IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Formulation And Evaluation Of Herbal Lollipops Of Sterculia Lychnophora Seed And Licorice Root For The Treatment Of Inflammation

Aarti J. Shete[1], Tejashri R. Kedar[2],Ankush Jadhav[3] ,Yogesh Bafana[4] Amol D. Rohokale[5].

[1,5]Students, [2]Assistance Professor of department of Quality Assurance,[4]principal of Arihant college of Pharmacy kedgoan, Ahmednagar, [3]QA head Ajanta Pharma Aurangabad, Quality Assurance Officer.

Abstract: As our lifecycle grows more technologically savvy, we are moving away from the natural world. Today,we are not using herbs as much as in ancient times.herbs are found in nature ,and due to this,they have no side effects , are also relatively safe , environmentally friendly and locally accessible.Medicinal plant are very helpful for treatment of various illnesses.. There is a world wide interest in searching for The safe new phytochemical condition such as mouth ulcer ,throat infection, and other ailments.

In light of this details, the currently study attempts to create and assess herbal lollipop with anti-inflammatory properties utilising seed extract from sterculia Lychnophora and root extract of licorice. The preliminary goal of this research is to increase retention time of the dosage forms in oral cavity and increase bioavailability, reduction in gastric irritation by passing first pass metabolism.

The lollipop were prepared by heating and congealing method using methyl cellulose citric acid as a polymer.the advantage of current study include the tablet and capsule are difficult for pediatrics patients to swallow or have an unpleasant taste, the traditional dosage forms such as syrup , tablet,and capsules are inconvenient for them. The need is to create new technologies has therefore been growing daily. For the analysis of drug many instrumental techniques were used. The produce lollipop formulation underwent tested for anti-inflammatory efficacy, hardness, friability, thickness, and weight variation.

Key words : Lollipop**,** sterculia Lychnophora seed, Anti-inflammatory activity, licorice root

I. INTRODUCTION:

Native to mainland Southeast Asia, Sterculia Lychnophora Hanse is a species of tree in the Sterculia genus. tree is a deciduous species within the family Sterculiacae. The Tropical regions, such as those in India, Malaysia, Thailand, and Indonesia, are home to trees. The seeds of this species, along with those of its close relative S. macropodum, are used in traditional medicine, particularly Ayurveda and traditional Chinese medicine, to treat gastrointestinal disorders, soothe sore throats, and act as a “coolant”. It is therefore a well-liked non-timber forest product in Laos, where it ranks second in terms of export crops after coffee. This species contains the bioactive alkaloid sterculinine.

The tree can grow up to 25–30 meters in height, and its seeds are the size of a fingertip, with a brown, coarse-textured skin.This species' seeds are combined with sugar, dates, hawthorn berries, licorice, chrysanthemum flowers, lilyturf roots, and jasmine tea to create a range of herbal teas that are consumed in China. These herbal teas are thought to balance bodily fluids, lessen "heat"in the body, and enhance general health.

It has been reported that other species of the genus Sterculia contain flavonoids, terpenoids, phenolics, polysaccharides, and histamines (Ru-Feng Wanga et al., 2003). In Sterculia lychnophora, cerebroside compounds have been shown to have a neuroprotective effect (Ru-Feng Wang et al., 2013). Secondary metabolites such as tannins The, saponins, flavonoids, phenols, terpenoids, alkaloids, and lipids were found in Sterculia lymphophora. s.Lychnophora has been used in the treatment of many types of inflammation including lung heat, sore throat, headache, acute tonsillitis, etc. (Chinese Pharmacopoei) .

Fig1:Sterculia Lychnophora seed

Fig2: licorice root

Licorice is a perennial plant belonging to the legume (Fabaceae) family and the Gly-Cyrrhiza genus, and there are more than 20 known and accepted species in the family, such As G. glabra, G. uralensis, G. inflata, G. lepidota, G. triphylla, G. pallidiflora, G. echinate, G. aspera,And G. foetida, .Plants have been one of the important sources of medicines since the beginning of Human cultivation.Medicinal plants are very important to people's individual and community health because they contain certain chemical compounds that have a specific physiological effect on humans. As a result, there is a growing demand for plant-based medications, health products, pharmaceuticals, food supplements, etc. The most important of these bioactive constituents of Plants are triterpenoid, saponin, flavonoids, tannins, alkaloids, and phenolic Compounds . Many of these

indigenous medicinal plants are used as spices and Food plants. For medicinal reasons, they are occasionally added to foods intended for expectant and nursing mothers. Glycyrrhiza glabra is an effective herbal remedy. The word “glycyrrhiza” comes from the ancient Greek words “glykos,” which means sweet, and “rhiza,” which means root.In northern India, Glycyrrhiza glabra is referred to as mulaithi. Glycyrrhiza glabra, also Known as licorice and sweet wood, is native to the Mediterranean and certain areas of Asia.(12).

II. PHARMACOLOGICAL ACTIVITY

Sterculia Lychnophora Hanse is recognised by the Chinese Pharmacopoeia (2000). Pharyngitis can be prevented and treated with sterculia seeds. It has also been utilised as a constipation remedy. Typically lollipops, Sterculia Lychnophora is boiled or soaked in hot water and consumed as a beverage to relieve intestinal lubrication, fight toxicity, and soothe sore throats. Bassorin can lessen spastic discomfort, lessen mucosal irritation, and constrict vascular smooth muscle. Treatment options include treating symptoms like hoarseness of voice, productive cough with yellow-sticky phlegm, painful dry throat brought on by heat in the lungs, constipation with headache, and bloodshot eyes. One or two malva nuts can be consumed by boiling them in a large cup of water and then drinking the liquid(1).

The licorice powder and extract was found to be useful for the treatment of sore Throat, cough, and bronchial catarrh. It shows antitussive, demulcent, and expectorant Loosening activities due to presence of glycyrrhizin and helping To expel congestion in the upper respiratory tract as it accelerates tracheal
Mucus Secretion. The methanolic extract of liquorice has been found to contain an active compound called liquiritin apioside recently. The compound inhibits Capsaicin-induced cough(12).

A Inflammation:

The biological reaction of body tissues to harmful stimuli, such as infections, damaged cells, or irritants, is known as inflammation (from the Latin inflammatio).[1][2] Heat, pain, redness, swelling, and loss of function are the five cardinal signs (Latin: calor, dolor, rubor, tumour, and functio laesa).As a defensive mechanism, inflammation involves blood vessels, immune cells, and molecular mediators. Inflammation serves to remove the initial source of damage to cells, remove damaged cells and tissues, and start the healing process of damaged tissues. A low level of inflammation could jeopardise the organism’s survival by allowing harmful stimuli, like bacteria, to gradually destroy tissue. On the other hand, inflammation may also be harmful. Chronic inflammation, or excessive inflammation, is linked to a number of illnesses, including hay fevar ,periodontal disease, atherosclerosis, and osteoarthritis.(10).

B.Lollipop:(16)

Due to its low cost of therapy, ease of administration, patient compliance, and formulation flexibility, the oral route of drug administration is the most widely used method. However, patients in the paediatric, geriatric, and bedridden populations have trouble swallowing conventional tablets or capsules because they have trouble swallowing the medication with less water in it, they find many medications too strong to swallow, and they don’t comply with their prescribed dosage forms.

Lollipops, also known as lozenges, are medicated dosage forms with flavours that are meant to be sucked and held in the mouth or throat. They usually contain one or more medications in a sweetened base. Lollipops are frequently used to target the buccal mucosa for local or systemic effects. The lollipop has several benefits as a dosage form, such as increased bioavailability, smaller doses, less gastrointestinal distress, and bypassing first metabolism . Lollipop is intended to enhance transportation, acceptability, and patient compliance, among other things. There has been a growing need for more patient compliance dosage forms over the last 20 years. As a result, each year, the demand for their technologies has tripled.

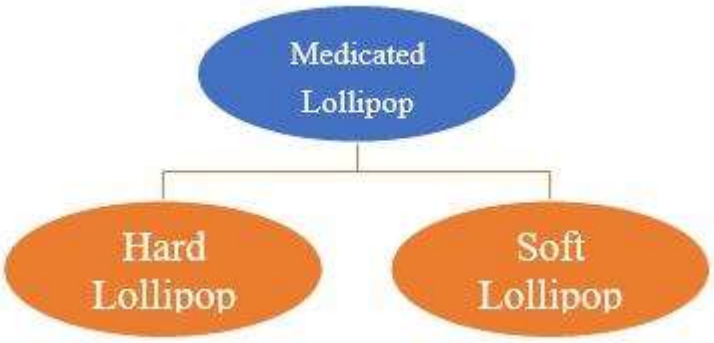
C. Types of lollipops: (16).

•Hard candy lollipop

Amorphous (noncrystalline) or glassy sugar and other carbohydrate mixtures make up hard candy lozenges. They can also be thought of as solid sugar syrups. Hard candy lozenges should weigh 1.54.5 g and have a moisture content of 0.5 to 1.5%, respectively. These shouldn't dissolve; instead, they should erode or dissolve gradually and uniformly over the course of five to ten minutes. Heat-labile materials cannot be included in them because the preparation of these materials typically requires high temperatures.

•Soft candy lollipops

The versatility of soft lollipops, which can be made quickly, and their ability to work with a variety of medications have made them well-known. Those lollipops can be coloured and flavoured and they can be either slowly dissolved in the mouth (or) chewed, relying at the intended impact of the incorporated drug (13).



Types of medicated Lollipop

•Advantages of herbal lollipop:

1.Possessing a formulation that is both patient-specific and flexible to alter.

2.Moreover, a pharmacist can quickly and easily make lollipops using the least amount of equipment and time. It has a delicious flavour and prolongs the amount of drug that remains in the oral hollow space to produce a healing effect.

3.Lollipops may be given to those patients who have problem in swallowing.

4.It prolongs the duration of the drug's presence in the oral cavity to produce a specific effect.

•Disadvantages of herbal Lollipop:

1. Heat labile medicines are not suited for use in lollipop

2.Formulations due to the high temperature necessary for Manufacture. however, medications with a low bitter taste are acceptable.

3.The medication is drained from the oral cavity into the Stomach along with saliva.

III. MATERIAL AND METHODS

A.Material used:

Sterculia Lychnophora seeds were acquired from Herbal store Ahmednagar, Maharashtra, India. Licorice root were aquired from laboratory of Arihant College of pharmacy kedgoan.The other materials required for the present work were Procured from different sources. Following drugs, Excipients, polymers, and chemicals were used for The formulations and evaluation of medicated lollipop

> **Collection, Identification and preparation of Sterculia Lychnophora seeds:**

After being identified, the gathered seeds were allowed to dry for 30 days at room temperature in a shaded area to avoid active chemical degradation. After drying, the seed material's husk and kernels were separated before use. For extraction and phytochemical analysis, the seeds were broken into small pieces and mechanically ground into a coarse powdery state.

Extraction of sterculia Lychnophora:

Extraction method used:

a. Hot Extraction (Soxhlet)

b. Cold Extraction

a.Hot Extraction:

Using a blender to grind up the powdered Sterculia lychnophora, soxhlet apparatus is used to prepare hot extracts. Clamps with rubber padding that are fastened to a 4-inch iron rod support the condenser. Condenser then fits into thimble chamber. Using Whatman's filter paper No. 1, a thimble was prepared and 20g of powdered steriaculia lychnophora (also known as malva nut) was added. Then, these thimbles were placed inside the Soxhlet apparatus's extraction tube, which is attached to another extraction tube.thimbles were placed inside the Soxhlet apparatus's extraction tube, which is attached to another extraction tube.Using a heating mantle, the round-bottom flask containing the solvent is brought to a boil, with the temperature being kept at 65°C for methanol and 100°C for water. This procedure is repeated until the solvent spilling out of the thimble chamber becomes colourless. After letting the extract cool, it was evaporated on a water bath to remove the remaining volume (20 ml), which was then placed in a borosil bottle and chilled to -4 oC. The heated extract utilised in HPTLC analysis and antimicrobial assay.

b.Cold Extraction

In order to extract cold After weighing and crushing 10g of the seeds (Sterculia lymphophora) in a mortar and pestle with 8ml of a solvent (distilled water and methanol), the mixture was left for 45 minutes. The extract was then filtered through Whatman's filter paper No. 1 and 6–8 millilitres of solvent were added and filtered once more in a similar manner. This extract was used for phytochemical tests and antimicrobial assay after the final volume was reached at 20 ml by adding solvent, which was then stored in an airtight bottle and chilled at -4oC.

Extraction of licorice:

1.Weighing licorice root powder.
2.take 70% ethanol.
3.licorice root powder mixed with ethanol.
4.After 72 hours filter the mixture by using Whitman's filter paper.
5.the filtrate obtained after filtration should be clear.
6.Drying of the filtrate in hot air oven to obtained the extract.
7.licorice extract obtained.

Δ*Anti-inflammatory activity of extract of sterculia Lychnophora:*(1)

The carrageenan-induced rat paw edoema technique was used to test the anti-inflammatory efficacy of the chosen extract sample in vivo. Five adult albino rats per group were selected. Wistar rats weighing 150–200 grammes, of both sexes, were used in the experiment. They were kept in polypropylene cages with husk bedding, which were cleaned every 48 hours and kept at a temperature of about 250 degrees Celsius with a 12:12 light/dark cycle. They had access to limitless water and commercial pellet rat chow. A subplantar Injection of 0.1 ml of 1% carrageenan in saline was administered to each rat's right hind paw in order to induce edoema. One hour prior to injecting carrageenan, a suspension of specific extract samples in 1% w/v gum acacia was prepared and administered orally at doses of 100 and 300 mg/kg. While the standard group was given diclofenac sodium, the control group was given just a vehicle. A plenthysmometer was used to measure the volume of the injected and control paws at 0, 1, 3, and 5 hours following induction. At different time intervals, the value was expressed as a percentage reduction in volume relative to the control group (1).

Δ*Anti-inflammatory activity of extract of Licorice*: (8)

Since ancient times, G. glabra has been used to treat inflammatory diseases due to its documented anti-inflammatory activity (R. Yang, Yuan, Ma, Zhou, & Liu, 2017). Following four weeks of feeding, Shalaby, Ibrahim, Mahmoud, and Mahmoud (2004) assessed the anti-inflammatory activity of G. glabra in male rats. The levels of serum liver enzymes, triglycerides, and total cholesterol all significantly decreased, according to the authors' observations. Harwansh, Patra, Pareta, Singh, and Biswas(2011) review the advantages of G. glabra in treating disorders of the upper respiratory tract and the digestive system.According to Bahmani et al. (2014), these pharmacological effects resulted from an increase in prostaglandin and serotonin secretion in the stomach, which decreased gastric inflammation. Various authors have reported that glycyrrhizin plays a primary mediating role in the anti-inflammatory action. In vitro, this compound has the ability to inhibit inflammatory factors and facilitate the healing of mouth and stomach ulcers (Rackova et al., 2007; Yin et al., 2017). Indeed, glycyrrhizin's anti-inflammatory properties were compared to those of mineralocorticoids and glucocorticoids (Kageyama, Suzuki, & Saruta, 1994). Moreover, G. glabra is utilised in liver and renal complications due to its potent anti-inflammatory properties (Y. Xiao et al., 2010). Y. Xiao et al. (2010) documented that glycyrrhizin inhibited the formation of liver granulomas and the production of inflammatory cytokines, while X. R. Wang, Hao, and Chu (2017) detailed the anti-inflammatory effects on endometriosis. Furthermore, Liu et al. (2017) demonstrated glabridin's anti-inflammatory effect on RAW cell.

Method of preparation

Preparation of herbal lollipop by heating and congealing technique,

1)Prepared a syrupy base in a beaker by dissolving the needed amount of sugar in water on heating and stirring. The temperature was maintained at 105^0c -110^0c till it became thick.

2)Then flavour was added between 120^0c to 130^0c.

3)After the temperature was bought down to 90^0c and then extract of drug were added.

4) After that polymers and other ingredients were added simultaneously and mixed it well.

5) The prepared slurry or mixture was put into the calibrated, moulds it was refrigerated for one hour.

6) The created lollipop were wrapped in aluminium foil and put in desiccator to stop them from absorbing moisture.

Formulation formula:

Sr.no.	Ingredient in (mg)	F1	F2	F3
1	Sterculia Lychnophora seed extract	100	100	100
2	Licorice root extract	100	50	100
3	Sucrose	4600	4600	4600
4	Methyl cellulose	25	50	75
5	Citric acid	100	100	75
6	Colouring agents	Q.s	Q.s	Q.s
7	Flavouring agents	Q.s	Q.s	Q.s

Table1:Formulation of herbal lollipop .

IV. Result and discussion:

A.Identification and authentication of the plant :

The plant seeds were identified and verified as sterculia Lychnophora seed after being purchased from a nearby herbal pharmacy in Ahmednagar, Maharashtra state, India.
The seed were subsequently processed and mounted on herbarium sheets in accordance with the Indian botanical surveys protocol.
Δ organoleptic features of lollipop:

Nature: Hard
Colour: Brownish red
Odour: Characteristics.
Taste: Sweet
Consistency: Solid

B. Evaluation of herbal lollipop:

1) Diameter and Thickness:

The measurement of diameter and thickness was calculated using five lollipop. Using the vernier calliper, the diameter and thickness of the lollipop were measured. The extent to which the thickness of The each lollipops deviated from ± 5% of the standard value was determined.

2) Hardness :

Hardness of herbal lollipop was determined using Monsanto Hardness tester. It is expressed in kg/cm^2. Three lollipop were randomly picked and hardness of the lollipop was determined.

3) Friability:

For the determination of Friability of herbal lollipop Roche Friability test apparatus was used. Weight accurately 20 lollipops and placed in the apparatus,which was subjected to 100 revolution, then the lollipop was reweighed. The percentage Friability calculated by using formula

%Friability= [Initial weight -Final weight]×100

4) Weight Variation

20 lollipops weighted individually and average weight and %weight variation was calculated, Weight Variation is a defect in which weight differs from the defined ranges given by the official pharmacopoeias.

5) Drug Content

Dissolve the prepared lollipop in 100 ml distil water and sonicated for 30 min and filtered. From the above Solution 1 ml was taken in volumetric flask and diluted up to 10 ml (100µg/ml) and it was Analyzed spectrophotometrically at 224 nm.

6) Disintegration Test

Disintegration study performed by disintegration apparatus. Put one Lollipop into each tube Suspend the assembly in the beaker containing pH 6.8 phosphate buffer and operate without the Discs 30 min. Remove the assembly from the liquid. The lollipops pass.

7) In Vitro Drug Release

In vitro release studies were performed using USP Apparatus II (Paddle type). The dissolution Test was performed using 900 ml of phosphate buffer (pH 6.8), 37 ± 0.5°C, 50 rpm. Samples (5ml) were collected at prearranged time intervals and replaced with equal volume of fresh medium, and analyzed using UV-Visible spectrophotometer at λ= 224 nm. Using a standard calibration plot, the drug concentration was computed and expressed as the cumulative percentage of drug release.

Parameter	F1	F2	F3
Weight variation	4.60	4.58	4.72
Thickness (nm)	15	15	15
Diameter (cm)	2.6	2.6	2.6
Hardness (kg/cm^2)	10.2	10.5	10.8
%Friability	97.42	97.30	98.20
%drug content	0.28	0.24	0.31

Table2: Physicochemical parameter of formulation.

8) Stability study :

The stability study was carried out for one month and Results revealed that all the lollipops showed better stability At 8^0c, Room Temperature, 45^0c.

Fig : Prepared herbal lollipop.

Days	Temperature	Colour	Crystallization	Presence of any participants
8	8^0c, Room temperature, 45^0c.	Orange, little sticky	No	No
15	8^0c Room temperature, 45^0c	Orange, sticky	No	No
30	8^0c Room temperature, 45^0c	Orange, sticky	No	No

Table3: Stability study of lollipop

V. Conclusion :

In the current research, an attempt was made to formulate and evaluate herbal lollipops of sterculia Lychnophora and licorice for the treatment of Inflamation. The main goal in such dosage form was for the development of new herbal dosage form and to check the effect of various herbal drug on Inflammation. The stability investigation revealed that the manufactured lollipops were stable when stored in an airtight container for the storage time and under the different conditions examined these findings may be useful in developing such formulation for paediatric patients.This will provide and improved, novel dose for enjoy an crucial role in pharmacy, where it will stay in the future.

REFERENCE :

1). Shalini Dhawale*, Rajkumar Moon, Pavan Birgad, Ujwala Salve, Pratiksha Bhajikhaye, Dipali Korde, Vishal Pagare, Suraj Thakare School of Pharmacy, Swami Ramanand Teerth Marathwada University, Nanded Formulation and Evaluation of Herbal Anti-Inflammatory Lollipop using Sterculia Lychnophora seed extract Volume 8, Issue 6, June – 2023.

2). Patil, K., Patil, N., Tadvi, S.A. and Pawar, S.P., Medicated lollipop containing fexofenadine HCl for Pediatrics. An International Journal of Pharmaceutical Sciences, Apr-Jun 2017, volume 8(2), page no. 448-460.

3). Mrs. Pradnya K. Mane*, Miss. Vahida Mulla Satara College of Pharmacy, Satara HERBAL LOLLIPOPS OF GINGER POWDER AND CLOVE OIL TO TREAT ORAL THRUSH .Vol.4 – Issue 1.

4). Anuradha Palve1, Pooja Shetty1, Mukesh Pimpliskar2 And R. N. Jadhav2*1Department of Bioinformatics, G. N. Khalsa College, Matunga, Mumbai, India2Zoology Research Laboratory, E.S.A. College of Science, Vasai Road, Study on Antibacterial and Antifungal Activities Of Sterculia lychnophora Extracts Volume 4 Number 11 (2015) pp. 336-341.

5). Padmasetty. J., Padmasetty J, P. Jagadeesh, P. Lokeswari, P. Suhasini. Design and characterization of Tramadol Hcl medicated hard lollipops. International Journal of research in pharmacy and chemistry, 2017, Volume 7(2), Page no. 187-193.

6). Yang, Y., Park, B.I., Hwang, E.H. and You, Composition analysis and inhibitory effect of Sterculia Lychnophora against biofilm formation by Streptococcus mutans. Evidence-based Complementary and Alternative Medicine: Ecam, 2016, page no. 1-9.

7). Pundir S, Abhay Murari Lal Verma, Review on Lozenges. Journal der pharmazie Forschung, 2014,

Volume 2(1), Page no.1-10.[5]. Tortora, G.J. and Derrickson, B, Anatomy & Physiology. Wiley India Pvt Limited, 2007, 11th
Edition, page no.158,817,832.
8). Varsha Sharma, Akshay Katiyar, and R. C. Agrawal Glycyrrhiza glabra: Chemistry And Pharmacological Activity .
9). Shaikh, R.U, Pund, M.M. and Gacche, R.N, Evaluation Of anti-inflammatory activity of selected medicinal Plants used in Indian traditional medication system in Vitro as well as in vivo. Journal of traditional and Complementary medicine, 2016, volume 6(4), Page no. 355-361.
10). Murugesan D and Deviponnuswamy R, Potential anti-Inflammatory medicinal plants, International Journal Pharmaceutical Science, March 2014, volume 6, Page No. 43-49.
11). Prathap M, Panda S and Anusha A, Formulation and Evaluation of the suckable chewable medicated Lollipops of Venlafaxine Hcl, World Journal of Pharmaceutical Research, Volume 5, page no. 568-579.
12). Minglei Tian, Hongyuan Yan and Kyung Ho Row * Extraction of Glycyrrhizic Acid and Glabridin from Licorice Center for Advanced Bioseperation Technology, Department of Chemical Engineering, Inha University, Incheon 402-751, Korea.
13). Purushotham Rao K, Girish Ktti, Ajay Kartik And Manjunath P. “Design of medicated Lozenges for pediatrics”, International Journal Of Research in Medical and health Sciences.2013;2(4).
14). S. Perumalla Jagadeesh*, Padmasetty Jyothi, G. Nethra Vani and S. Dasthagiri Department of Pharmaceutics, Sri Lakshmi Venkateswara Institute of Pharmaceutical Sciences, Proddatur. Review Of Medicated Lollipops, WJPR Volume 6, Issue 3, 399-405.
15). Soumya D, Dharamjit P. Formulation development and optimization of medicated lozenges for paediatric use. Int J Pharm Sci Res 2012; 3(1) :138-40.
16). Dhairyasheel Gund1*, Tushar Humbe2, Prof. Vijaya Barge3, Prof. Amit Kasabe4 And Dr. Ashok Bhosale5 . A REVIEW ON MEDICATED LOLLIPOPS FOR PAEDIATRICS: A NEW DOSAGE FORM
1,2,3,4,5Department of Pharmaceutical Quality assurance, PDEA’s Shankarrao Ursal College Of Pharmaceutical Sciences & Research center, Kharadi, Pune, Maharastra, India.