisic acid and flower pigments during floral senescence of petunia. *Biologia Plantarum*. 2006; 50(4):581-585.
51. Halevy AH. Cytokinin activity in rose petals and its relation to senescence. *Plant Physiology*. 1970; 46:497-499.
52. Panavas T, Rubinstein B. Oxidative events during programmed cell death of daylily (*Heimerocallis* hybrid) petals. *Plant Sci*. 1998; 133:25-138
53. Hoeberichts FA, De Jong AJ, Woltering EJ. Apoptotic like cell death marks early stage of gypsophila (*Gypsophila paniculata*) petal senescence. *Post harvest Biol. Technol*. 2005; 35:229-236.
54. Yamada Tetsuya, Yasumasa Takatsu, Toru Manabe, Masakazu Kasumi, Wataru Marubashi. Suppressive effect of trehalose on apoptotic cell death leading to petal senescence in ethylene-insensitive flowers of gladiolus. *Plant Science*. 2004; 164:213-221.

55. Green D, Koerner G. The central executioners of apoptosis: caspases or mitochondria. *Trends Cell Biol.* 1998; 8(7):267-71.
56. Yamada T, Takatsu Y, Manabe T, Kasumi M, Marubashi W. Suppressive effect of trehalose on apoptotic cell death leading to petal senescence in ethylene-insensitive flowers of gladiolus. *Plant Science.* 2008; 164:213-221.
57. Shibuya K, Tetsuya Yamada, Kazuo Ichimura. Morphological changes in senescing petal cells and the regulatory mechanism of petal senescence. *Journal of Experimental Botany.* 2016; 67(20):5909-5918.
58. Van Doorn WG, Kirasak K, Ketsa S. Macroautophagy and microautophagy in relation to vacuole formation in mesophyll cells of *Dendrobium tepals*. *Journal of Plant Physiology.* 2015; 177:67-73.
59. Charles S Whitehead, Abraham H Halevy, Michael S Reid. Control of ethylene synthesis during development and senescence of carnation petals. *J Amer. Soc. Hort. Sci.* 1984; 109(4):473-475.
60. Scariot V, Paradiso R, Rogers II, Pascale SD. Ethylene control in cut flowers: Classical and innovative approaches. *Postharvest Biol. Technol.* 2014; 97:83-92.
61. Yuan RC, Carbaugh DH. Effects of NAA, AVG, and 1-MCP on ethylene biosynthesis, preharvest fruit drop, fruit maturity, and quality of 'Golden Supreme' and 'Golden Delicious' apples. *Hort. Science.* 2007; 42:101-105. ISSN: 0018-5345.
62. Wang TW, Zhang CG, Wu W, Taylor C, Thompson JE. Pleiotropic effects of suppressing deoxyhypusine synthase expression in *Arabidopsis thaliana*. *Plant Molecular Biology.* 2003; 52:1223-1235.
63. Badliyan D, RBH Willis, Bowyer MC. Use of nitric oxide donor compound to extend the vase life of cut flowers. *Hort. Science.* 2004; 39(6):1371-1372.
64. Zeng Chang-Lia, Liu Li, Xu Guo-Quan. The physiological responses of carnation cut flowers to exogenous nitric oxide. *Scientia Horticulture.* 2011; 127:424-430.
65. Maclsan DC, Dodolph RR. Effects of N'-benzylamino purine on postharvest respiration of *Chrysanthemum morifolium* and *Dianthus caryophyllus*. *Bot Gaz.* 1962; 124:20-21.
66. Evans PT, Malmberg RL. Do polyamines have roles in plant development? *Annual review of plant biology.* 1989; 40(1):235-269.

67. Luo HG, Jing HJ, Li J, Luo SR. Effects of different preservatives on fresh keeping of cut carnation flower. *Plant Physiology Communications*. 2003; 39(1):27-28.
68. Gul F, Tahir I, Sultan SM. Effect of some polyamines and protein synthesis inhibitors on flower senescence in *Petunia hybrida* Vilm. cv. Tint Cascade. *Oriental Science*. 2005; 10:117-122.

Online Education one of the Way to Handle Challenges Posed by COVID-19 in Higher Education

Archana. R. Mukhedkar
Head Of Department ,Botany
S.M.D. Mohekar Mahavidyalya, Kalamb,
Dist-Osmanabad

Abstract:

Online education is delivered through internet to the students. It allows students to study from any place. The online method of teaching and learning is best suited for everyone. COVID -19 pandemic affected the world negatively. Education sector is also suffered. Due to lockdown, face to face teaching and learning is also disturbed. Academic institutes gradually adopted online mode of teaching and learning in order to teach students. Many professional institutes and colleges have organized training and faculty development programmes to upgrade ICT knowledge of teachers. Online teaching and learning is alternate mode of delivery of knowledge. Now a days online teaching learning getting momentum. Through online education, social distancing can be exercised.

Key Words: Online education, COVID -19, higher education

Introduction :

Teaching is an art and learning is science. In this electronic era for teaching does not mean that it will lost the beauty of teaching. In this COVID 19 time online teaching is a combination of skill set by teacher in art of teaching. Each teacher can use own method by using ICT tools. Knowledge and skill creation, knowing skill of teaching are important. Online education turning crises into opportunities. Online education is a form of education that is delivered via internet to the students using their computers or smart phones. It is electronically supported learning that relies on the internet for teacher - student interaction and the distribution of class materials. Online learning allows students to study from any place where they have a stable internet access. It also allows them to study at any time they find comfortable. Due to its convenience and flexibility the resources are available from anywhere at any time. Everyone who are part time students or are working full time can take advantage of web- based learning. The online method of learning is best suited for everyone. Online learning gives you more flexibility. This flexibility provided learning opportunities for many more learners. (Young 2002). This is the great transformation is posing challenges to teachers and teacher education in using technologies in creative and productive ways. Teacher have to meet these new challenges by continuously acquiring new knowledge and skills to discharge our duty effectively. Online education is way ahead in education.

Skills expected from worrier teachers:

From live to virtual classroom become cause of worrying. Most of the teachers not accepting online teaching, to teachers it become habitual to chalk and talk method. COVID-19 has forced to suspend physical classroom and shift to online classes. It is a massive, disruptive shift to move all the existing courses online in matter of days. In general to complete online courses requires an elaborate lesson plan design, teaching materials such as audio, video contents, as well as technology supports teams. However due to sudden emergence of COVID-19, most faculty members are facing the challenges of lacking online teaching experience, early preparation, or support from educational technology teams. High quality participation to improve the breadth and depth of students learning. (Wei 2020).

Learning is a lifelong process as per teaching is concern weather offline or online teaching, to know what is education most characteristics in teaching. It is important to learn and set the mind power to deliver the knowledge. Digitilization is not a problem when teachers adopts a skills. Teaching becomes great challenge because entire things are going to change rapidly. How to become a online teacher in the form of worrier is a challenge. When we call about digitalization, digital tool, everyone should have exact connectivity in mind with digital learning. As the outcome of teaching- learning, educational outcome should be appreciated. Skilling online education the need to undergo not only basic tools of technology and skills of technology is required. Teachers have to update in all respect and have to reskill themselves in many ways. online education empower in Higher education. By using effective E resources teachers have to adopt technology for online teaching for exploring online education.

Utility of online learning during COVID- 19 lockdown:

Due to the closure of Schools, Colleges, Universities, many parents, teachers, and students are trying to adopt to new "Routin" and challenges involved in online learning. COVID -19 pandemic impacted negatively to the world. It has affected to the health of citizens of the country. Lockdown is imposed in order to handle challenge posed by COVID -19. During lockdown period educational institutes are closed. Face to face teaching and learning is disturbed. Academic institutes gradually initiated online meeting and classes in March to cope up with the lockdown situation. Number of institutes started sharing academic recourses through online mode. Many professional institutes and colleges have organized training and faculty developing programmes to upgrade the ICT knowledge of teachers. COVID-19 crises have enabled teachers to enhance their ICT skills. The outbreak has resulted online interaction between teachers and students. In India 37 million students are currently enrolled in higher education. The bottom line of success of online courses is engagement of students. Online teaching and learning is alternate mode of delivering of knowledge and this is found beneficial (Hadiya 2017).

online lab experiment should be encouraged, this is possible in Computer Science, Commerce and Management Studies. Now a day's online teaching and learning getting momentum. The online method of learning is best suited for everyone. Through online education social distancing can be exercised. The lockdown has been working as catalyst for educational institutes to grow and opt for platforms and technique they haven't used before.

Creating Tech savvy teachers for future classroom:

Strategies and Challenges during COVID-19 pandemic has changed the responsibilities and role of faculties in higher education, which is changing the face of education. It is the need of time to create tech savvy teachers for future classroom during and post COVID-19 times. The students and teachers do not have much access to library and all materials converted to e-form so there are challenges. Distance learning and learning outcome, web based leaning are three important pillars of education and which have become more important in today's times. The breaks comes due to COVID-19 historical accident this lead to structural break. Before COVID-19 and after COVID-19 teaching will be changed. This is the time to collaborate and share skills. Technosavy skills to be upgraded of ICT like learning management system(LMS) for individual teacher, group of teacher, online courses creation and sturcturing, teacher student formation and management, grading of offline and online assignments, quizzes, content uploading, discussion forum, analytic tools management for tracking learners performance. As per Gazette notification (Indian Government) any student can enroll in up to 20% of courses per semester through MOOCs and SWAYAM (Study Webs of Active learning for Young Aspiring Minds) and earn credits. Teachers have to empower with ICT tools because 50% job requires in ICT tools so transformation will come when each and every student and teacher adopts online teaching learning and for this all technological support should be required in every college. So many teachers are scared about online teaching and not mentally prepared for online teaching. Technology cannot replace great teachers but technology in hands of great teacher can be transformational. Teachers have to make empower and relevant to the system by use of technology in that way student can't replace you. And for that content quality of online teaching is very important.

Artificial intelligence, robotics, virtual reality, internet of things (IOT) are the education technologies of future to face the challenges posed by COVID-19. Artificial intelligence will help in adaptive assessment, algorithms which replace mentors. Examinations at doorstep, digital invigilation and digital attendance can be possible. To upgrade the ICT knowledge technology enhanced programme is an attempt to empower teachers to keep up with time and need of student's. To go beyond chalk and talk method teachers have to be trained from basic to advance level. In order to transform this idea into reality, for this each college have maximum computers along with servers so that learning process continues and colleges become a part of this E-learning journey.

In India over 200 universities are planning to offer online degree courses for students. ICT empowered teaching, ICT enabled research and creation of digital resources, online faculty development programmes. Webinars, ARPIT (Annual refreshment programme in teaching), ICT enabled administrative roles etc, these are the new roles of a teacher to face the challenges posed by COVID-19.

How to hold student attention while online teaching:

Online education has its own pedagogy. The effectiveness of online learning varies among the age groups. The general consensus on children, especially younger ones, is that a specially structured environment is required. Because kids are more easily distracted. To get full benefit of online learning, there needs to be a concerted effort to provide this structure and go beyond physical class, lecture through video capabilities, instead using a range of collaboration tools and engagement methods that promote "inclusion, personalization and intelligence", according to Dowson Tong, Senior executive vice president of Tencent. During online education to hold the students' attention is also a challenge, for this dividing the teaching content into smaller units to help students focus and adopt modular teaching methods. In traditional class teaching, body language, facial expression, and teacher voice are all important teaching tools. However, once a course is switched to online teaching it's difficult to use these teaching tools in online teaching, therefore faculty slow down their speech to allow students to capture key knowledge points. Faculty should use various methods to strengthen students' active learning outside of class. Combining online and offline self-learning effectively. (Wei, 2020) Give relevant examples, try to summarize the knowledge, content should be easily understood on screen, important points should be there, don't put the audience off, generate the interest so the audience remains the same there. Increase involvement of students so students will be prepared, understand the psychology of students, instead of informative learning conceptual learning should be there. Make students attentive so online teaching can go effectively. In the education student interest is at topmost at any agenda. In this lockdown period counseling centers should be set like "MUSKURAYEGA INDIA". and teachers have to motivate students for online learning. Digital population in India is also increased, we can use this in COVID-19 for online education and most internet users are from the younger generation. Online learning is the catalyst to create new, more effective methods of educating students.

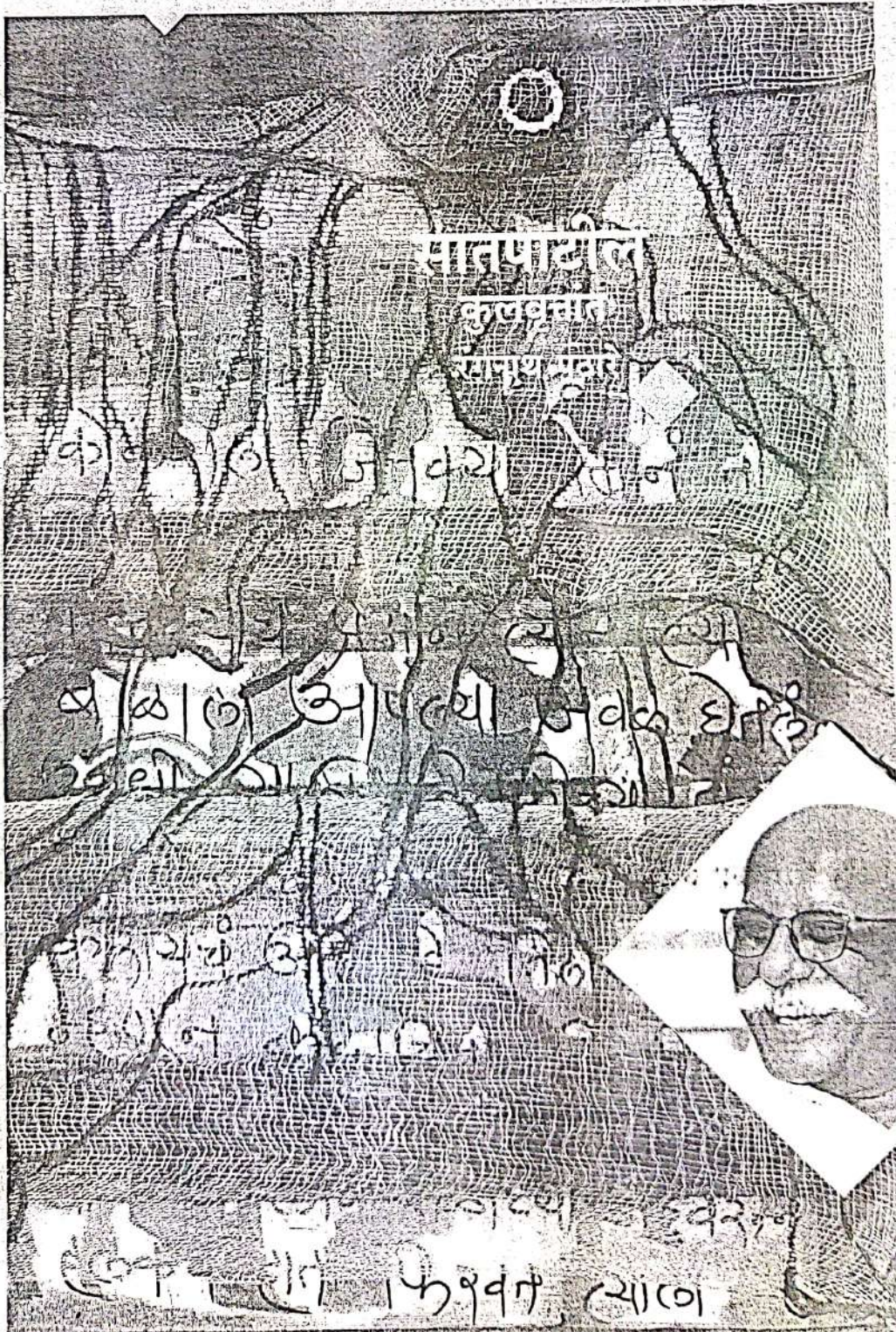
Result and Discussion :

Digital learning has led to a reduction in cost and has taken the impact and reach of resources for students as well as teachers to another level. It has been observed that the things taught through online mode have a lot many challenges for educators and learners. (Howell, et al. 2003). Learning Digitally will be the new face of Indian education. It will be very useful and constructive means for both teachers and students in coming years. The Government is working with various agencies to build up new platforms through which e-learning can be easily done and where students, teachers and parents can closely connect (Shtakshi and Nardev 2020).

दिवाळी २०२०

शब्दालय

सातपाटील कुलवृत्तांत विशेषांक



शब्दालय दिवाळी २०२०
सातपाटील कुलवृत्तांत : विशेषांक
संपादक : सुमीत लांडे

◆ **समीक्षा :**

- वंशश्रेष्ठत्वाच्या दंभावर प्रहार करणारी प्रागतिक कादंबरी :
राकेश वानखेडे/ ९
- मानवी 'अहं'ना नख लावणारी कादंबरी :
नीतीन रिंटे/ १३
- मराठी कादंबरीच्या विकासाची नवी दिशा सूचित करणारी कादंबरी :
नीलकंठ कदम/ २१
- भाषेच्या जीवाभ्रामध्ये लपून राहिलेल्या मुळांचा शोध :
विनायक येवले/ २९
- स्त्रीत्वाची महती सांगणारी पुरुषार्थाची गाथा :
प्रतिक पुरी/ ४४
- प्रस्थापित संस्कृती-विचारांना छेद देणारी कादंबरी :
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- बखर लेखनाची वैशिष्ट्ये सामावलेली कादंबरी :
डॉ. अरुणा दुभाषी/ ६२
- काळाचे नाद-निनाद :
अकनाथ पगार/ ६४
- पर्यायी इतिहासाची दृष्टी देणारी कादंबरी :
नंदकुमार मोरे/ ९०
- काही बीजात्म स्त्रीरूपांचा शोध :
प्रवीण दशरथ बांदेकर/ १०४
- देशीयतेच्या उपयोजनाचे स्पष्ट उदाहरण :
डॉ. किशोर सानप/ ११२
- महाराष्ट्रीय संस्कृतीचा कुलवृत्तांत :
केदार काळवणे/ १३४
- जिथे संपत्ते तिथूनच सुरू होणारी कादंबरी :
सुचिता खल्लाळ/ १३६
- मराठी माणसांचा (मराठ्यांचा) वृत्तांत :
शंकर विभुते/ १४०
- वांशिक दुराभिमानाला धक्का देणारी कादंबरी :
कौस्तुभ पटाईत/ १४४
- आत्मशोधातून सत्वशोधाकडे जाणारी कादंबरी :
राजीव जोशी/ १४७
- महाकादंबरीची विस्तारणारी वाट... :
विजय चोरमारे/ १५२
- जातीच्या अहंकाराला टाचणी :
विजय चोरमारे/ १५३
- काही नोंदी :
दा.गो.काळे/ १५६

- काळाची गोष्ट :
बालाजी सुतार/ १६५
- स्वतःचा वेगळा रस्ता शोधणारी कादंबरी :
विश्वनाथ शिंदे/ १६९
- नवी उर्जा देणारी कादंबरी :
डॉ. गणपतराव ढेंबरे/ १७४
- बहुजनांच्या सांस्कृतिक पुनर्शांथाची कुळकथा :
डॉ.गणेश मोहिते/ १७८
- गावगाड्यातील स्त्रियांची शहाणीव :
सुहास पाटील/ १८५

◆ **प्रतिसाद :**

- अभिषेक धनगर/१९१ ● गणेश आवटे/१९३
- कविता ननवरे/ १९५ ● जनार्दन वेल्लेकर/१९७
- अजय कांडर/१९९ ● अंजली ढमाळ/२०१
- विलास शेळके/ २०३ ● किरण लिमये/२०५
- सुप्रिया आवारे/२०६ ● संजय भास्कर जोशी/२०८
- प्रमोद मुनघाटे/२१० ● अरुणा सबाणे/ २११
- राहुल तांबोळी/२१२ ● संजन मोरे/२१३
- दिलीप भाऊराव पाटील/ २१४
- सावित्री जगदाळे/२१६
- ले. कर्नल संजीव पटवर्धन/ २१९
- संतोष पद्माकर पवार/२२१
- समाधान महाजन/ २२६ ● प्रतीक महेंद्र कदम २२८
- आनंद प्रतापराव जाधवराव/ २२३१
- लक्ष्मीकांत रांजणे/ २३३ ● डॉ. एकनाथ आळवेकर/२३५ ● प्रमोद भगवान पडवळ/ २४२

◆ **प्रतिक्रिया :**

- पपायरस बुक स्टॉल/श्रीपाद चौधरी/भूषण कोलते/१८८
- अमृता देसर्डा/१९४ ● आशुतोष दिवाण/१९८
- भास्कर निर्मळ/२०० ● जयदीप सावंत/२०७
- दादासाहेब खांडेकर/२११ ● महेश भोसले/२१२
- उन्मेश एकनाथ अमृते/२१५ ● स्वप्नील शेटे/२१८
- मनोज पाठक/२२० ● मकरंद साठे/२२५
- नीरजा/२२७ ● नितीन वैद्य/२३०
- प्रा. व्यंकटेश सोळंके/२३२ ● जयदीप शिंदे/२३४
- ज्ञानदेव राऊत/२४१ ● अॅड. अमोल पाटील/२४२
- स्वप्नील महेंद्र जाधवराव/२४३ ● संगिता कुलकर्णी/२४४

◆ **प्रकाशन कार्यक्रम भाषण :**

- सुमती लांडे/२४५ ● दीपक करंजीकर/२४६
- राजन खान/२४९ ● राजन गवस/२५३
- रंगनाथ पठारे/२५५ ● प्रभाकर कोलते/ २५८

आपल्या पूर्वजांच्या शोधाची सातपाटील कुलवृत्तांत ही कहाणी एकट्या लेखक रंगनाथ पठारे यांचा कुलवृत्तांत राहत नाही तर मागील सातशे वर्षांतील महाराष्ट्रीय समाजजीवनाच्या स्थितीगतीचे पडसाद तीमधून ध्वनित झालेले आहेत. मराठीजनांच्या सांस्कृतिक संचिताचा दस्तावेज म्हणून या लेखनकृतीचे मोल अधिक आहे. महाराष्ट्र आणि महाराष्ट्राबाहेरील अशा व्यापक भूप्रदेशाचा कॅनव्हास या कादंबरीला लाभला असला तरी तिचे मुख्य केंद्र हे महाराष्ट्र भूमी हेच आहे.

भारतीय मौखिक कथनपरंपरांचा संस्कार रिचवत नव्या कथन शक्यता आजमावण्याचा सातत्याने प्रयत्न रंगनाथ पठारे यांनी केलेला आहे. कथन रचनेची वैशिष्ट्यपूर्ण लेखनशैली घडवत त्यांच्या कथा-कादंबऱ्यांनी मराठी साहित्याला वजनदार ऐवज देत नवे वळण दिले आहे. गेल्या चार दशकातील त्यांच्या कथा, कादंबरी आणि समीक्षेने मराठी साहित्याला दिग्दर्शित केलेले आहे. विचारवंत म्हणूनही ते महाराष्ट्राला सुपरिचित आहेत. ताम्रपट या बहुआयामी कादंबरीने त्यांची श्रेष्ठ कादंबरीकार म्हणून मराठीत ओळख स्थापित झालेली आहे.

आज ते मराठीतील श्रेष्ठ कादंबरीकार म्हणून

मराठी कादंबरी व्यवहाराच्या केंद्रस्थानी आहेत. त्यांची नुकतीच 'सातपाटील कुलवृत्तांत' ही मागील सातशे वर्षांच्या कालपटावरील वंश, जात, धर्म, संस्कृती, समाज, राजकारण यांच्या विशाल पटाला सामावून घेत बदलत्या जगण्याची कुळकथा सांगणारी सातशे शहाण्णव पृष्ठांची बृहद कादंबरी प्रसिध्द झाली आहे. मराठा योद्धे, त्यांचे जगणे आणि स्थलांतर यांना केंद्रेवती ठेवत माणसाच्या वाटचालीचा घेतलेला हा शोध मूल्यवान आहे. मानवी नातेबंध, त्यातील गुंतागुंत आणि विविध समूहांच्या काळपरिणामातून होणाऱ्या सरमिसळीचा कोलाज या कादंबरीतून साक्षात झालेला आहे. बदलत्या काळाच्या परिणामातून बदलत गेलेल्या माणूस नि समूहाच्या आयडेंटिटीचे स्वरूपही या कादंबरीतून अधोरेखित होते.

आपल्या पूर्वजांचे जीवन आणि मागील पिढ्यांची वाटचाल समजून घेण्याच्या कुतूहलातून या कादंबरीची निर्मिती झालेली आहे. गेल्या वीस-पंचवीस वर्षांपासून या कादंबरीचे लेखन रंगनाथ पठारे करत असल्याचे त्यांनी म्हटलेले आहे. अशाप्रकारच्या कादंबरी लेखनासाठी एक चिकित्सक संशोधनपूर्ण व्यासंग लागतो आणि त्या व्यासंगातून झालेल्या

अभ्यासाला बौद्धिक पातळीवर शेकडो वर्षे मागे जाऊन चिंतनाच्या पातळीवर वास्तव वाटणारा चित्रपट डोळ्यासमोर ठेवत रेखाटावा लागतो. तो रेखाटण्यात पठारे कमालीचे यशस्वी झालेले दिसतात. वर्तमानातील गुंते हे इतिहासात दडलेले असतात. इतिहासाच्या शिकवणीतून वर्तमान अधिक सुरूप करता येतो. इतिहासच वर्तमानाला घडवत असतो.

वर्तमान जगण्यातील अनेकविध पेचांचे मूलस्रोत या कादंबरीतून उलगडलेले आहेत. त्यातून वर्तमानातील अनेक प्रश्नांची उत्तरे आपणाला मिळू शकतात. विशेषतः आजच्या दंभमय जातनिष्ठांचा पाया किती कमकुवत आहे हे या कादंबरीच्या अवलोकनातून लक्षात येते. रंगनाथ पठारे आपल्या कुळाची गोष्ट सांगताना परंपराशील होत नाही तर मानवतावादी दृष्टी स्वीकारून चिकित्सकपणे ही गोष्ट रचतात. वंश आणि जात अस्मितांना धक्का देणारी ही कादंबरी परिवर्तनवादी मूल्यविचार ठळक करणारी आहे. जातीव्यवस्थेचा तळ धुंडाळत तीमधील ठिसूळपणाची पोलखोल करणारी ही कादंबरी जातसंघर्षवाद्यांना आत्मभान देणारी आहे. जातनिर्मितीचा इतिहास या कादंबरीतून उजागर होतो. हा इतिहास आजच्या टोकदार झालेल्या जात अस्मितांना ठिसूळ करणारा

आहे.

महाराष्ट्रीय संस्कृतीचा कुलवृत्तांत :

अल्लाउद्दीन खिलजीने

इ.स.१२८९ साली पैठणवर स्वारी केल्याच्या निर्देशापासून या कादंबरीचा प्रारंभ होतो आणि साधारणतः इ.स.२००० पर्यंत या कुलवृत्तांताचा शेवट. या जवळपास सातशे-आठशे वर्षांच्या विस्तीर्ण अवकाशात अनेकविध आशयसमृद्ध घटितांनी ही कादंबरी घडते. श्रीपती, साहेबराव, दसरत, जानराव, रखमाजी आणि पिराजी, शंभुराव, देवनाथ या प्रमुख व्यक्तिचित्रांच्या माध्यमातून या कादंबरीचे महाकथानक उभे राहते. त्या-त्या कालखंडातील या नायकांच्या संघर्षातून या कादंबरीतील कथानक उभे राहत या कुलवृत्तांताची गोष्ट साकारते. स्त्री व्यक्तिचित्रांचाही हे कथानक उभे करण्यात महत्त्वाचा वाटा आहे.

या कादंबरीतील स्त्रिया अत्यंत सामर्थ्यशीलपणे लेखकाने उभ्या केलेल्या आहेत. त्यामुळेच पुरुष व्यक्तिचित्रापेक्षा त्यांचाच अस्तित्वजनक आवाज कादंबरीभर जाणवतो. जगण्याशी चिवटपणे टिकून राहण्याच्या स्त्रियांच्या आदिम-नैसर्गिक वृत्तीचा निर्मळ आविष्कार या कादंबरीतून झालेला आहे. या कादंबरीत आलेल्या स्त्रिया मातृसत्ताक समाजव्यवस्थेची आठवण करून देतात. सर्वसामान्य कष्टकरी माणसांच्या कहाण्याही या

कादंबरीतून समोर येतात. त्यांच्या भावविश्वाच्या अस्तित्वाने या कादंबरीच्या जागा भरलेल्या आहेत. या माणसांनी या कादंबरीला तोलून धरलेले आहे.

इतिहास आणि भूगोलाच्या व्यापक अवकाशाला कवेत घेत ही कादंबरी अनेकविध घटिते, पात्रे आणि उपकथानकांच्या आधारे महाराष्ट्रीय भूमीचे सत्त्व घेऊन उभी राहते. रूढ अर्थाने ही ऐतिहासिक कादंबरी नाही; तर ऐतिहासिकतेच्या परिप्रेक्षात वास्तव आणि कल्पिताच्या आधारे एका विशिष्ट समाजाचे जगणे आणि स्थित्यंतरांची महाकथा साक्षात करणारी आहे. आपल्या पूर्वजांच्या शोधाची ही कहाणी एकट्या लेखक पठारे यांचा कुलवृत्तांत राहत नाही तर मागील सातशे वर्षांतील महाराष्ट्रीय समाजजीवनाच्या स्थितीगतीचे पडसाद तीमधून ध्वनित झालेले आहेत.

मराठीजनांच्या सांस्कृतिक संचिताचा दस्तावेज म्हणून या लेखनकृतीचे मोल अधिक आहे. महाराष्ट्र आणि महाराष्ट्राबाहेरील अशा व्यापक भूप्रदेशाचा कॅनव्हास या कादंबरीला लाभला असला तरी तिचे मुख्य केंद्र हे महाराष्ट्र भूमी हेच आहे. सकृतदर्शनी रंगनाथ पठारे आणि त्यांच्या मराठा जातीचा हा कुलवृत्तांत वाटत असला तरी त्याला जातीविशिष्टता प्राप्त झालेली नाही. महाराष्ट्रीय जगण्याची बहुस्तरीय रचना, वैविध्यपूर्ण जीवनरीत, मूल्यव्यवस्था, श्रमसंस्कृती, ज्ञानव्यवस्था, लढाऊ बाणा, युध्दशास्त्र, शेती आणि गावगाडा अशा अनेक अंगांना स्पर्श करत ही कहाणी सर्वांची होऊन जाते. त्यामुळेच महाराष्ट्रीय समाजाच्या सांस्कृतिक जगण्याचा कुलवृत्तांत म्हणून या कादंबरीचा निर्देश करणे आवश्यक ठरेल.

कालसंवादी प्रमाण आणि लोकभाषेच्या उपयोगामुळे या कादंबरीचे निवेदन प्रवाही झालेले आहे. त्यात सहज-सुलभता असल्याने ही भाषा वाचकांना गुंतवून ठेवते. कथानकाची मांडणीही कुतूहल जागवणारी असल्याने ती वाचकांना खिळवून घेत संपूर्ण कादंबरी वाचावयास भाग पाडते. यादवकाळ, निजामशाही, आदिलशाही, पेशवाई, ब्रिटिश राजवट, आधुनिक काळ, स्वतंत्र्योत्तर काळ अशा वेगवेगळ्या काळाचा दीर्घ पट मांडताना ही भाषा वाचकाला रसग्रहणात-आकलनात कुठेही अडसर ठरत नाही. ठलट प्रमाण-बोलीचा हा मिश्र भाषासंयोग त्या-त्या काळाच्या गोष्टीला प्रभावीरित्या पुढे नेत परिणामकारक

होतो.

'काय समजानी झालंय', 'माझी भैन. मेरा भैन', 'आरे त्यो जिता हाये दोडांनोऽऽ', 'भैने आपको कई दफा देखा है', 'पेंढारी?' 'आवई व्हतीच तिच्यामायला सका त्यांछे!', किंवा 'काय सांगतोयस काय! तसे असेल तर आपण एकमेकांचे कझिन्स झालो.' या प्रकारचे संवाद आणि प्रमाण भाषेतील प्रवाही विचारगर्भ निवेदनाने ही कादंबरी वैशिष्ट्यपूर्ण ठरलेली आहे. "माझ्या देशातील गरीब हे तमाम दुनियेतील गरीबांपेक्षा गरीब आहेत, हे मी मान्यच करतो. पण तसे जगणे केवळ इथेच शक्य आहे. इथली हवा, पाणी आणि अन्न तशी तुम्हाला संधी देते. काही किमान गोष्टींची पूर्तता झाली की तुम्ही इथे जगू शकता." यासारख्या अनेक निरीक्षणांनी हे निवेदन अधिक प्रगल्भ आणि परिपक्व झालेले आहे.

कोणत्याही कादंबरीला नुसत्या तपशीलांनी कादंबरीपण प्राप्त होत नाही; तर ती कादंबरी कोणते सामाजिक तत्त्वज्ञान घेऊन साकारते यावर तिच्या कादंबरीपणाची योग्यता अवलंबून असते. सामाजिक परिवर्तनाचा सत्यशोध या कादंबरीतून पठारे यांनी घेतलेला आहे. त्या अनुषंगाने आवश्यक असणारे सामाजिक तत्त्वज्ञान आणि संशोधनपूर्ण निरीक्षणांची कादंबरीगत योजना लेखकाने या महागोष्टीत मिसळून टाकल्याने एक परिणामकारक वैचारिक संस्कार ही कादंबरी घडवते. मराठी विचारविश्वालाही काही नवी दृष्टी देण्याची क्षमता ही कलाकृती बाळगून आहे.

यादृष्टीनेही ही कादंबरी महत्त्वाची वाटते. कोणत्याही कादंबरीचे श्रेष्ठत्व हे तिच्या बहुआवाजीपणात आणि जीवनाच्या समग्र दर्शनात असते. यात माणूस-समूह, त्याच्या भाव-भावना, मानसिक आंदोलने, त्याच्या भोवती असणाऱ्या सर्व समाजव्यवस्था, त्यांना जोडून येणारी सर्व प्रकारची घटिते, अनेक पात्रे, कथानके-उपकथानके, कालखंडाचा व्यापक पट, भू-जैविकता, भाषिक सघनता अशा अनेक अंगांचे दर्शन तीमधून घडणे अपेक्षित असते. यादृष्टीने ही कादंबरी यशस्वी ठरलेली आहे. एकविसाव्या शतकाच्या मराठी कादंबरीच्या पुढील दिशा विस्तारण्याच्या दृष्टीने मैलाचा दगड म्हणून या कादंबरीचा निर्देश करता येईल.

•••

दीपावली, पाडवा व नूतन वर्षाच्या



'अक्षय प्रकाशन', नासिक
यांच्यावतीने हार्दिक शुभेच्छा!



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1020-21

स्वराज्य ते लोकशाही : एक चिंतन

संपादक

डॉ. विठ्ठल जाधव

डॉ. रमेश लांडगे

प्रा. विठ्ठल गुंडे

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Email- hitechresearch11@gmail.com

राष्ट्रीय एकात्मतेचे प्रतिक : छत्रपती शिवाजी महाराज

डॉ. दीपक सुभाषराव सूर्यवंशी

(मराठी विभाग), शि.म.ज्ञानदेवमोहेकरमहाविद्यालय, कळंबजि.उस्मानाबाद

प्रस्तावना :- छत्रपतीशिवाजीराजेभोसले (१९फेब्रुवारी१६३० ते३ एप्रिल१६८०), मराठीस्वराज्याचेसंस्थापक, आदर्शशासनकर्ता, समतेचापुरस्कर्ता, सहिष्णूराजा, उत्कृष्टयोद्धाम्हणूनसंपूर्णजगभरत्यांचीख्यातीआहे.

गनिमीकावापद्धतवापरूनतत्कालीनविजापूरचीआदिलशाही,

अहमदनगरचीनिजामशाहीआणिबलाढ्यमुघलसाम्राज्यशाहीशीलढादिलाआणिमराठीस्वराज्याचीबीजारोपणकेले. अन्याय -

अत्याचारापासूनगोरगरीबजनताशेतकरीआणिमहिलांचीसुटकाकरूनउत्तमवसंविधानिकस्वराज्याचीस्थापनाकेली. प्रत्येकमाणसालासन्मानमिळावा, श्रमालाप्रतिष्ठामिळावी,

प्रत्येकालाआपलीचराज्यआहेअसेपोषकवातावरणनिर्माणकेले,

सर्वसमावेशकउत्तमप्रशासकअशीभूमिकात्यांचीराहिलेलीआहे,तसेच जगभरातील अनेक महान व्यक्तींनी त्यांचा गौरव केला आहे,त्यांनी जीवनात कृतीला आणि तत्वला महत्व दिले.

मराठवाड्याच्या मातीत जन्माला आलेले गौरा कुंभार यांचे योगदान अदितीय आहे.

संशोधन पद्धती :-

प्रस्तुत शोधनिबंध लेखनासाठी वर्णनात्मक व विश्लेषणात्मक अभ्यासपद्धतीचा अवलंब करण्यात आला आहे. तसेच प्राथमिक व दुय्यम साधन सामुग्री म्हणून प्रकाशित ग्रंथाचा उपयोग करण्यात आला आहे.

विषय प्रवेश-

महाराष्ट्र भूमी 'संत' 'महंत' 'नररत्नांची खाण' असे मानले जाते. छत्रपती शिवराय, महात्मा फुले, राजर्षी शाहू महाराज आणि डॉ.बाबासाहेब आंबेडकरांच्या विचारधारेवर भारतीय समाज वाटचाल करीत आहे. मला आकलन झालेल्या शिवरायांच्या चरित्रावर प्रकाश टाकत आहे. वास्तविक पाहता 'न भूतो न भविष्यति' असे चरित्र असलेल्या त्यांच्या जीवनविषयक कार्यावर थोडक्यात मांडणी करणे, म्हणजे सूर्यासमोर काजव्याने प्रकाशमान होण्यासारखे आहे. तरी पण एक अल्पसा प्रयत्न मी करीत आहे. त्यांची राजकीय आर्थिक विशेषतः सामाजिक क्षेत्रातील कार्य हिमालयाच्या उंचीचे आहे. प्रजाहित दक्ष, बहुजन प्रतिपालक, कुळवाडी भूषण, आदर्शवत जाणता राजा अशा अनेक गुणांचा गौरव इतिहास संशोधकांनी केला आहे.

तत्कालीन महाराष्ट्र पारतंत्र्यात होता. अशा कठीण परिस्थितीत शिवरायांनी रयतेचे 'स्वतंत्र राज्य' निर्माण केले. त्यांचे जीवन एखाद्या दैवी चमत्कारासारखे आहे. त्यांची आई जिजाबाई लखुजी जाधवराव निजामशाहीतील शूर सरदारांची मुलगी तर वडील शहाजीराजे भोसले हे स्वकर्तृत्वाने सामर्थ्यवान बनलेल्या मालोजीराव भोसले यांचे चिरंजीव राजकारणात मुरलेल्या व स्वातंत्र्याचाच नवन्मेष बाळगणाऱ्या माता-पित्याच्या पोटी शिवाजी महाराजांचा जन्म १९ फेब्रुवारी १६३०मध्ये वैशाख शुद्ध द्वितीयेस जुन्नरजवळील शिवनेरी किल्ल्यावर झाला. आई जिजाबाईंनी त्यांच्यावर अनेक उत्तम संस्कार केले. लिहिणे, वाचणे, शिकविले

लढाईचे शिक्षण दिले. आईने दिलेली संस्काराची शिदोरी, आचार विचारांची थोरवी संपूर्ण जगभर मानली जाते. त्यामुळे विविध ठिकाणी असलेल्या त्यांच्या अश्वारूढ पुतळ्याची साक्ष येणाऱ्या पिढ्यांना प्रेरणा देत राहते. अनेक समाजसुधारक समाज घडविण्यासाठी अहोरात्र परिश्रम घेतात आणि आपण पिढ्यानपिढ्या त्यांनी दाखविलेल्या विचारांच्या वाटेवरून मार्गक्रमण करत असतो.

स्वातंत्र्य, समता, नैतिकता, सामाजिक न्याय आणि बंधुता या मानवी जीवनमूल्य व विचारांची रुजवणूक जनमानसात करण्यासाठी त्यांनी सातत्याने प्रयत्न केले. त्यांच्या प्रत्येक कृतीतून आपणास मानवतावादी दृष्टिकोन पहावयास मिळतो. जाती, धर्म, पंथ, जन्मठिकाण, गरीब-श्रीमंत यावरून कदापीही माणूस श्रेष्ठ ठरत नाही. तर त्याच्या कर्तृत्वावर ते अवलंबून असते. येथे समीक्षक श्री. म. माटे यांचे मत सार्थ ठरते, ते म्हणतात, 'महापुरुषांचे वय कसे मोजावे? याचे उत्तर देताना म्हणतात, 'त्या महापुरुषांच्या मृत्यूनंतर समाज जितकी वर्षे त्यांची कृतज्ञतेने आठवण काढतो, ते त्यांचे वय असते.' या संदर्भात समर्थ रामदास शिवरायांचे व्यक्तिमत्वाविषयी समर्पक शब्दात लिहितात,

'निश्चयाचा जनांशी आधारु अखंड स्थितीचा निर्धारु । श्रीमंत योगी!!!'

या काव्यातून यशवंत, कीर्तिवंत, सामर्थ्यवंत, दानशूर, नीतीवंत, पुण्यवंत जाणता राजा असल्याचे सांगितले आहे, तसेच 'बाळाचे पाय पाळण्यात दिसतात' याप्रमाणे शिवरायांचे व्यक्तिमत्व महापराक्रमी असल्याचे एका कवितेत पुढील प्रमाणे रेखाटले आहे,

"शिवाईचा प्रसाद म्हणूनि, नाव ते शिवराय । बांधा मजबूत, निश्चयी मुद्रा, सुंदर त्यांची काया ॥ शून्यातूनी स्वर्ग निर्मिती, करील ऐसा बाळा । पराक्रमी होईल हा हो, शत्रूस कर्दनकाळ ॥"

• असे म्हणतात की, त्यांनी मुठभर मावळे सोबत घेऊन जिद्द चिकाटी आत्मविश्वासातून स्वराज्य स्थापन केले. पण ते सर्व विविध जाती-धर्मांच्या आधारावर एकत्र आलेले नव्हते, तर विचार व ध्येय गाठण्याच्या ध्यासाने एकदिलाने लढण्यासाठी आलेले होते. जीवाला जीव देणारे, त्यांच्यातील नातं होतं ते माणुसकीचं ! दलित शोषित अशा प्रकारच्या सर्वच क्षेत्रातील मंडळी त्यांच्या या साम्राज्यात एकवटलेली होती. संघटन कौशल्य, जलनिती, पर्यावरणासंबंधीचा विचार, मानवतावादी योद्धा, शेतकऱ्यांचे हित जोपासणारे शिवराय तसेच नौदलाचे महत्त्व जाणणारा जाणता राजा असे अनेक गुण खरेतर आजच्या तरुणाईसाठी अत्यंत उपयुक्त आहेत. त्यांचा हा लढा माणुसकीसाठी असून अन्याय अत्याचार करणाऱ्या शत्रूशी होता.

१३ व्या शतकात देवगिरीच्या यादवांची सत्ता संपवणाऱ्या परधर्मीय परकीय सत्ताधीशांनी महाराष्ट्रावर पुढे दोनशे ते तीनशे वर्षे सत्ता गाजवली. त्यांची सत्ता मजबूत होत गेली, तसतशी त्यांच्यातील जुलमी प्रवृत्ती वाढली होती. आपल्या प्रजेवर अन्याय करणे, त्यांच्या जमिनी बळकावून घेणे, दीन-दुबळे व स्त्रीयावर प्रचंड अत्याचार करित असत. या परिस्थितीमुळे मराठी माणस हतबल झाली होती. या जुलमी सत्तेपुढे शहाणपण चालत नाही, याप्रमाणे सर्वत्र परिस्थिती दिसत होती. आपला देश स्वतंत्र व्हावा, हा संकल्प शिवाजी महाराजांनी पूर्ण केला.

हिंदू धर्माचा पाडाव करून सर्व हिंदुस्तान मुसलमानमय करून टाकावा, याच महत्त्वाकांक्षेने झपाटलेले औरंगजेब हा दिल्लीच्या तख्तावर होता. विजापूरची आदिलशाही, अहमदनगरची निजामशाही व गोवळकोंड्याची कुतुबशाही अशा वेड्यात सापडलेल्या पुणे-सुपे

“भाफ केलं कर्ज गरिबांचं, फिटल ओझ जन्मोजन्मीच ।

असं राज्याच महिमानगाऊ, शिवरायांचं गाणं स्वाती नक्षत्रास दान ॥”

अनेक जगप्रसिद्ध इतिहासकाराने अलेक्झांडर, सिद्धर, नेपोलियन सारख्या जगद्विख्यात सेनानीशी त्यांची तुलना केली आहे. खरे तर छत्रपती शिवराय एका लेखात न मावणारा विषय आहे. म्हणून शेवटी शिवरायांचे कार्य स्वतः डोळ्यांनी पाहण्याची, त्यांच्या पदरी सेवा केलेले बखरकार कृष्णाजी अनंत सभासद एके ठिकाणी म्हणतात,

“राजा साक्षात केवळ अवतारी जन्मास येऊन पराक्रम केला, नर्मदेपासून रामेश्वरपर्यंत द्वाही दिशा फिरवली, देश काबीज केला. आदिलशाही, निजामशाही, कुतुबशाही व मोगलशाही या चारही पातशहा व समुद्रातील २२पाठशाहा असे जेरजप्त वरून नवेच राज्य साधून मराठा पातशहा सिंहासनाधिश छत्रपती जाहला. प्रतिच्छा मरण पाहून कैलाससी गेला. ये जातीचा कोणी मागे जाहला नाही, पुढे होणार नाही.” त्यांच्याविषयी खाफीखान सारखा इतिहासकार नोंदवतात, “शिवाजी महाराजांच्या राजनीतिमध्ये जातीयता, धर्मांधता यांना जागाच नव्हती.”

याबाबतीत नवोदित कवी राजकुमार गाजरे लिहितात,

“सूर्याचा तेज नव्हे सूर्य जर शिवबा माझा । पराक्रमी राजा शिवबा माझा ॥

शेवटीस भारतीय समाजमनाचे प्रेरणास्थान असणाऱ्या बहुजनांचा कैवारी, जाणता राजा यांना मानाचा मुजरा, अशा युगप्रवर्तक छत्रपती शिवाजी महाराजांचेविचार आपण संकल्प आचरणात आणणे महत्वाचे ठरेल.

निष्कर्ष :-

जगाच्या इतिहासात जे थोर राज्यकर्ते होऊन गेले, त्यात छत्रपती शिवाजी महाराजांची गणना होते, नेपोलियन हा ही असाच शूर होता पण शिवाजी महाराजांजवळ जे नैतिक सामर्थ्य होते, ते नेपोलियन जवळ नव्हते. त्यांच्यासंदर्भात अनेक विचारवंतानी आपले मत मांडून ते सिद्ध केले आहे. प्रातिनिधिक स्वरूपात ते पुढीलप्रमाणे ..

‘छत्रपतीशिवाजीमहाराजसारखाराजामाझ्यादेशातजन्मालाआलाअसतातरत्यांच्यास्मृतीचा ठेवाडोक्यावरघेऊनआम्हीआनंदानेनाचलोअसतो’, ओल्डडायन्सीब्रिटिशइतिहासकार

संदर्भातपुरुषोत्तमखेडेकरम्हणतात, ‘शिवचरित्रकेवळडोक्यावरघेऊनमिळवण्याचाविषयना हीतरडोक्यातघालण्याचाविषयआहे.’

‘अमेरिकेसारख्याराष्ट्राच्याविरुद्धस्वतंत्रराष्ट्राच्याविरुद्धलढूनआम्हीस्वतंत्रझालोतेछत्रपतीशिवाजीमहाराजांच्यायुद्धनीतीचीप्रेरणाघेऊनच’-फिडेलक्युबा

‘छत्रपतीशिवाजीमहाराजांच्यामहतीसंदर्भातप्रबोधनकारठाकरेम्हणतात, ‘छत्रपतीशिवाजी राजेइतकेमहानआहेत, कीत्यांच्यानावापुढे 33 कोटीदेवांचीफलटणबादहोते’, या शंभर वर्षात अठरापगड जाती धर्मातून असंख्य मावळ्यांची श्रेणीच निर्माण झाली. जणू एकप्रकारे ते वर्तमान लोकशाहीचे ते स्वरूप होते.

संदर्भ :- प्रा. डॉ. दादाराव गुंडरे, मराठी कवितेतील महानायक, मैत्री प्रकाशन, लातूर
कृ. अ. केळुसकर, छत्रपतीशिवाजीमहाराज, वरदा बुक्स, पुणे

परिसरावर या तीनही राज्याचा मोगल व मुसलमानांच्या गुलामीतून राज्याची मुक्त करण्याचा निर्धार शिवरायांनी केला.

सह्याद्रीच्या कडेकपारीतून जीवाला जीव देणारे तानाजी मालुसरे, नेताजी, सूर्याजी मालुसरे, बाजीप्रभू देशपांडे, येसाजी कंक, जीवा महाले, वाघोजी तुपे सूर्याजी काकडे असे एकापेक्षा एक जीवाला जीव देणारे महार, मांग, रामोशी, मुस्लिम, बेरड, न्हावी, कोळी, भंडारी, कैकाडी, घिसाडी, कुणबी मराठा, पारधी, लोहार, प्रभू, कुंभार, सुतार, गवंडी, डवरी, गोसावी, वासुदेव, ब्राह्मण, कायस्थ, आगरी, कातकरी आणि ठाकुर अशा अठरापगड जातीतील मर्द-मावळ्यांची फौज तयार केली अनेक मुसलमान होते. तोफखाना प्रमुख इब्राहिमखान तर शिवरायांना एका प्रसंगात वाचणारा मदारी मेहतर. एक कवी याच अनुषंगाने आपल्या कवितेत लिहितो,

*‘तू भरवला नाहीस तर उच्च नीच माणसांचा, गाई-बकऱ्यांचा बाजार
तुझ्या सम्यक सेनेत होते, बहादूर वीर सरदार
मदारी, दौलतखान, तानाजी, जीवा, कुणबी, महार
न्हावी, रामोशी अन मुसलमान तू घेतले होते कवटाळून उराशी !’*

त्यांनी ‘हर हर महादेव’, अशा सिंहगर्जनेने आपल्या कार्याला सुरुवात केली. विविध नीतीचा अवलंब करून वयाच्या सोळाव्या वर्षी तोरणा गड जिंकून स्वराज्याचे तोरण बांधले. अनेक संकटांना त्यांनी मोठ्या धीराने तोंड दिले. सिंहगड काबीज करताना तानाजी पडला, पावनखिंड लढताना बाजी प्रभुने छातीचा कोट केला. मुरारबाजी महाडकर, प्रतापराव गुजर अशा एकाहून एक शूर वीर जिवलग मावळ्यांनी आपले रक्त दिले. प्रसंगी आपल्या प्राणांचे बलिदान दिले. त्यातूनच भव्य दिव्य असे ‘रयतेचे स्वराज्य’. आकाराला आले. स्वराज्यात ८४ किल्ले आणि २४० गड झाले होते. अगदी प्रतिकूल परिस्थितीतून हे महान कार्य केले, म्हणूनच शिवरायांचा इतिहास हा वैभवशाली इतिहास मानला जातो. महाराष्ट्रात १६३० ते १६५० या कालावधीत भीषण दुष्काळ पडला होता. त्याची झळ मराठी मुलखात बसली होती. याचे विदारक वर्णन समर्थ रामदास व संत तुकारामांनी आपल्या लेखणीद्वारे केलेले दिसते.

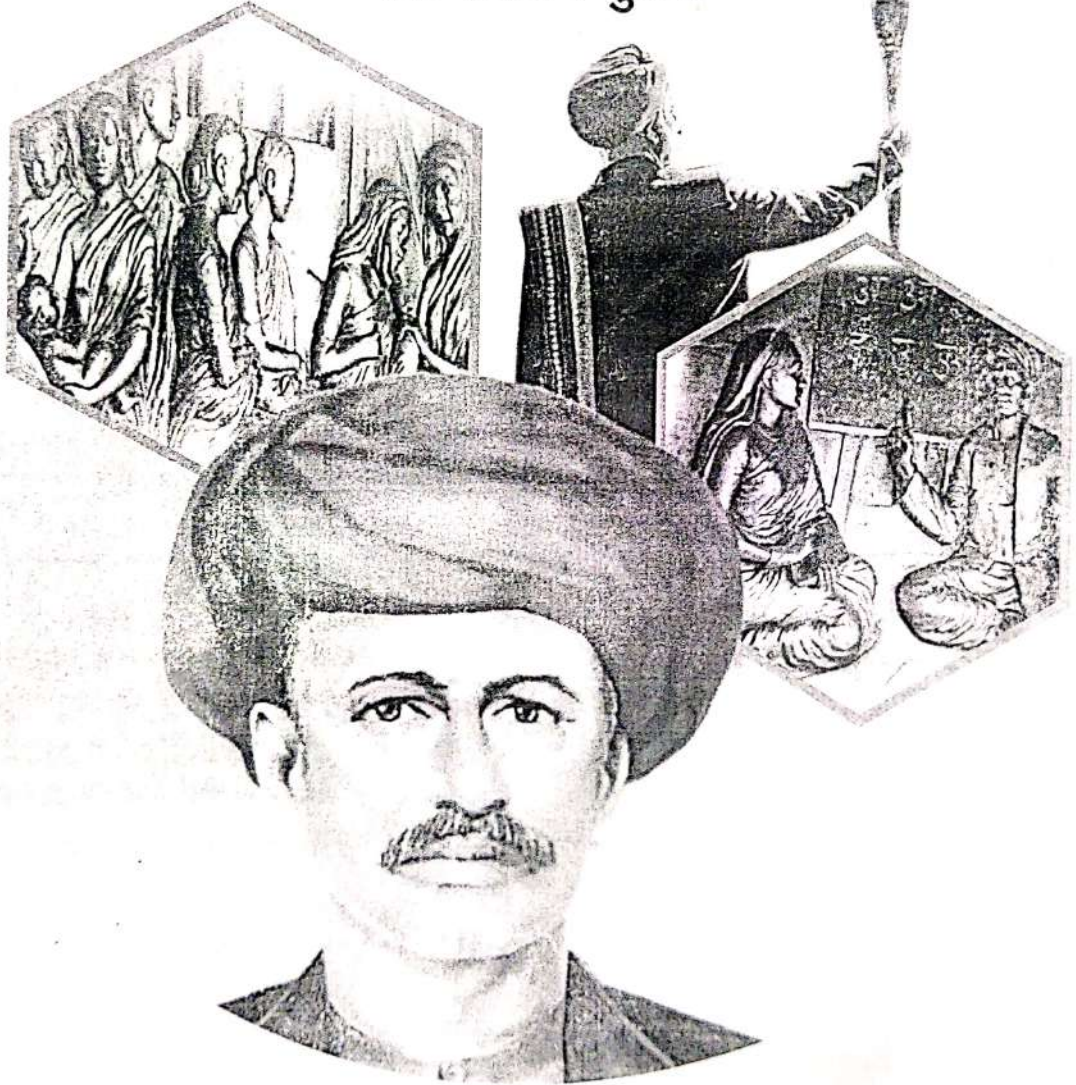
छत्रपती शिवरायांनी अतिशय भयंकर असणाऱ्या दुष्काळी अस्मानी तत्कालीन परिस्थितीत संकटाना तोंड देण्यासाठी मोठस्थळ व पाटस्थळ अशा स्वरूपाचे शेती व शेतकऱ्यांच्या उन्नतीसाठी निर्णय हाती घेतले होते. त्याप्रमाणे अंमलबजावणी केली होती. त्याला सुख संपन्नतेकडे बळीराजा, हा सिंचन व्यवस्था अचानक दुष्काळात पडलेल्या जनतेला तग धरून राहण्यासाठी तगाई (सबसिडी) देणारा पहिला राजा. बळीराजाचा वारसा समर्थपणे चालवणारे छत्रपती शिवराय हे खऱ्या अर्थाने शेतकऱ्यांचे राजे ठरतात. न्याय, बंधुता व परनारी मातेसमान, याबरोबरच रयतेच्या भाजीच्या देठालाही हात लावता कामा नये, सैनिकाकडून आपल्याच रयतेला त्रास होत असेल, तर मग मोगल बरे असे म्हणण्याची वेळ येऊ नये, अशी सूचना व ताकीदही देत असत. म्हणून महात्मा फुले यांनी त्यांना ‘कुळवाडीभूषण’ हे विरुद्ध बहाल केले. सर्वांसाठी ‘समान न्याय’ असे त्यांचे राज्यकारभाराची सूत्र होते. बिकट परिस्थितीमध्ये जुलूम जबरदस्ती करून शेतसारा वसूल करणाऱ्या देशमुखांचे हक्क शिवरायांनी काढून घेतले व स्वतंत्र महसूल अधिकारी नेमले. शेतीच्या विकासासाठी बी-बियाणे देण्याची पद्धत सुरू केली, भर दुष्काळात शेतकऱ्यांचे कर्ज माफ केले, सर्वांगाने शेतकरी वर्गात एक प्रकारची सुरक्षितता वाटावी असे प्रयत्न केले. तेव्हाचा शेतकरी सामाजिकदृष्ट्या स्वयंभू होता तसेच शेतकरी ‘आर्थिक व कल्याणकारी’ कार्य करणारे होते याच बाबतीत शिवरायांसारख्या शेतकरी राजाचा जयघोष कविवर्य महानोर आपल्या काव्यातून करतात,

महात्मा फुले चिंतन आणि चर्चा

• संपादक •

डॉ. भगवान डोंगरे

डॉ. गोवर्धन मुळक



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८४.	महात्मा फुले यांच्या विचारांची प्रासंगिकता प्रा.कुंकडे एस.जे. - प्रा. जुमडे जी.के.	२९१
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✓ ८७.	आद्य समाजसुधारक महात्मा फुले यांचे शैक्षणिक विचार आणि कार्य प्रा. डॉ. दीपक सुभाषराव सूर्यवंशी	३०९
८८.	महात्मा फुले यांच्या विचारातील स्त्री प्रश्न आणि सुधारणा प्रा. हिवराळे के.बी.	३१३
८९.	महात्मा फुले यांच्या विचारातील स्त्री प्रश्न आणि सुधारणा प्रा.डॉ. काळे सुनिल रायत्रा	३१६
९०.	महात्मा फुले : स्त्री प्रश्न आणि सुधारणा प्रा.डॉ.सुषमा शंकरराव प्रधान - घेवंदे	३१९
९१.	महात्मा फुले यांचे कृतीयुक्त शैक्षणिक विचार प्रा.डॉ. विवेकराजे (विठ्ठल) घोलप	३२४
९२.	स्त्री जीवनातील परिवर्तनात महात्मा फुलेंच्या विचारांचे योगदान सहा. प्रा. पुरुषोत्तम बांडे	३२७
९३	महात्मा फुले यांचे शिक्षणविषयक विचार आणि कार्य योगेश रामकृष्ण वायाळ - रामेश्वर लिंबाजी दिवटे	३३०

प्रा. डॉ. दीपक सुभाषराव सूर्यवंशी

मराठी विभाग

शि.म. ज्ञानदेव मोहेकर महाविद्यालय,

कळंब, ता. कळंब, जि. उस्मानाबाद

प्रस्तावना :

बहुजन समाजास अज्ञानाच्या अंधकारातून बाहेर काढून ज्ञानरूपी प्रकाशाच्या वाटेवरती घेऊन जाणारे क्रांतीसूर्य महात्मा ज्योतिराव फुले. १९ व्या शतकातील एक महान विभूती, समाज सुधारक, तत्व चिंतक आणि लोकोत्तर युगपुरुष होत. महात्मा फुले यांच्या सामाजिक, शैक्षणिक कार्यात त्यांच्या धर्मपत्नी सावित्रीबाई फुले यांनी खंबीर साथ दिली. त्यामुळे ते भारतीय विशेषतः महाराष्ट्रातील प्रबोधनाचे आद्य व खंदे प्रवर्तक म्हणून ओळखले जातात.^१ महात्मा ज्योतिबा फुले यांच्या शैक्षणिक कार्याचा आढावा घेताना तत्कालीन भारतीय समाजात प्रचलित असणारी शिक्षण व्यवस्था व तिचे स्वरूप विचारात घेणे आवश्यक आहे. शिक्षणतूनच खरे परिवर्तन होते, आधी शिक्षण दिले पाहिजे याच विचार धारेतून १८ व्या शतकात दीनदलित, बहुजन स्त्रियांना योग्य शिक्षण समानतेचा हक्क सर्वांना मिळाला पाहिजे. यासाठी धडपड करणाऱ्या अनेक समाजसुधारकांचा उदय झाला, यामध्ये सर्वात अगोदर क्रम लागतो तो महात्मा जोतराव गोविंदराव फुले यांचा. तदनंतर याच परंपरेत राजर्षी शाहू महाराज, कर्मवीर भाऊराव पाटील, डॉ. बापूजी साळुंखे, पंजाबराव देशमुख यांच्या कार्याची प्रेरणा घेऊन मराठवाड्यात शिक्षण प्रसार व प्रचाराचे कार्य शिक्षण महर्षी ज्ञानदेव मोहेकर गुरूजींनी केले आहे. बहुजन समाज शिक्षणाच्या परिप्रेक्षात आणण्यासाठी आटोकाट प्रयत्न केले आहेत. १८ व्या शतकात भारतात सर्वत्र इंग्रजांचे साम्राज्य पसरलेले होते. भारतीय समाजाचा इंग्रजी समाज संस्कृतीचा संबंध आलेला होता. अनेक जुन्या चालीरीती प्रथा-परंपरा अनिष्ट कर्मकांड, देव-दैव, धर्म-पुजा, कर्म-संकेत, स्वर्ग-नरक व पाप-पुण्य अशा बाबींचा सामान्य नागरिकांसमोर प्रचंड मोठ्या प्रमाणात अनेक अडचणी निर्माण होत होत्या या सर्व सामाजिक परिस्थितीचे अवलोकन करून महात्मा ज्योतिबा फुले यांनी माणसाला माणूस म्हणून जीवन जगता यावे यासाठी तसेच त्यांच्या पिढ्यानपिढ्या प्रस्थापितांच्या सामाजिक, धार्मिक, आर्थिक, राजकीय, सांस्कृतिक व्यवस्थेला हादरून सोडण्याचे काम त्यांनी केले. दलित व शोषितांसाठी क्रांतीमुक्तीची प्रबळ प्रेरणा देण्याचे, इतिहास सत्याचा नव्याने शोध घेणाऱ्या या महात्मा फुलेंच्या कार्याविषयी एक कवी राजकुमार गाजरे यांनी आपल्या क्रांतीसूर्य ज्योतिबा कवितेतून रेखाटले ते सार्थ ठरते.

इतिहासाची जाण ज्योतिबा । क्रांतीची मशाल ज्योतिबा ।

क्रांतीची भाषा ज्योतिबा । शिक्षणाचा प्रसार ज्योतिबा ।।२

याप्रमाणे बहुजन समाजाला शिक्षणाच्या प्रवाहात आणण्याचे कार्य उत्तम रीतीने केले आहे.

अभ्यासाची उद्दिष्टे :

१. महात्मा फुले यांच्या पहिल्या कार्याचा आढावा घेणे.
२. महात्मा ज्योतिबा फुले यांच्या तत्कालीन असलेल्या सामाजिक व शैक्षणिक परिस्थितीचा आढावा घेणे.
३. ब्रिटिश सरकारच्या तत्कालीन शैक्षणिक धोरण व प्रतिकूल परिस्थितीचा अभ्यास करणे.

महात्मा फुले : चिंतन आणि चर्चा / ३०९

४. भारतीय सामाजिक व शैक्षणिक परिस्थितीमध्ये सुधारणा करण्यासाठी महात्मा ज्योतिबा फुले यांनी वैचारिक क्रांतीचा दिलेला लढा विचारात घेणे.

संशोधन पद्धती :

प्रस्तुत शोधनिबंधामध्ये उपलब्ध असलेल्या प्रामुख्याने प्राथमिक व द्वितीयक स्रोतांचा वापर करून तथ्य संकलन करण्याचा प्रयत्न केला आहे. त्यामुळे प्राप्त माहितीचे वर्णन व विश्लेषणात्मक आणि वस्तुनिष्ठ संशोधन पद्धतीचा या ठिकाणी अवलंब करण्यात आला आहे.

महात्मा फुले यांच्या अलौकिक व व्यापक शैक्षणिक कार्यामुळे राजर्षी शाहू महाराजांनी त्यांना महाराष्ट्राचा मार्टिन ल्युथर असे म्हटले, तसेच दुसरे श्रीमंत सयाजीराव गायकवाड यांनी त्यांना हिंदुस्थानचा वॉशिंग्टन असे म्हटले आहे. उपेक्षित दीन दलित तरूणांना त्यांच्या सामाजिक जीवनात माणूस म्हणून त्यांना वागणूक देण्यात यावी. यासाठी महात्मा ज्योतिबा फुले यांनी अविरत परिश्रम घेतले. ज्योतिबांचे पूर्वज सातारा येथील कटगुण येथे राहत असत, त्यावेळी त्यांचे आडनाव गोन्हे असे लावले जाई. पुढे ते पुण्यात स्थायिक झाले. तेथे ज्योतिबांचे वडील गोविंदराव भाजीपाला फुलांचा व्यवसाय करू लागले. त्यांचा हा व्यवसाय त्या काळामध्ये नावारूपाला आला, त्यामुळे त्यांचे फुले हेच आडनाव कायमस्वरूपी झाले. त्यानंतर त्यांनी आपल्या व्यवसायात स्थिर झाल्याने ते पुणे येथे स्थायिक झाले. गोविंदरावांनी धनकवडीच्या झगडे पुण्यातील चिमणाबाई सोबत विवाह केला. त्यांना दोन मुले झाली. त्यातील थोरला राजाराम व धाकटा ज्योतिबा म्हणजे महाराष्ट्रातील आद्य समाजसुधारक आणि दलितोद्धारकाचे काम करणारे ज्योतिबा फुले यांचा जन्म २० फेब्रुवारी १८२७ रोजी पुणे येथे झाला. वयाच्या सातव्या वर्षी ज्योतिबा शाळेत जाऊ लागले. परंतु शूद्राने शाळेत शिक्षण घेणे महापाप असे तत्कालीन सामाजिक परिस्थितीत मानले जात असे. याचवेळी त्यांच्या वडिलांना एका मुसलमान व इंग्रज गृहस्थाने शिक्षणाचे महत्त्व पटवून सांगितले. हे ऐकून महात्मा फुले यांना त्यांच्या वडिलांनी शिक्षण घेण्यासाठी इंग्रजांच्या ख्रिस्ती मिशनरी शाळेत टाकले. याच काळात पाश्चिमात्य विचारवंत थॉमस पेन यांचे राईट ऑफ मॅन हे पुस्तक वाचनात आले त्या वेळी त्यांना कळले की तत्कालीन समाजातील व धर्मातील प्रचंड दारिद्र्य विषमता ही ईश्वर निर्मित नसून मानवनिर्मित आहे. या काळात त्यांच्या पुढे एक त्यांना प्रसंग अनुभवता आला. ते परांजपे नावाच्या एका मित्राच्या लग्नात गेले होते. मात्र गरीब शूद्र असल्याने लग्नात वरातीमागून जाताना त्यांना हाकलून देण्यात आले. तेंव्हापासून या प्रसंगावर त्यांनी खूप चिंतन केले, त्यातूनच समाजात असणारी प्रचंड विषमता याविरूद्ध लढा देण्यास सुरुवात केली. महात्मा फुले यांनी प्रचलित हिंदू समाजातील मतलबी रूढीचा प्रथा परंपरांचा अंधश्रद्धेचा शालेय अभ्यासक्रम पूर्ण झाल्यानंतर लहजी वस्ताद कडून शारीरिक व्यायामाचे धडे गिरवले. साधी राहणी, उच्च विचारसरणी अशी त्यांची विचारधारा होती. समाजात असणारी गरीबी श्रीमंतीची दरी दिवसेंदिवस वाढत जाते हे केवळ विशिष्ट वर्गातील सत्ता प्रभावामुळे सामान्य लोकांच्या जीवनात प्रचंड मोठी गुलामगिरी येताना दिसते. अशा परिस्थितीमध्ये त्यांनी आपले भावी आयुष्य त्यातील दिशा ठरवून दिले. कोणत्याही सरकारी नोकरीशिवाय सामाजिक कार्य करायचे असा त्यांनी निर्धार केला. भारतीय समाजातील दारिद्र्य दूर करण्यासाठी एकमेव पर्याय आहे. तो म्हणजे शिक्षणाच्या प्रवाहात सर्व सामान्य व्यक्तीला आणण्याचा त्यांनी प्रयत्न केला. पुढे १८४७ पर्यंत महात्मा फुले यांनी शिक्षण घेतले त्यांनी अभ्यासक्रम पूर्ण केला आणि प्रगल्भ झाले. त्यानंतर १८४८ मध्ये पुणे येथे मुलींची पहिली स्वतंत्र शाळा काढली. तत्कालीन पडलेल्या समाजाला त्यांचे कार्य रूचले नाही. अनेक लोकांनी विरोध केला तरी परंतु त्याची पूर्व तयारी म्हणून महात्मा फुले यांनी आपल्या पत्नीला सर्वप्रथम शिक्षण दिले. सावित्रीबाईंनी आपल्या पतीच्या सामाजिक व शैक्षणिक कार्यात मनापासून कार्य केले. याचा परिणाम म्हणून १८५१ मध्ये दुसरी शाळा अनुक्रमे मुलींसाठी काढली आणि खऱ्या अर्थाने शिक्षणाच्या परंपरेला शाळेच्या माध्यमातून सुरुवात झाली. तत्कालीन त्यांच्या कार्यामुळे त्यांच्या सर्वच शाळा अत्यंत व्यवस्थितपणे चालवल्यामुळे त्याची दखल घेऊन तत्कालीन इंग्रज अधिकारी सर मेजर कॅंडी यांनी (दक्षिणा प्राईज कमिटी)

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सरकारतर्फे ७५ रूपये अनुदान त्यांना दिले. परंपरा प्रिय असलेल्या भारतीय समाजाला प्रगती कडे घेऊन जायचे असंल तर भ्रामक रूढी, प्रथा, परंपरा, अनिष्ट चालीरीती, अंधश्रद्धा, अस्पृश्यता व कर्मकांड, इ. गोष्टींचे उच्छाटन करणे आवश्यक आहे, असे त्यांचे स्पष्ट मत होते. तसेच आपल्याला ज्ञान-विज्ञान-तंत्रज्ञान यांची कास धरावी लागेल. सामाजिक, शैक्षणिक, धार्मिक, अस्पृश्य वर्गाच्या कार्यांमुळे त्यांचा गौरव करण्यात आला. स्वातंत्र्य, समता, बंधुता, बुद्धीप्रामाण्यवाद्यांसाठी ते पडू लागले. सतीची प्रथा, बालजरठविवाह, केशवपन, अंधश्रद्धा निर्मूलन अशा समाज विधायक कार्यात त्यांनी प्रचंड मोठे योगदान दिले. ते खऱ्या अर्थाने बोलके सुधारक नसून कर्ते सुधारक होते. केवळ शाब्दिक विरोध न करता आलेल्या परिस्थितीला तोंड देण्यासाठी म्हणून अनेक ठिकाणी बालहत्या प्रतिबंधक गृह ही संस्था सुद्धा सुरू केली. त्याचबरोबर दैन्य दारिद्र्य यामध्ये खितपत पडलेले जे बहुजन होते त्यांच्यासाठी आपल्या घरातील पाण्याचा हौद खुला केला. भारतीय समाजाचा अन्नदाता पोंशिंदा असणारा शेतकरी वर्ग हा खऱ्या अर्थाने मागासलेला आहे. वर्षानुवर्ष अज्ञान अंधश्रद्धा चालीरीती रूढी-परंपरा व गुलामगिरीत अडकलेला आहे. असंघटित असल्याने त्यांचे अतोनात हात होतात हे ओळखून त्यांना एकत्रित आणण्यासाठी सत्यशोधक समाजाची स्थापना त्यांनी केली. महात्मा फुले यांनी सामाजिक परिस्थितीचा सखोल अभ्यास केला. यावरून त्यांनी विविध प्रकारचे ग्रंथ लेखन केले. त्यात शेतकऱ्यांचा असूड (१८८३), ब्राह्मणांचे कसब (१८६९), गुलामगिरी (१८७३), शिवाजी महाराजांचा पोवाडा (१८६९), सार्वजनिक सत्यधर्म (१८८५) या ग्रंथांच्या माध्यमातून अशा प्रकारे जागृती चळवळ त्यांनी उभी केली. मूलगामी तर्कशुद्ध अशा प्रकारचे लेखन त्यांनी केले आहे. त्यांच्या गुलामगिरी या ग्रंथातील हे खालील ओळी वरून लक्षात येईल,

विद्येविना मती गेली । मती विना नीती गेली ।

निती विना गती गेली । गती विना वित्त गेले ।

वित्त विना शूद्र खचले । इतके अनर्थ एका अविद्येने केले ।३

थोडक्यात शिक्षण हे समाज परिवर्तनाचे दुरगामी असणारे प्रभावी माध्यम आहे. दलित अस्पृश्य स्त्रिया व बहुजन समाज यांच्यासाठी अनाथाश्रम वृत्तपत्रे आणि शेतकरी पोहोचवल्या आपल्या सर्वांचा असलेला समाजाचा कणा असलेला घटक म्हणजे शेतकरी होय. याची जाणीव त्यांना होती. त्यामुळे विशेषतः शेतकऱ्यांच्या कुटूंबातील सर्वांना शिक्षण मिळाले पाहिजे. असा अट्टाहास त्यांनी केला होता. स्वातंत्र्य, समता, लोकशाही, विज्ञान, इतिहास, संस्कृती यावर भर देऊन सामाजिक विचारांची क्रांती केली. वयाच्या ६० व्या वर्षी त्यांना मुंबई येथील सामान्य जनतेच्या वतीने रावबहादुर वडेकर यांनी महात्मा ही पदवी बहाल केली.^५

शिक्षणाच्या माध्यमातून जे ज्ञान मनुष्याला होते, त्यावरून विचारांची प्रगल्भता अवलंबून असते. त्यांच्या मते शिक्षणा अभावी व्यक्ती हा पशु समान असतो. ज्ञानाशिवाय केलेली सर्व कामे निरर्थक असतात. असा माणूस हा एकप्रकारे पाषाणच असतो उचभू समाजाने शिक्षण व ज्ञानाचे दरवाजे शूद्र अतिशूद्रांसाठी बंद केलेली असल्याने त्यांना त्यांच्या अवस्था अत्यंत विकट झालेल्या होत्या. जोतिबांनी दूरगामी शिक्षणाची व्यवस्था ब्रिटीशांकडून अपेक्षा व्यक्त केली होती. त्यांनी तत्कालीन असलेल्या शिक्षणविषयक झिरपता सिध्दांताला विरोध केला होता आणि स्वतंत्र अशा सार्वत्रिक शिक्षणाची संकल्पना मांडली होती, पुढे त्याची अंमलबजावणी करण्यासाठी अलीकडच्या काळातील शासनाने प्रयत्न केले आहेत. सर्वसमावेशक आणि सर्व थरातील समाजातील लोकांसाठी विशद केली होती. यामध्ये शिक्षणाचे सार्वत्रिकीकरण म्हणजे जात, धर्म, पंथ, लिंग आणि शारीरिक अपंगता याचा अडसर न ठेवता समाजातील सर्व घटकांना समतेच्या तत्वावर शिक्षणाची संधी उपलब्ध करून देणे होय.^६

शिक्षणाविषयी महात्मा फुले यांनी जे विचार मांडले, ते खऱ्या अर्थाने स्वानुभवावर अवलंबून आहेत. शिक्षणातून उपेक्षित बहुजन वर्गाचे कल्याण व्हावे, असे त्यांना नेहमी वाटतं असे. ते पुढे म्हणतात, शिकून सुशिक्षितांची संख्या शेकडो

महात्मा फुले : चिंतन आणि चर्चा / ३११

पटीने वाढत जाईल. पण केवळ नोकरीच्या पाठीमागे लागण्याची गरज न पडता त्या सर्वांना उपयुक्त व्यवसाय आणि रोजगार उद्योगधंदे पुरेशा प्रमाणात उपलब्ध होतील, असा काळ फारसा दूर नाही.^६

एकूणच महात्मा फुले हे त्रेसष्ट वर्ष चंदनासारखे भारतीय समाजाच्या उत्थानासाठी प्रवास करीत राहिले. अनेक ठिकाणी व्याख्याने दिली. स्वातंत्र्य, समता, बंधुता आणि लोकशाही जीवनमूल्यांवर सातत्याने भर दिला. स्त्री आणि पुरुष यांच्यातील मतभेद सुध्दा त्यांना मान्य नव्हता. ते नेहमी पुरुषांच्या बरोबरीने स्त्रियांना अधिकार असावेत असे मानीत, जन्मतः स्त्री आणि पुरुष हे स्वतंत्र आहेत. त्यांना निवडीसाठी समान संधी आहे. मत मांडण्याचा स्त्रियांनाही सारखेच हक्क आहेत. शिक्षक हा समाजाला दिशा देणारा महत्त्वाचा घटक असून शिक्षकाची जबाबदारी केवळ शाळेपुरती मर्यादित नाही, त्याचा समाजाशी घनिष्ठ संबंध निर्माण होणे तितकेच आवश्यक असते. तसेच शिक्षण क्षेत्रात शैक्षणिक समाजशास्त्र ही संकल्पना महत्त्वाची असून शिक्षण व समाज यांच्यातील परस्पर संबंधाचा अभ्यास असणे आवश्यक आहे, असे महात्मा फुले यांचे दूरगामी मत होते.

समारोप :

प्रचलित समाजव्यवस्था ही ब्राम्हणांनी आपले वर्चस्व गाजवले आहे, ते म्हणत आपण सर्वजण एकाच निर्मिकाची लेकुरे आहोत. मग आपल्याच निर्मिकाची (देवाची) भेट (दर्शन) घेताना कोणत्याही प्रकारच्या मद्यस्थांची गरज नसते. ज्याप्रमाणे आई-वडिलांना भेटायला कोणत्याही प्रकारच्या मद्यस्थांची गरज नसते. त्यांच्या या असीम कार्याबद्दल भारतीय राज्यघटनेचे शिल्पकार डॉ. बाबासाहेब आंबेडकरांनी त्यांना आपले गुरु मानले. थोडक्यात संत वचनाप्रमाणे बोले तैसा चाले त्याची वंदाची पाऊल याप्रमाणेच महात्मा ज्योतिबा फुले यांनी अविरोधपणे शैक्षणिक, सामाजिक, धार्मिक विधायक परिवर्तनासाठी आपले आयुष्य वेचले असा हा महात्मा ज्योतिबा फुले यांनी २८ नोव्हेंबर १८९० रोजी जगाचा निरोप घेतला.

संदर्भ :

१. डॉ. दादाराव गुंडरे, मराठी कवितेतील महानायकांचे दर्शन, मैत्री प्रकाशन, लातूर, प्रथम आवृत्ती, ऑगस्ट २०१८.
२. प्रा. राजकुमार गाजरे, बहुजनांचे वादळ, पार्थ कॉम्प्युटर, औरंगाबाद.
३. कीर धनंजय, डॉ. मालशे स. ग. व डॉ. फडके य. दि. (संपा.), महात्मा फुले समग्र वाङ्मय शेतकऱ्यांचा आसूड, महाराष्ट्र साहित्य व संस्कृती मंडळ मुंबई, सहावी आवृत्ती.
४. श्री पं. स. पाटील, महात्मा ज्योतिराव फुले, महाराष्ट्र साहित्य व संस्कृती मंडळ, मुंबई, द्वितीय आवृत्ती, १९३८.
५. प्रा. सरदार गं. बा. महात्मा फुले, व्यक्ती आणि विचार, ग्रंथाली प्रकाशन, मुंबई, दुसरी आवृत्ती, १९८२.
६. कित्ता, हंटर शिक्षण आयोगापुढे सादर केलेले निवेदन.
७. कुलकर्णी अ. रा., महात्मा ज्योतिराव फुले, सामाजिक व सांस्कृतिक कार्य, डायमंड पब्लिकेशन, पुणे प्रथमावृत्ती २००८.
८. प्रा. डॉ. सतीश ठोंबरे, महाराष्ट्रातील समाजसुधारक, कैलास पब्लिकेशन, औरंगाबाद.
९. www.google.com

