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A Review Paper on Pharmaceuticals Expicients in Drug Formulation: A Comprehensive Overview of Their Functional Role

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ABSTRACT

Pharmaceutical excipients play an important role in the medical system and in formulating dosage form. The pharmaceutical drugs are developed by manufacturing and distribution of new drug and treatments.

Excipients are the substances other than the active drug used in formulating dosage forms. The word is derived from the Latin excipere, meaning 'other than'. Excipients are pharmaceutical are inert products which contains pharmaceutical formulation, stability of drug while manufacturing active pharmaceutical ingredients. It helps to ensure the therapeutic efficiency, safety and patient regulatory requirements of pharmaceutical of pharmaceutical products.

This review examines the various categories of excipients used in the drug formulation an theirs, functions, properties, objectives, advantages, toxic effects and specific application for solid, liquid, and semi solid dosage forms.

Excipients act as protective agents and also improve the bioavailability of development of new drug. Excipients which make up 80-90% of new drug are no longer considered inactive ingredients. Advances in technology and science have made them a crucial part of creating effective and safety of new medicines.

This review also highlights the safety and compatibility of excipients. Especially the growing awareness of excipients related to adverse effect and their potential risk to ensure the pharmaceutical product quality and safety. So, this review gives a brief explanation about history of excipients in pharmaceutical formulation

INTRODUCTION:

Excipients are inactive substances added to a pharmaceutical drug formulation to boost the stability, bioavailability, and overall functions of the active pharmaceutical ingredients (API).

Excipients play a vital role in regulating the release of API and improving its absorption by the body, and improve the health outcomes of the patients. They are important for improving the consistency, safety, and effectiveness of the drug.

The choice of excipients depends on various complex factors which must be carefully considered to ensure the development of safe, effective, and high-quality pharmaceutical products. Factors like:

1. Drug properties like chemical, physical, and pharmaceutical characteristics of the API.
2. Route of administration like oral, topical, parenteral, and other drug routes that impact excipient choice.
3. Regulatory requirements like compliance

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with guidelines, laws, and standards governing pharmaceuticals.

4. Formulation goals like desired release profile, stability, bioavailability, and patient acceptability.

Excipients exhibit various functional properties like:

1. Binders
2. Fillers
3. Stabilizers
4. Lubricants
5. Preservatives
6. Flavoring agents
7. Disintegrants
8. Coatings

Each excipient has different roles to improve the formulation's productivity and effectiveness. Binders which hold the tablet together. Filler which increases the bulk of the tablet. Stabilizers Prevent degradation of active pharmaceutical ingredients, ensure its shelf life. Lubricants Reduce friction between the particles.

Preservatives Prevent the microbial growth. Flavoring agents Improve the taste and patient compliance.

Disintegrants which breakdown the tablet & capsule & release the API. Coatings which improve the API absorption & bioavailability.

Importance of Excipients:

1. Improve the bioavailability of excipients which can enhance the absorption of API and optimize its productivity.

2. Enhance the patient compliance too which improve the taste and texture of the drug making it easier to take.

3. Increase the stability of drug which prevent degradation of API and increase the shelf life.

4. Better safety profile which reduces the risk of the adverse reactions.

History of Excipients in Pharmaceutical Formulation:

The uses of excipients in thousands of years ago (Ancient Day's). Natural substances like starch, sugar, and gums were used in drug formulation. The modern excipients are started in the mid-20th century with the introduction of synthetic polymers and other materials.

Natural resources also play a vital role as excipients in drug formulation which improve the stability.

Development of Synthetic Excipients:

The 1950s and 1960s saw the development of synthetic excipients such as cellulose derivatives, food and polyethylene glycol (PEG). These materials improved the effectiveness, consistency and safety compared to natural excipients.

Regulatory and Safety play crucial role in the development drug formulation (FDA).

Food and Drug Administration provide the guidelines and (GRAS) generally recognized that safe provide guidance on the use and safety of excipients.

New advance technology like Biotechnology, Novel delivery systems and Nanotechnology have expanded the important role of excipients in creating effective and safety medicines.

The future pharmaceutical excipient is focused sustainability and personalized medicine, which can develop eco-friendly, biodegradable & recyclable excipients and also enable the creation of patient customized pharmaceutical formulation by advanced excipients & manufacturing system.

This review covers the excipients in pharmaceutical formulation including their type, function & their role & selection factors. It also covers the regulation, safety, current research and challenges. By understanding the excipients, scientist can create better delivery systems improving treatment results for patients.

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HISTORY OF EXCIPIENTS IN PHARMACEUTICAL FORMULATIONS

The history of excipients in pharmaceutical drug formulation is closely and deeply connected and intermined with evolution of drug system, advancing technologies and complexity of pharmaceutical products.

Excipient is defined as non-active ingredients include drug formulations critical roles such as improving stability, enhancing bioavailability, increasing shelf life or minimizing stability and promoting patient adherence.

While active pharmaceutical ingredients (API)are the fundamental part of therapeutic effects excipients make sure that these active substances are delivered effectively and safely to the patient.

The use of excipients has changed and improved over time, following the same path as the growth and development of pharmaceutical sciences from early, simple herbal remedies to complex, specially designed drug formulation.

EARLY HISTORY OF EXCIPIENTS:

Ancient and classical periods the earliest use of excipients can be followed back to the ancient civilizations. Specifically ancient Egyptians, ancient Greece and Romans in which

- **Ancient Egypt:** Used natural ingredients like plant extracts, animal products and minerals to prepare medicinal compounds

- **Ancient Greece and Rome:** Also used as a basic form of excipients but the concept and terminology weren't well developed. In this early period, the goal was on preparing active pharmaceutical ingredients by using natural ingredients, rather than understanding the science of formulation.

The use of excipients in the early medicines was primarily about preparing effective pharmaceutical products rather than understanding the scientific methodology behind the formulation. However, in the simplified explanation, the earliest use of excipients followed back to the ancient Egypt Greece and roaming they use natural ingredients to prepare medicines but did not fully understand the science behind the drug formulation excipients were used to make medicine more effective rather than to follow scientific way. methods to treat patients. They had a good understanding about the human body and also performed various surgeries. Egyptian's medical papyri from around (1500 BCE) described various medical procedures that were used to.

treat various diseases like women health issues (gynecology), digestive issues (gastrointestinal), urinary problems, diabetes and cancer.

These mixtures often include herbal remedies mixed and common excipients such as honey or oil to improve the stability, texture and make the medication easier to apply mask the unpleasant taste and help to make the active pharmaceutical ingredients (API) more stable and easier to swallow. Honey was used for two important purposes: Medicinal properties (to treat various health issues) and as a base or binder to hold the active pharmaceutical ingredients (API) together.

ANCIENT GREECE AND ROME: -

In the Greece - Roman world, Hippocrates, Galen and other ancient medical physicians highlighted the importance of combining the active plant-based constituents with other components to prepare medicines that were more effective, stable, easier to take and simpler to use. Galen specially is considered an explorer in pharmaceutical in pharmaceutical drug formulation.

His work focused on combining herbal ingredients

with other substances to prepare effective, stable medicinal preparation especially "galenical" herbal remedies like fat, oil and honey to mix with medicines, this was an ancient form of using "excipients" ingredients that help to deliver medicines effectively. These mixtures were used to create pills, ointments and suppositories. It was a good way to make medicines more effective.

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THE RISE OF MODERN PHARMACEUTICALSCIENCE: 17-19th century

The 17th and 18th century mark the beginning of the modern pharmacy, during this period the role of excipients in the pharmacy became more scientific and evidence- based. Excipients played an important crucial role in preparing better drug formulation. It also shifted from mystic alchemy to scientific approach. Plant based medicines, minerals and synthesis compound increased.

There was a growing need for excipients to make stable, effective and easy to use medicines formulation.

PHARMACY IN THE 17 TH CENTURY:

During this century pharmacy developed into a unique occupation. Excipients like alcohol sugar and gelatine became widely used to improve the drug formulation. These ingredients helped to make active pharmaceutical ingredients (API) more soluble, enhance the stability and improve the taste and structure in which alcohol acted as a solvent and preservative to extend the shelf life and sugar which masked

the unpleasant taste, gelatine used as material for encapsulating drugs and paving the way for modern capsule.

These excipients played important role in making the medicines more effective, stable and easier to take.

PHARMACY IN 18 AND 19 TH CENTURY:

The development of tablets and pills:

In the 18th and 19th century: Pill making improved with better equipment and techniques like gum Arabic and starch were used as binder Active pharmaceutical ingredients into solid pill

The first pill making machine is enabled early (1800's) which allowed the consistent dosing and precise drug amount.

Starch became a key binder and filler, which helps to make solid dosage form stable.

In other words, pill making technology advanced allows for more accurate consistent drug dosing.

THE 20 TH CENTURY: The era of progress and advancement

In the early 20th century saw a major advancement in the drug formulation due to.

- **Synthetic chemical:** preparation of new drugs through chemical synthesis
- **Modern pharmaceutical industries:** organized new medicines, development and production.
- These advancements enabled the creation of more complex and effective medicines delivery systems.
- the unpleasant taste, gelatine used as material for encapsulating drugs and paving the way for modern capsule.
- These excipients played important role in making the medicines more effective, stable and easier to take.

DEVELOPMENT OF SYNTHETIC EXCIPIENTS:

Synthetic excipients have become the most important place in today's pharmaceutical Dosage forms synthetic products has important use in the dosage form for the stability and delivery of active ingredients as compared to traditional natural excipients.

Synthetic excipients are defined as excipients which are completely man-made or artificially created. They are derived from natural sources

RISE OF SYNTHETIC DRUG: There was an increase in synthetic drugs in the early 20th century. Which required new excipients to support their stability and delivery of active ingredients. There was development of cellulose derivatives

such methyl cellulose and hydroxypropyl cellulose. These derivatives are developed as synthetic excipients.

Where Lactose which is natural excipients was also modified to create synthetic excipients by using improved properties.;

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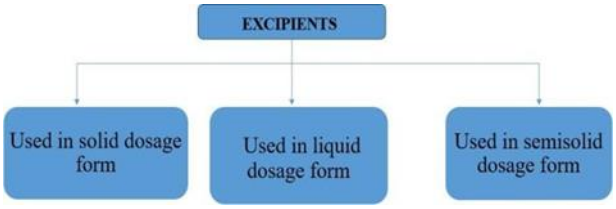
www.jchr.org
JCHR (2026) 16(2), 773-784 | ISSN:2251-6727

Synthetic excipients have better compressibility and ability to provide bulk in drug and it also enhances the stability and delivery of active ingredients.

The development of stabilizers, preservatives and other controlled release agent were marked as significant improvement in pharmaceutical formulations

These excipients were used to improve the shelf life, ensure the consistency of dosage form Magnesium stearate, an excipient used for lubrication in tablet formulation.



The other excipients like Polymer - Based excipients such as hydroxypropyl methyl cellulose (HPMC) where used to enable the controlled the release of active ingredients, also used to create various drug delivery system such as tablets, capsules and implants.

Regulatory and safety also play a crucial role in the development of controlled release drug formulations using polymers like hydroxypropyl methyl cellulose (HPMC)

US FDA (Food and drug administration) provide guidance on development of controlled release formulation including use of polymers.

The GRAS (Generally recognized that safe) was established to classify excipient that should be safely used in the pharmaceutical products without pre-

marketing testing it also helps to solidify I the experience which is important component in the drug

formulation.

The late 20th century to the present the pharmaceutical industry has made significant progress. It has been developed in advanced biotechnology, nanotechnology and personalized medicines. This is led to:

1. Development of new excipients that is novel excipients to stabilize, solubilize and deliver the drug complex.

2. Novel excipients such as polyethylene glycol (PEG), Lipid based excipients, polymer- based excipients and green excipients these all excipients used to formulate the complex drugs and to enhance their solubility and pharmacokinetics.

3. Sustainable practices which shift towards eco- friendly and plant-based excipients

4. Use of nanotechnology and personalized medicines for the precise of drug delivery.

Classification of excipients in Pharmaceutical Formulations:

(Figure 1 Classification of excipients in Pharmaceutical Formulations)

Excipients used in solid dosage form

In solid dosage form the drug and excipients are close in contact, therefor these excipients may have impact on the medication stability. The criteria for excipients for solid dosage form as follows

The excipients used in solid dosage form it should be chemically stable. It should be non-responsive. It should inert to human body.

It should be non-toxic and affordable. It effective in term of use. It should be acceptable in term of organoleptic qualities.

Example of excipient used in solid dosage form: Binder, Filler, Disintegrant, Lubricant, Coating agent etc.

Excipients used in liquid dosage form

Liquid dosage form contains API and excipients which are dissolved or suspended in appropriate solvent and used as medication.

It is pharmaceutical preparation for quick absorption and therapeutic effect in which two components are suspended together. In liquid dosage form excipients.

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are added for suitable morphological property and to enhance the patient compliance.

Excipient selection depends on physical and chemical compatibility, stability of appropriate organoleptic product such as consistency, taste, color, texture, etc.

Example of excipient used in liquid dosage form: emulsifying agent, dispersing agent, solubilizing agent, suspending agent, wetting agent, flavoring agent, preservative, etc.

Excipients used in semi-solid dosage form

Excipients used in semi solid dosage preparation include ointments, paste, gels and rigid foams.

It is used to dissolving or disperse the active ingredients as well as other excipients which are present in formulation.

It supports rapid formulation and easy local and regulatory compliance of ointment, creams, gels, suppositories, and patches.

Excipients used in semi solid dosage forms are Bases, Gelling agent, Emulsifying agents, Solvents, stabilizers, Humectants etc.

TYPES OF EXCIPIENTS AND THEIR FUNCTIONS IN PHARMACEUTICAL FORMULATIONS: -

FILLER:

It increases the volume and bulk of tablet or capsule. It enlarges size of tablet or capsule. It helps to achieve the desired dosage size and facilitate the processing and handling of drug. It also improves the flowability of powder blends and aid the uniform distribution of API. It should be compatible with another ingredient. It should be non-hygroscopic.

Examples: plant cellulose, steric acid, polythene glycone, lactose.

BINDER:

Binders are those who hold the constituents together. They help to ensure that tablets or capsule do not disintegrate prematurely. It improves flow properties of granules. It should be compatible with another ingredient. It should have cohesiveness.

Examples: pregelatinized starch, microcrystalline cellulose

DISINTEGRANT:

It is added in pharmaceutical formulation that help break down tablet and capsule into tiny pieces so they dissolve fast in the contact with water in GIT. For these, they should have good hydration capacity. Disintegrant helps in breaking of tablet and capsule once ingested in body for absorption. Disintegrant absorb water which causes swelling of tablet and break it into smaller pieces.

Examples: sodium starch, polyvinylpyrrolidone, carboxymethyl cellulose

GLIDANT:

It is used to improve the flow of granular mixture by reducing friction. It reduces particle friction when added in the dry state prior to compression.

Examples: talc, corn starch, magnesium carbonate.

COLOURING AGENT:

The colouring agent used to provide aesthetic look, unique appearance to the dosage form. It improves the appearance of medications. It also helps in to increasing patient acceptance.

Examples: Brillant blue, titanium dioxide, amaranth carmine, saffron green, caramel.

LUBRICANT:

Lubricant helps to improve the product quality by reduces the inter particulate friction between dies and punches. It also helps in increasing flow of powder and granules by reducing friction present between the inter molecular. It also provides slide coating on tablet surface which help in swallowing process.

Journal of Chemical Health Risks
www.jchr.org
JCHR (2026) 16(2), 773-784 | ISSN:2251-6727

Examples: steric acid, magnesium stearate, polyethene glycone, talc

COATING:

The process in which a dosage form is surrounded that is coated with dry protective layer for masking, identification and protection is called coating. Its properties are identification, masking, elegance, protection. It prevents the drug from moisturing and destroying it.

Example: HPC, ethyl cellulose, hydroxypropyl methylcellulose

PRESERVATIVES:

These ae added in to dosage form to increase shelf life of a drug. It prevents microbial growth. It helps in preserving stability and safety of drug. By preventing microbial growth, it increases the shelf life of the drug.

Example: benzyl alcohol, propyl and methyl paraben sorbic acid, sodium benzoate

FLAVOURING AGENT:

It is used to improve patient acceptability by improving the taste of medication. It is mostly used for the pediatric and geriatric people. It mostly important for making drug more palatable without compromising its stability or effectiveness.

Example: glycerin, citric acid, syrup, spray dried, menthol, rose oil

SORBENTS:

Material that absorbs oil from water. It is substance that absorb or adsorbs moisture or excess liquid molecule from pharmaceutical dosage forms.

Examples: lactose, maize starch, sodium starch glycolate

ANTIOXIDANTS:

It prevents oxidation of API. It protects drug by neutralizing free radicals and reactive oxygen species

that may cause oxidation damage. It mostly used in formulation which contains API for example vitamin sensitive drugs like statins

Example: ascorbic acid (vitamin c), propyl gallate, butylated hydroxyanisole, ascorbic palmitate, citric acid.

SOLVENT AND COSOLVENT: It used to dissolve or disperse API in pharmaceutical formulation widely in liquid dosage form like solution, suspension, injectable. It affects solubility and bioavailability of drug. Cosolvent is added in formulation which helps to solvent for increasing solubility. Example: water, Alcohol

BUFFERING AGENT: It is also called pH modifier. It is used to adjust and maintain ph. Many drugs have limited solubility or stability at certain pH levels and pH modifiers help to optimize these conditions. Examples: sodium citrate, citrate, acetate

CHELATING AGENT: Chelating agent binds to metal ions and preventing metal ions from catalyzing degradation reaction such as oxidation. It helps in enhancing the stability as well as the shelf life of drug product. It is mostly used in treatment of metal toxicity reactions. Examples: EDTA (ethylene diamine tetra acetic acid), dimercaprol, deferoxamine, penicillamine

SURFACE ACTING AGENT:

Surface acting agent is also known as the surfactant. It is used to reduce surface tension between two phases, such as oil and water. It is widely used in emulsion, suspension. It improves the stability and bioavailability of poorly water-soluble drug.

Examples: polysorbate 80, sodium lauryl sulphate (wetting agent), benzalkonium chloride.

HUMECTANT:

A substance that attracts and retains moisture is called humectant. It is help in preventing drying out of product as well as maintaining desired moisture level within the medication. The humectant is used to prevent the loss of moisture Examples: calcium chloride, ether and esters of polyhydric alcohol.

ANTIADHERENT:

Anti-adherent is also known as anti-sticking agent. It is

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www.jchr.org
JCHR (2026) 16(2), 773-784 | ISSN:2251-6727

help in preventing adhesion of tablet surface to die walls and punches and consequence counter picking or sticking of tablets. Examples: magnesium stearates, Asca talc and starch

SWEETING AGENT:

It is used to improve palatability of the medicinal ingredient. It is used to improve patient acceptability by improving the taste of medication. These are essential in liquid syrups and chewable lozenges. It mostly important for making drug more palatable without compromising its stability or effectiveness. Examples: sucrose, sorbitol, aspartame, saccharine

SUPPOSITORY BASES: It is used to develop base for dissolving active ingredient. It plays important role in maintaining their shape, solidity of formulation. Example: cocoa butter, glycerin

GELLING AGENT: It is a thickening agent or thickener is substance which can increase viscosity of liquid without substantially changing its other properties. It is mostly used for forming gel. Example: Carbopol carboxymethyl cellulose

EMOLLIENTS: It is used to treat dry, itchy or scaly skin. It helps to moisturize skin. Example: glycerin, miner oil.

Naturally occurring excipients pharmaceutical formulations:

Information about some natural resources that play a significant role as Excipient in pharmaceutical formulation development.

The natural Excipients have potential to improve properties of formulation and increase patient compliance. Natural Excipients such as gum, starch, cellulose and

peels of the fruits are used as natural binders, fillers, disintegrant in pharmaceutical formulation of solid dosage form as well as in semi-solid dosage form.

Pectin is used to form micro and nano encapsulated particles. These Natural Excipients are used to stabilize and suspend API in liquid medium.

APPLICATIONS OF NATURAL AND SYNTHETIC EXCIPIENTS IN NOVEL DRUG DELIVERY SYSTEMS

The role of excipients in novel drug delivery systems (NDDS) has expanded significantly. Both natural and synthetic excipients contribute in unique ways:

- Applications of Natural Excipients:
- Used as binders, disintegrants, and fillers in tablets and capsules.
- Pectin and gums for mucoadhesive and controlled- release systems.
- Starch derivatives from jackfruit, potato, and banana improve disintegration and stability.
- Natural mucilage (okra, fenugreek) enhances suspension stability and bioavailability.
- Applications of Synthetic Excipients:
- Cellulose derivatives (HPMC, MCC) enable sustained and controlled drug release.
- Polyethylene glycol (PEG) and polymers act as solubilizers and nanoparticle carriers.
- Preservatives (parabens, sodium benzoate) ensure product stability and extended shelf life.
- Surfactants (polysorbates, SLS) improve solubility of poorly water-soluble drugs.

ARPUS HETROPHYLLUS:

Belongs to family of Moraceae. Commonly known as jackfruit or Ceylon jack. The seeds of jackfruit have good source of starch. Powder of Artocarpus heterophyllus seeds has been effective binder in formulation of paracetamol tab. Jackfruit seed starch powder was employed as super disintegrant in formulation of quick dissolving tab.

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www.jchr.org
JCHR (2026) 16(2), 773-784 | ISSN:2251-6727

(Fig No.2 Artocarpus Hetrophyllus)

ABELMOSCHUS ESCULENTUS: Belongs to family of Malvaceae. Popularly known as lady finger, okra and bhindi .The mucilage from its seed and fruit is great source of pectin which has suspending property. The mucilage is used as a binder in drug formulation.

(Fig No.3 Abelmoschus Esculentus)

MAGNIFERA INDICA: Commonly known as mango tree. Belongs to Anacardiaceae family

Mango fruit have high nutritional value antioxidant, wound healing, antidiabetic, anti-degenerative activities. The seeds of mango are rich source of starch which is used ad binder and disintegrant in formulation of paracetamol and ibuprofen tab. The mango peels are rich in pectin which are natural disintegrant. The mango gums are used to design matrix tab and sustained release tab.

(Fig No.4 Mangifera Indica)

SOLANUM TUBEROSUM:

Commonly known as potato. Belongs to family of Solanaceae.

Referred as king of vegetables .Used in production of starch and alcohol. Potato starch used as filler binding agent, disintegrating agent and diluent. Potato starch is biodegradable resource.

(Fig No.5 Solanum Tuberosum)

MUSA PARADISIACA: Popularly known as banana. Belongs to family of Musaceae. Has high nutritional value and has health benefits. Used as binding agent in solid dosage form. From the peels of banana, we get high amount of pectin which used in preparation of semi solid as well as solid dosage form.

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(Fig No.6 Musa Paradisiaca)

FENUGREEK SEEDS:-Commonly known as Trigonella foenum-graceum. Belongs to leguminous family. It is known as methi in Hindi. The fenugreek gum powder helps in reducing cholesterol, chance of heart attack and hypertension The seed contains high percentage of mucilage. The mucilage derived from fenugreek seeds are used for matrix formulation which contains propanolol hydrochloride. The fenugreek gum is used as binder in tablets and capsules. Fenugreek contains active compounds like saponins and hydroxy isoleucine.

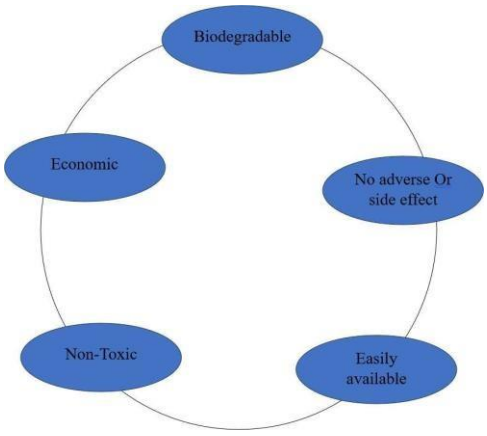
(Fig No.7 Fenugreek seeds)

OCIMUM SANCTUM LINN: -Commonly known as Tulsi. Belongs to Labiatae family. It contains nutrients, biological active compounds. Biological active compounds like Volatile oil, phenolic compounds, flavonoids. It is used as anti-asthmatic and anti-kaphic drug. It is believed that Tulsi supports your immune system and prevent illness, relieve stress.

(Fig No.8 Ocimum sanctum linn)

ADVANTAGES OF NATURAL EXCIPIENT: -

- They are safe and biodegradable.
- They don't have any side effects.
- They are non-toxic compounds.
- They are easily available.
- They are used to enhance stability.
- They improve the texture of dosage form.
- They prevent breakage of dosage form.



(Fig No.9 Advantages of natural Excipient)

Journal of Chemical Health Risks
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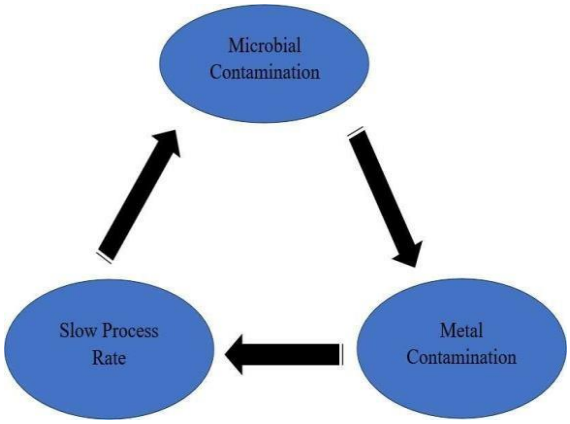

(Fig No.10 Disadvantages of natural Excipient)

FUTURE ASPECTS OF EXCIPIENTS USED IN PHARMACEUTICAL FORMULATIONS:

1. **Smart excipients: -** Smart excipients should be respond to certain conditions such as increase or decrease in temperature, pH, enzyme activity. It helpful for increasing drug absorption, decreasing side effects and improving patient compliance.

2. **Personalized excipients: -** Personalized excipients will be designed for individual patient according to their need, genetics, their health issues, age, allergies, lifestyle factor. For example - If patient contains liver disease or gastrointestinal disorder excipients should to ensure optimal drug absorption and minimize adverse effects.

3. **Nanotechnology excipients: -** Excipients will be engineered to interact with nanocarriers and enhancing drug delivery and targeting.

4. **Biopharmaceutical excipients: -** Growing field of biopharmaceutical requires specialized excipients to ensure stability and efficacy of the complex drugs.

ADVANTAGES OF EXCIPIENTS:

1. Excipients can improve bioavailability of drug

2. It improve stability and self-life.

3. It enhancing stability of API by reducing risk of overdose or adverse reactions.

4. It improves taste, texture, appearance of medication.

5. It controls release rate of API.

6. It enhances pharmaceutical elegance.

DISADVANTAGES OF EXCIPIENTS:

1. Excipients causes allergies, adverse reaction effects

2. Some excipients are made in abroad which are very costly

3. Some excipients are physically, chemically unstable they require proper storage, handing.

4. Excipients directly react with formulation which hydrolysis, reduction, oxidation, etc.

5. E.g. pH modulator, buffer solution

6. Excipients affect the dissolution and bioavailability of API.

7. Excipients affect pharmacokinetic as well as pharmacodynamic of drug.

8. Availability of excipients is directly affecting their cost.

9. Specialized excipients used in complex drug delivery system are costly.

Journal of Chemical Health Risks
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CONCLUSION

Excipients have evolved from being regarded as inert fillers to becoming indispensable components of modern pharmaceutical formulations. They not only ensure stability, bioavailability, and patient compliance but also play a pivotal role in advanced drug delivery systems. Natural excipients provide sustainability and biocompatibility, while synthetic excipients offer reproducibility and enhanced functionality. Future research.

REFERENCES:

1. Desai K. Critical Role of Excipients in Formulations [Webinar]. AIDCOC Training Academy; 2021 Oct 30.
2. Pawar PA, Chopade V. A review paper on excipients used in the pharmaceutical formulations: an overview. Int Res J Mod Eng Technol Sci. 2024;6(11):5408–5410.
3. Pockle RD, Masareddy RS, Patil AS, Patil PD. A comprehensive review on pharmaceutical excipients. Ther Deliv. 2023 Jul 19. doi:10.4155/tde-2023-0026.
4. Jadav M, Patel J, Upadhyay U. Pharmaceutical excipients. Natl J Pharm Sci. 2022;2(2):24–36.
5. Patil PS. Natural excipients: Uses in pharmaceutical formulations. Int J Pharm Tech Res. 2014;6(1):21–28.
6. Sarmah J, Choudhury A, Deka H, Ganguly D, Baishya D, Jyrwa R. A comprehensive overview of edible natural excipients and their potential use in pharmaceutical formulation development. J Young Pharm. 2023;15(4):589–594. doi:10.5530/jyp.2023.15.83.
7. Gunjal VB, Sonawane DS, Ahire SK, Jadhav PK, Deore YK, Jadhav SP, Patil DM. A review on novel excipients. Int J Pharm Sci. 2023;1(9):304–320.doi:10.5281/zenodo.8344687.
8. DC Fine Chemicals. Excipients: Their importance in the pharmaceutical industry [Internet]. 2024 Sep 16 [cited 2025 Jul16].
9. Chaudhari SP, Patil PS. Pharmaceutical excipients: A review. Int J Adv Pharm Biol Chem. 2012;1(1):21–23.
10. DC Fine Chemicals. Excipients: Their importance in the pharmaceuticalA.industry [Internet]. Núria; 2024 Sep 16[cited 2025 Jul 16].
11. Wakchaure S. A Detailed Review on The Use of xcipients inDrug formulation [Internet]. Int J Pharm Sci; 2023[2025 JUL 16].