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Prapration of Tablet from Pencil Cactus for Treatment of Piles by Direct Compression method

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Abstract: ***The intention of current review is to make available upto-date information on morphology, ecological biodiversity, medicinal uses, phytochemistry and pharmacological activities on different parts of Euphorbia tirucalli (E. tirucalli). This plant has a number of medicinal uses. Latex of E. tirucalli is vesicant and rubefacient which is used for rheumatism, warts, cough, asthma, ear-ache, tooth-ache and neuralgia. It acts as a purgative in small doses while in big doses it is bitter irritant and emetic. Milky juice is alexiteric, carminative and purgative. It is useful in whooping cough is used in treatment of piles. gonorrhea, asthma, leprosy, dropsy, dyspepsia, enlargement of spleen, colic, jaundice and stone in bladder. The fresh milky juice is good alternative in syphilis and a good application in neuralgia. A decoction of branches is used in gastralgia and colic. Bark is used in treatment of fractures. Poultices prepared from the stem are useful to repair the broken bones. Boiled root liquid acts as an emetic in cases of snake-bite and for infertility in women. The wood is used for rafters, toys and veneering purposes. It is also useful against leprosy and foot paralysis subsequent to childbirth. E. tirucalli is reported to have euphol, β-sitosterol, euphorbol hexacosonate, cycloeuphordenol, cyclotirucanenol, tirucalicine, tri-methyl ellagic acid, gallic acids, terpenic alcohol. genotoxic/mutagenic, hepatoprotective, insect repellants, immunomodulatory, larvicidal, molluscicidal/ovicidal/piscicidal, myelopoiesis, proteolytic/chitinolytics pharmacological activities. There is a need to isolate dynamic constituents, their biological trial, molecular mechanisms, experimental protection and legalization of therapeutic uses of E. tirucalli. The collected information will be helpful to locate up study protocol for expansion in curative and treat a variety used in treatment of piles., isoeuphorol, taraxasterol, tirucallol, euphorone, euphorcinol, euphorbins, 12-deoxy-4βhydroxyphorbol-13-phenyl acetate-20-acetate, 12, 20- dideoxyphorbol-13-isobutyrate, glut-5-en-3-β-ol, 3,3′- diO-methylellagic acid, euphorbin-A (polyphenol), tirucallin-A (7) (tannin), tirucallin-B (11), euphorbin-F (14) (dimers), cycloartenol, 24-methylenecycloartenol, ingenol triacetate, 12-deoxy-4β-hydroxyphorbol- 13- phenyl acetate-20-acetate, taraxerone, euphorginol, taraxerol, campesterol, stigmasterol, palmitic acid, linoleic acid, β-amyrin, etc. Active phytoconstituents. E. tirucalli have possessed activity in humanly mphocytes, analgesic, anthelmintics, antiarthritic, antibacterial/antifungal/antimicrobial Antihemerrhoids.***

Keywords: Euphorbia tirucalli Morphology Ecological biodiversity Medicinal uses Phytochemistry Anticance antihemerrhoids

I. INTRODUCTION

In spite of great advances of modern scientific medicine traditional medicine is still the primary form of treating diseases of majority of people in developing countries including India; even among those to whom western medicine is available, the number of people using one form or another of complementary of alternative medicine is rapidly increasing worldwide[1].Over the centuries humans have relied on plants for basic needs such as food, clothing, and shelter, all produced or manufactured from plant matrices (leaves, woods, fibers) and storage parts (fruits, tubers)[2].pencil cactus plant-have been used as piles treatment. Taxonomic Description In the binomial system (USDA plants data at www. plants.usda.gov),

E. tirucalliL. belongs to: Kingdom: Plantae. Division: Magnoliophyta. Class: Magnoliopsida Order: Malpighiales. Family: Euphorbiaceae

Genus: Euphorbia. Species: E. tirucalli. Binomial name: Euphorbia tirucalli Vernacular Names :

Amharic: Kinchib

Arabic: Knjil

English: Finger euphorbia,

Indian spurge tree: milk bush, naked lady, pencil-tree, rubber euphorbia, Filipin: Bali bali.

French: Arbre de Saint Sebastien, Euphorbeeffileeuphorbe, Gardemaison, Tirucalli;

Malay: Kayupatah, Tentulang, Tulang, Tulang-tulang;

Somali: Dana; Spanish: Alfabeto chino, Antena, Esqueleto, Palito, Aveloz; Swahili: Mtupamwitu, Mwasi, Utupa;

Thai: Khiacheen, Khiathian;

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Fig 1: pencil cactus

II. MATERIAL AND METHOD

A. Material

Euphorbia trirucalli were recived from mountain. All other ingredient such as mannitol. Magnesium stearate and talc were purchased from central drug house new Dehli, India. All ingredients used were of analytical grade.

B. Method

Preparation of tablet from euphorbia tirucalli powder for treatment of piles. Other ingredient like lactose was used as diluent magnesium stearate as lubricant and talc as glidant. All the excipient along with API weighed as shown in table 1 and passed through sieve no 20 . then, all ingredient were mixed following geometric mixing excluding glidant and lubricant thoroughly for 15 min. The powder blend was thoroughly mixed with talc and magnesium stearate and compressed into a 400 mg tablet using single roatatory machine



Fig 2: Mortal and pestle

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III. TECHNIQUES IN DIRECT COMPRESSION

The processes involved in the manufacture of tablets by direct compression method can be summarized in three steps.

A. Direct Compression Technique Using Induced Die Feeders

This involves the use of a special feeding device which prevents segregation and enhances the flow of powders from the hopper into the die cavity of a tablet press. The use of induced die feeder also reduces air entrapment, making the fill powder more dense and amenable to compaction.

Direct compression technique using induced die feeder is used when formulation ingredients will compact but will not adequately fill the die cavity.

B. Direct Compression Technique Using Dry Binders

This technique will affect compression of drugs at relatively low filler to drug ratio, with little addition of preparatory techniques. Materials used as dry binders should possess adequate cohesive or compressibility properties in order to form satisfactory tablets of acceptable hardness and friability. They should possess adequate flowability and bulk density to ensure the die cavities are uniformly filled and hence tablets of uniform weight and drug content would be obtained. They should also have high capacity or low binder to drug ratio in order to make possible the manufacture of suitable sized tablets containing relatively high doses of drugs.

Examples of dry binders used in the manufacture of tablet by direct compression method include microcrystalline cellulose, polyethylene glycol 400, polyethylene glycol 6000 etc.

C. Direct Compression Technique Using Direct Compression Excipients

A direct compression excipient also referred to as direct compressible excipient or direct compression filler/binders are inert, non-medicinal substances which may be compacted with no difficulty and which may do so even when mixed with drug substances. Direct compressible excipients should exhibit satisfactory tabletting characteristics. This is because they determine the overall characteristics of the tablet, particularly in regard to the fluidity of the component powders. Direct compressible excipients can also influence the hardness, disintegration and dissolution characteristics of the finished tablets.



Fig 3: tablet punching machine

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IV. EVALUATION OF PILES TABLETS

A. *Pre-Compressional Studies Of Powder Blend*



Fig 4: powder of pencil cactus

In development of new dosage form preformulation study is the prior step in the potential drug development. It is the principal investigation in the drug development to obtained information on the known properties of compound and the proposed development schedule. So, this preformulation investigation may merely confirm that there are no significant barriers to compound development. Following pre- compressional parameters were studied like angle of repose, bulk density, tapped density, compressibility indices etc

B. *Angle Of Repose*

It is the maximum angle that can be obtained between the freestanding surface of powder heap and the horizontal plane. It was determined by using fixed funnel method. Specified amount of powder drug was transfer to the funnel keeping the orifice of the funnel blocked by thumb.

When powder was cleared from funnel then measured its angle of repose and measured in θ 7 . Angle of repose (θ) = tan-1 h/r Bulk density It is the ratio of bulk mass of powder to the bulk volume. It is denoted by ρb. Bulk density is used to find out homogenecity.

Bulk density (ρb) = M/Vb Where, M is the mass of the sample, Vb bulk volume

C. *Tapped Density*

It is the ratio of the weight of powder to the minimum volume occupied in measuring cylinder. Tapped density is determined by placing a graduated cylinder containing a known mass of drug or formulation on a mechanical tapper apparatus which is operated at fixed no. of taps (1000) until the powder bed reached a minimum volume. 8 Tapped density (ρt) = weight of powder blend/Minimum volume occupied by cylinder

D. *Compressibility Indices*

1) *Carr's:* Index Based on the apparent bulk density and the tapped density, the percentage compressibility of the powder mixture was determined by the following formula. Carr‟s index = Tapped density -Bulk density × 100/ Tapped Density
2) *Hausner's Ratio:* It is an indirect index of ease of measuring of powder flow. Lower Hausner‟s ratio (1.25). 10 Hausner‟s ratio = Tapped density/ Bulk density

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V. POST-COMPRESSIONAL STUDIES OF PREPARED NUTRACEUTICAL TABLETS

The tirucalli tablets were evaluated for various parameters after consideration of preformulation to overcome errors during formulation preparation. These are like appearance, thickness, weight variation, hardness and friability. All the evaluation parameters of all formulations are given in Table 2

A. Physical Appearance

The general appearance of tablet was studies visually in shape, colour, texture and odour.
Thickness The tablet thickness was calculated by Vernier calipers. Tablet was put in between two jaws vertically and measured thickness and 6 tablets were used for this test and expressed in mm

B. Weight Variation

Weight variation test is run by weighing 20 tablets individually, calculating the average weight and comparing individual tablet weight to the average. The weight variation test would be a satisfactory method of determining the drug content uniformity of tablets.



Fig : weight variation

C. Hardness

Hardness also termed as tablet crushing strength. The tablet hardness was determined by Monsanto hardness tester. The tablet was placed lengthwise between upper and lower plunger and force applied by turning a threaded bolt until the tablet fractures and measured hardness of tablet in Kg/cm2 7, 8 .

D. Friability

It is determined by Roche friabilator, subjects a number of tablets to combined effects of abrasion and shock by utilising a plastic chamber that revolves at 25 rpm, dropping tablet from inches distance operated for 100 revolutions. Pre-weighed tablets were dusted and reweighed and according to standard limit friability should be less than 1%. It is calculated by formula- % Friability = Initial weight – Final weight / Initial weight.



Fig : weight variation testing

E. In-vitro Drug Release

Dissolution profile of eugenol was determined at 37 ± 0.5°C at a stirring rate of 100 rpm using the USP dissolution apparatus II in 900 ml of simulated gastric fluid (0.1 N HCl) . Various aliquot samples were withdrawn with replacement simulated fluid of same amount at 5, 10, 15, 30, 45, and 60 min respectively. Samples were filtered using whatmann filter paper and taken absorbance at wavelength of 366 nm by UV spectrophotometer.

VI. RESULTS AND DISCUSSION

The piles tablet of pencil cactus was formulated by direct compression method. This technique was used for conventional from pencil cactus tablet which minimize processing steps and eliminated wetting and drying process. The physiochemical property show satisfactory results by pencil cactus tablet which are within the range of prescribed standards required for investigation of present study

A. Pre- Compression Studies Of Powder Blend

The powder blend was evaluated for various parameters and their results are shown in Table 2. The evaluation parameters such as angle of repose, bulk density, tapped density, Carr‟s index and Hausner‟s ratio were found to be 21.12±0.11 to 27.46±0.12 (Ɵ),0.4071±0.21 to 0.4741±0.32 g/ml, 0.4132±0.17 to 0.4965±0.028 g/ml, 11.00±0.12 to 14.17±0.39, 1.11±0.012 to 1.17±0.13 respectively. After evaluation of preformulation parameters it showed that there is no presence of moisture in power and showed uniformity of powder blend . After study of flow rate it conclude that powder blend exist optimum proportion that leads to maximum flow rate. So the result showed that the powder have good flowing property which does not cause affect the process of tablet punching

B. Post-Compression Study

The result from different physical parameters like thickness, hardness, weight variation, and friability of tablets was shown in table 3. The presence of active pharmaceutical ingredients, filler, glidant and lubricant is sufficient for provided bulk to the tablet which decrease risk during punching. The thickness, hardness, weight variation, and friability of pencil cactus tablet were founded to be in acceptable limit. It shows that the herbal drugs containing pencil cactus tablets have satisfactory disintegration profile due to their hardness within range of standard limit

C. Physical Appearance

The general appearance of tablet was found to be round in shape, brown in color, smooth texture, and odourless.

D. Thickness

The thickness of clove pencil cactus containing tablet for piles was found to be 1.2± 0.1cm. It is depends upon the size of die and punches or a function of die fill and compression force.

E. Weight Variation

The weight of 20 tablets was measured and it was found to be 0.397±0.012 to 0.399±0.034 for all formulations respectively. All the piles for tablet containing pencil cactus powder passed weight variation test as the average percentage weight variation was within the USP limits of ±5%.

F. Hardness

The hardness of conventional piles tablet was found to be 4.31±0.21kg/cm2 to 5.21±0.033 for piles containing formulations. Mannitol containing formulation code showed more friable and less hardness than lactose as diluent. It is depend upon the compression force of punching machine and showed that it is sufficient for tolerating mechanical strength. Tablets showed sufficiently hard to resist breaking during packaging, shipment and normal handling.

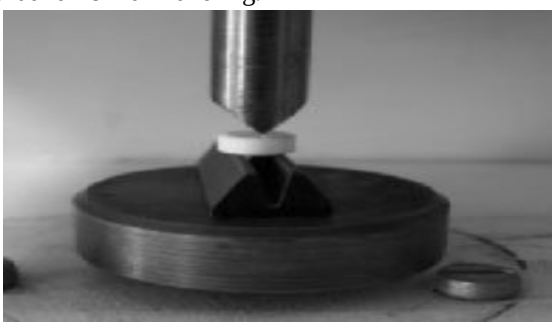


Fig 5: hardness tester

VII.FRIABILITY

Friability of all formulations was found to be0.14±0.045 to 0.31±0.0.12 %. The friability of pencil cactus powder containing tablet was found to be in acceptable limit i.e. less than 1%. There no capping problem occurs in the tablets so it could be considered for commercial use. It produced no loss during shipping process.

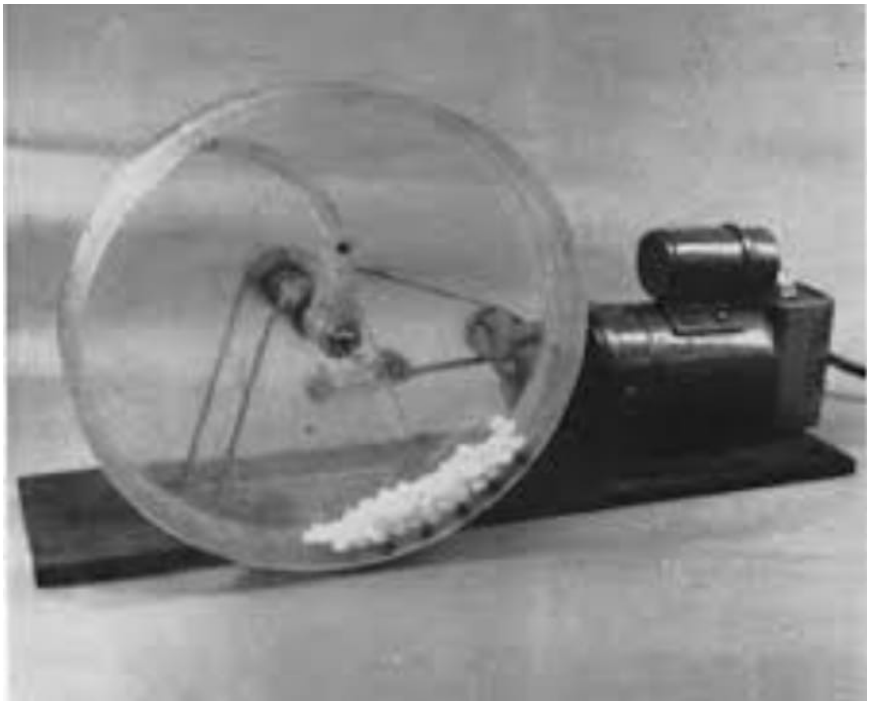


Fig 6: Tablet Friability Tester

A. Botanical Description

E. tirucalli L. is a succulent, cactus-like pineless, unarmed, much- branched, monoecious or more often dioecious, easy to recognize, perennial shrub or tree up to 10–15 m tall. The rubber-hedge euphorbia reaches usually 2-5 m but may grow up to 15 m on occasion with a 2-4 m spread. The main trunk and branches are woody and brownish and may thickening

B. Trunk/stem

Diameter of 25 cm. It grows with single or multiple trunks. The bark of very old specimens is grey and rough with longitudinal dents and ridges that break up into very small fragments. There are sometimes conspicuous, small protuberances, such as a bulge, knob, or swelling, on the bark, and occasionally black, rough, crosswise bands.



Fig 7: Stem of pencil cactus

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C. Branches

E. tirucalli is a plant very branched with branches often arranged in pseudo whorls10 forming brush-like masses that are the best known feature of this species. Branches: E. tirucalli is a plant very branched with branches often arranged in pseudo whorls10 forming brush-like masses that are the best known feature of this species.

D. Leaves

Leaves are rarely seen as they fall very early and quickly (early deciduous), tiny, few, simple, fleshy, small or minute, slender and alternate. The leaf blade is linear-lanceolate to oblanceolate, 1–2.5 cm long, 3–4 mm broad and 2 mm thick, acute at tip, tapered to the sessile base, arranged spirally, present only at the tips of young branchlets. The extreme tips of young leafy branchlets are sparsely tomentose, with curled brown hairs, and soon glabrescent. Stipules are minute, glandular and dark brown. The function of the leaves is taken over by the green branches



Fig 8:Leaves of pencil cactus

E. Flowers

Plants are monoicous or dioicous, the chromosome number is 20 and the diploid number is 2n. The flowers are small or very small, yellow, green or pink arranged in groups on the terminal branches, discreet, and grouped at the top of the short branches, in heads, stalkless at the end of twigs, and carried in clusters at the apex of the short branches or in the angles branches.



Fig 8: flower of pencil cactus

Pencil cactus do produce flowers. They usually bloom in Spring and in summer. You could spot them blooming at the branches' edges. Those branches would be green in color.

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F. Fruits

Fruits are tripartite capsule and a capsule measures about 8-12 mm in diameter, is subglobose (nearly globose), almost glabrous or glabrescent, longitudinally very slightly lobed, short-stalked (8 mm), bent at an angle, pale gree8n, with a pink tinge and conspicuously pubescent (soft hairs).



Fig 9: fruit of pencil cactus

Capsules dehisce while still on the tree, and exserted on a tomentosepedicelto 1 cm long. Fruits: Fruits are tripartite capsule and a capsule measures about 8-12 mm in diameter, is subglobose (nearly globose), almost glabrous or glabrescent, longitudinally very slightly lobed, short-stalked (8 mm), bent at an angle, pale green, with a pink tinge and conspicuously pubescent powder prepare in pilesdehisce while still on the tree, and exserted on a tomentosepedicelto 1 cm long.

G. Seeds

The seeds are ovoid (oval), about 3-4 mm x 2.8-3 mm, glabrous, smooth, buff speckled with brown and with a dark brown ventral line (with white line), around the small white caruncle 1 mm across.



Fig 10: seed of pencil cactus

H. Latex

The latex is a caustic milky white sap when damaged, like many other Euphorbia specie

VIII. USES OF E. TIRUCALLI

A. Traditional Medicines

Possibly due to a great variety of chemical substances found in E. tirucalli tissues (Table II), medical folklore literature of different parts of the world, especially tropical and subtropical areas where it is endemic, is tainted with its curative abilities (Table III). According to Schmelzer and Gurib-Fakim (7) and Van Damme (3), in East Africa, latex is used in cases of sexual impotence, warts, epilepsy, toothache, hemorrhoids, snake bites, for the extraction of ecto-parasites and cough among others.

Pests and Disease There is a tendency to believe that E. tirucalli has no pests and disease because of its poisonous latex. However, a few pests including Meloidogyne incognita Botrytis spp. and the weed Cuscuta spp. have been reported. The latter that an infestation by Botrytis spp. causes the plant stem and roots to rot especially in warm and humid conditions.

He reports that a combination of Meloidogyne . that it is an unavoidable plant in many traditional homesteads whereas it is used as a remedy for ailments such as: spleen enlargement, asthma, dropsy, leprosy, biliousness, leucorrhoea, dyspepsia, jaundice, colic, tumors, and bladder stones. He further says that vesicant and rubifacient though it is, its latex is emetic in large doses but a purgative in small doses and applied against toothaches, earaches, rheumatism, warts, cough, neuralgia and scorpion bites.

The same author points out that its branch and root decoctions are administered for colic and gastralgia while powder are applied in piles.

IX. PILES :CAUSE ,TYPE SYMTOMS AND TREATMENT

Ageing has its own advantages and disadvantages. Included in the latter are piles, clinically known as haemorrhoids, which is a condition when veins in your rectum or under the skin around the anus swell. These swollen blood vessels can turn bowel movement into an intensely painful experience. According to research published in the year 2017 by The Indian Journal of Surgery, half the men and women in India above the age of 50 may develop the symptoms of haemorrhoids during their lifetime. Even though piles are rarely dangerous, if left ignored, they can lead to serious health complications. In this blog, let's get a clear picture of the causes, types, symptoms and measures that can help prevent or cure haemorrhoids.

A. Causes

It is not established yet what actually causes the veins around your anus to swell and bulge, yet nearly two out of the four adults undergo the symptoms of haemorrhoids. Some of the common factors contributing to an increased risk of suffering from piles are constipation, sedentary lifestyle, bad diet, smoking and alcohol, family history, being pregnant or obese, regular heavy eating, and stress.

B. Types

Hemorrhoids are classified into 4 different categories Internal, Prolapsed, External and Thrombosed.

Internal Hemorrhoids: They lie deep inside the rectum and so, are not visible to the naked eye. They might not cause any pain but their presence is marked with the symptom of bleeding through the anus.

External Hemorrhoids: They are formed in the outer lining of the anal creating extreme discomfort and pain. They are sometimes invisible and the other times develop as a lump. These can also form blood clots within the mass that slips down.

Prolapsed Hemorrhoids: When internal haemorrhoids swell and sticks outside your anus the situation is coined as prolapsed haemorrhoids. These lumps cause discomfort or pain along with itchiness and burning.

Thrombosed Hemorrhoids: These swollen bulges around your anus are blood clots within the haemorrhoid tissue. Due to lack of blood supply to your rectal tissue, thrombosed haemorrhoids need to be attended to urgently to prevent severe complications.

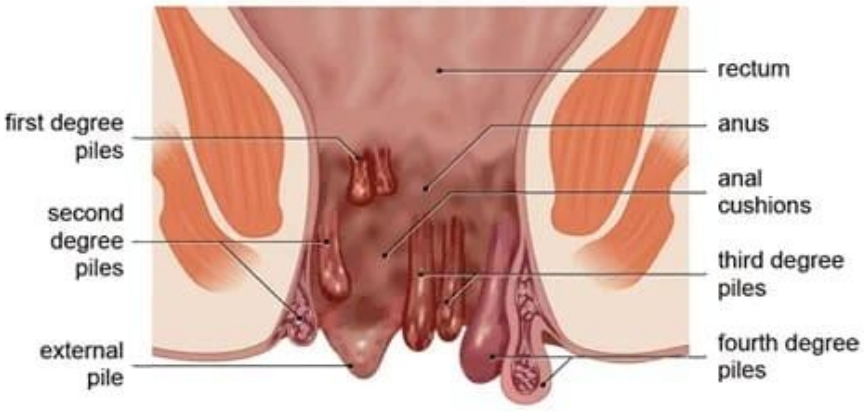


Fig 11: piles

C. Signs and Symptoms

The symptoms of piles subside on their own in a few days. However, in some cases, these must not be ignored. Since ignoring the initial symptoms can lead to serious complications, keep a check on these symptoms:

1) Itching and Bleeding
2) Sore and redness in the anus area
3) Mucus discharge

D. Side Effect of Euphorbia Tirucalli

When taken by mouth-there is not enough reliable information to know if Euphorbia hirta is safe.
It might cause side effect such as nausea and vomiting
When applied to the skin -There is not enough reliable information to know if euphorbia hirta is safe.
It might cause skin irritation or allergic reactions.

E. Special Precaution and Warning

pregnancy-it is possibly unsafe to take Euphorbia hirta by mouth if you are pregnant. there is some evidence that it might cause the uterus to contract, and this could cause a miscarriage.
Stomach or intenstinal problem- Euphorbia hirta can irritate the stomach and intestines. Dont use it if you have a stomach or intestinal disorder.

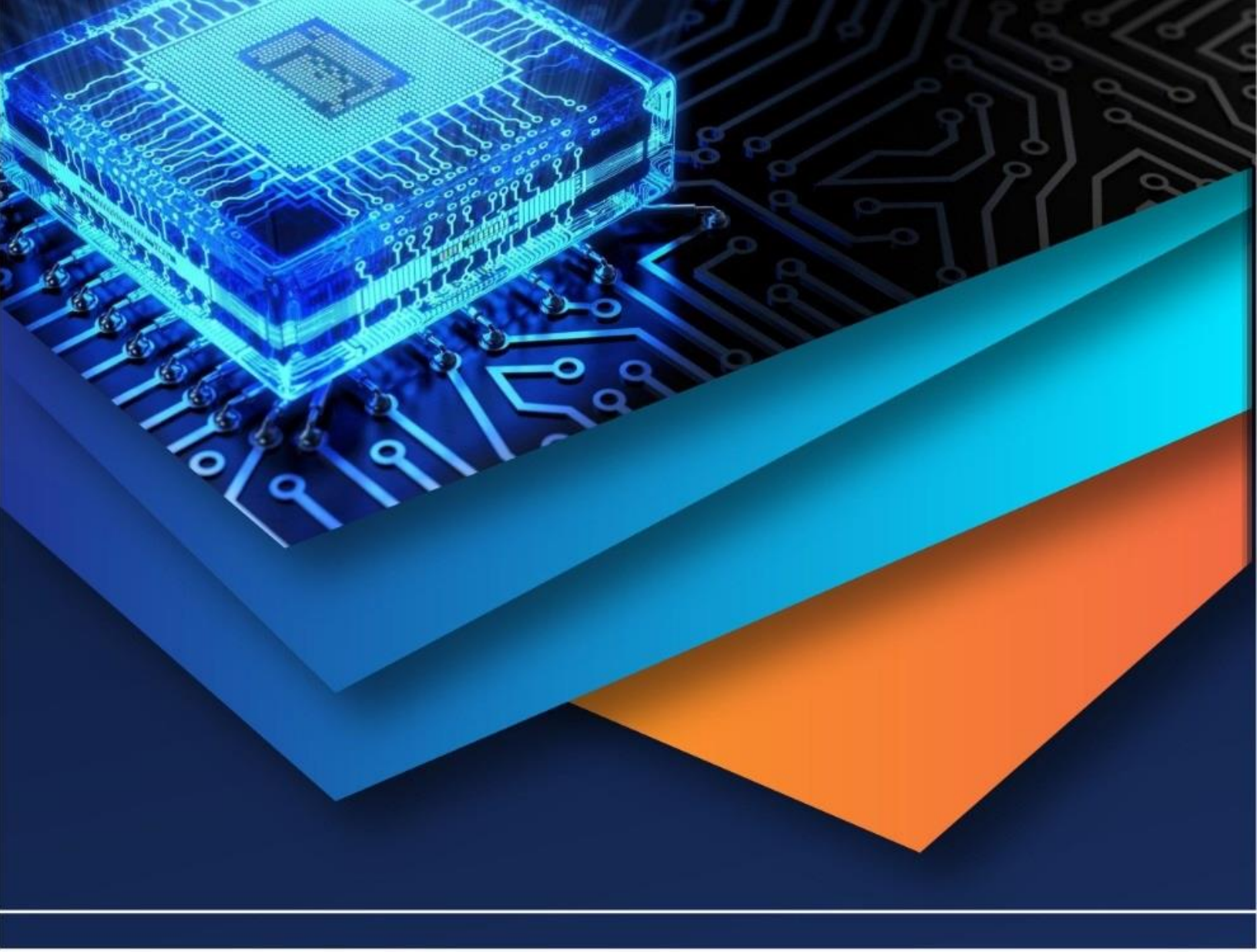
X. CONCLUSION

From the above study, we conclude that the pencil cactus tablets were prepared by direct compression method and gave satisfactory and acceptable result. Conventional tablet of pencil cactus shows immediate drug release due to direct compressed tablet. The formulation containing pencil cactus could be more beneficial as an effective due to the presence of its cyclotirucanenol , euphol and beta-amyrin containing tablet. From the above research work it was concluded that herbal pencil cactus tablet prepared in the form of cost effective tablet to minimize patients compliance in regarding supressing side effects and enhancing positive effects on the body.

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