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Diabetic Wound Healing Potential of Cucumis Sativus in Rat

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A B S T R A C T

The present study provides a scientific analysis for the diabetic wound healing potential of herbal cream of cucumis sativusCucurbitaceae family, Cucumbers are originated in Asian nation. it's a rising plant that is employed as summer vegetable throughout in Asian nation. The cucumber fruit is ingested raw or is served as a dish or soft-bo as a vegetable. The seeds of cucumber are used for oil extraction that is sweet for body and brain. Cucumbers contain ninety six water that is sweet in summer season. The plants ar giant sized, leaves are bushy and aer triangular in form and flowers are yellow in color. Cucumber is a superb supply of Mb (Molybdenum) and antihemorrhagic factor. Cucumber is employed to cure skin issues, excretory organ and heart issues and is employed as agent. Diabetes Mellitus (DM) could be a quick growing epidemic throughout the globe. polygenic {disease} could be a chronic disease characterised by high level of sugar within the blood. wound healing become difficult position to medicine sciences once related to diabetic folks.The seasoning merchandise are additional precious in each prevention furthermore as curative in delayed diabetic wound healing activity of methanolic powder extract cream of cucumis in alloxan (120mg/kg i.p.) evoked diabetic rats. A wound of 1cm incision was created on ventral facet of diabetic male Wister rats. 2 totally different concentration of cream of cucumis are applied on wound for fifteen days. The initial and final abstinence humor glucose level was calculable to substantiate the illness state. The plant melon having necessary role in ancient Ayurvedic, Unani systems of holistic health and seasoning drugs.

Keywords:Cucumis sativus, alloxan induced diabetic rats, wound healing, diabetes.

1.INTRODUCTION

1.1. Diabetes :

Diabetes could be a chronic illness that happens either once the β cells of exocrine gland doesn't turn out enough hormone or once the body cannot effectively use the hormone it produces. hormone could be a endocrine that keeps blood glucose maintained. diabetes is that the most typical endocrine disorder and frequently happens once there's deficiency or absence of hormone or seldom, impairment of hormone activity. It calculable that the entire variety of diabetic patients will be around forty.9 million all told over Republic of India and this will be sixty nine.9 million by the year 2025.[1]

1.1.1. There square measure some differing kinds of diabetes:

- Insulin Dependent diabetes (Type1 IDDM)

This type of diabetes is additionally known as polygenic disease|type I diabetes|insulin-dependent diabetes mellitus|IDDM|juvenile-onset diabetes|juvenile diabetes|growth-onset diabetes|ketosis-prone diabetes|ketoacidosis-prone diabetes|diabetes mellitus|DM|autoimmune

disease|autoimmune disorder} and antecedently it's called ketosisprone diabetes or juvenile-onset . The individual might also request with alternative response disorders like Graves' illness, Hashimoto's redness, and Addison's illness [5]. sort I diabetes is additionally called insulin- dependent diabetes (IDDM), this principally happens in childrens and young adults; the onset is typically unforeseen and may be life threatening.

- Non-Insulin Dependent diabetes (Type2 NIDDM)

Type two diabetes is additionally known as as adult onset polygenic disease. The progressive hormone secretary defect on the background of hormone resistance (American polygenic disease Association, 2014). folks with this sort of polygenic disease ofttimes square measure proof against the action of hormone. This affects blood vessels, kidneys, eyes and nerves occur in each sorts and square measure the main causes of morbidity and death from polygenic disease.[6,7]

1.1.2. General symptoms :

- Increased hunger
- Increased thirst
- Weight loss
- Frequent excretion
- Blurry vision
- Extreme fatigue
- Sores that don't heal.[8]

1.2. Wound Healing

A wound is break of the anatomic structure and its helpful continuity of residing tissue. Healing is that the system of repairing that heal injury of the skin and alternative soft tissues. Wound healing could be a survival method to revive form and have. the power of a wound to heal depends on its intensity of break, likewise as on the overall fitness and dietary standing of the person.[12]

The intense wound could be a breakdown of the integrity of the light tissue that encompassing any a part of the frame. Chronic wound will be understood as wounds that fail to progress orderly and timely sequence of restore.

Wound healing is associate Byzantine method within which the tissue repairs itself when injury. it's a method that involves the activation of inter-cellular pathways, coordination of tissue integrity, and equilibrium. counting on the character and depth of the injury, the wound healing will be classified.[2]

1.3. Diabetic Wound Healing

If someone has polygenic disease, then wounds will take longer time to heal. this will increase the danger of infections on wound and develop alternative complications.

Blood sugar level of body is that the main consider the fast healing of wound. once blood glucose level of body is more than traditional, it can :

- prevents gas and nutrients to energizing cells
- prevents system of body from functioning with efficiency

- increases inflammation within the cells of body
- These all effects curtail healing healing of wounds.[15]

1.3.1. Causes of Diabetic Wounds

The main concern with diabetic wounds is poor or delayed healing. Healing issues square measure caused by the peripheral blood vessel diseases and peripheral pathology which will occur with polygenic disease, whereby the little blood vessels in several elements of the body, particularly within the extremities (hands and feet), grow narrower and scale back the blood circulation to those areas. a scarcity of circulation within the extremities may end up in an exceedingly reduced offer of gas and nutrients to the body tissue and nerves, that is important for healing. Over time, nerves in these areas might become broken, decreasing the feeling of pain, temperature and bit, creating patients at risk of injury.[10]

Many diabetic peoples have issues with system activation. The immune fighter cells square measure activate to heal wounds, however throughout polygenic disease their ability to require action, is commonly reduced. If system of bady can't work properly, the wound healing can get slower and therefore the risk of infection can high.[1]

2.MATERIAL AND METHOD

2.1. Plant Selection-

Drug discovery from medicinal plant includes numerous field of inquiry &use various method of analysis. The process typically done with a Taxonomist, ethno botanist, ethno pharmacologist,or plant ecologist who identifies the plant of interest. Collection may involve species with known biological activity for which active compounds have not been isolated by solvent. According to the intensive literature survey, Cucumis sativus was used for the present study.

2.2. Collection and identification-

Collection and identification of plant include the plant material of whole plant of Cucumis sativus was collected from Indore market M.P. and the plant samples were authenticated by Dr. Dwivedi A.P.S. College Rewa.

2.3. Preparation of plant material-(Extraction)

For the preparation of extraction of plant use the following method-

Cucumis sativusseeds

↓

Collected

↓

Authenticated by taxonomist

↓

Drying

↓

Subjected to powdering

↓

Subjected to Maceration.

Flow Chart showing Solvent extraction method

The powder drug was extracted by the Maceration process with successively different solvent, in increasing order of polarity(Ethyl acetate, Methanol, and chloroform) for better pharmacological activity.

2.4. Preliminary Phytochemical analysis-

Extract was subjected to preliminary Phytochemical investigation for detection of Alkaloids, Flavonoids, Saponins, Carbohydrates, Tannins, Proteins and Terpenoids,etc. Phytochemical screening was performed using standard procedure.

2.5. Preparation of Cream-

- **Preparation [50gm]**

i. Liquid Paraffin - 22.5 ml
ii. Bees wax - 7.5 gm
iii. Borax - 0.5 gm
iv. Benzoic acid - 0.05
v. Water - q.s.
vi. Cucumis sativus extract - required as body weight
vii. Perfume - q.s.

2.6. Evaluation of Cream-

a) Appearance: - The appearance of the cream was judged by its color, roughness and pearlscence and graded.

b) Determination of pH: - About 0.5 g of the cream was weighed and dissolved in 50.0 ml of distilled water and its pH was measured.

c) Homogeneity: - The formulations were tested for the homogeneity by visual appearance and by touch.

d) Irritancy study: - Mark an area of 1sq.cm on the left hand dorsal surface. The cream was applied to the specified area and time was noted. Irritancy, erythema, edema was checked, if any, for regular intervals upto 24hrs and reported.

e) Spread ability:- Adequate amount of sample is taken between two glass slides and a weight of 100gm is applied on the slides for 5 minutes. Spreadability can be expressed as, S= m*l/t Where, m = weight applied to upper slide. l = length moved on the glass slide. t = time taken.[5]

Evaluation Parameters	Result
Appearance	Positive
Determination of pH	Positive
Homogeneity	Positive
Irritancy study	Negative
Spreadability	Positive

Table no. 3 : Results of Evaluation tests

2.7. Assessments of anti-diabetic activity in alloxan induced diabetic rats-

Diabetes was induced in rats by injecting 120 mg/kg of alloxan monohydrate intraperitoneally in 0.9% w/v sodium chloride (NaCl) into overnight fasted rats.

Fig.1 :- Administration of Alloxan i.p.

The rats were then kept for the next 24 h on 10% glucose solution in feeding bottles, in their cages to prevent hypoglycemia after alloxan injection. After 72 h, fasting blood glucose level was measured. Rats with BGL greater than 200 mg/dl and less than 400 mg/dl were selected and observed for hyperglycemia (fasting blood glucose level –FBG) greater than 200 mg/dl and lesser then 400 mg/dl) up to 7 days.[6]

- Such animals were divided into four groups as follows: each group contain 6 animals.

Group 1 Normal control (0.1 N NaCl)

Group 2 Standard (Soframycin)

Group 3Methanolic extract of cucumis sativus (150mg/kg) [Test 1]

Group 4 Methanolic extract of cucumis sativus (300mg/kg) [Test 2]

The treatment was continued for the next 15 days and blood samples were collected on 0hr, 24 hr, 48 hr and 72 hr after 1 hour administration.

Treatment	Dose of Alloxan	0 hr	24 hours	48 hours	72 hours
Control	120mg/kg	83±0.36	205.3±0.74	211.6±0.49	230.16±0.30
Standard	120mg/kg	88±0.36	208.6±2.29	210.16±0.60	224.2±0.47
[Test 1]	120mg/kg	86.5±0.51	205.5±1.38	214.1±0.60	232.5±0.56
[Test 2]	120mg/kg	89.5±1.10	207.83±6.10	216.2±0.47	220.83±0.47

Table 1 : BGL after 0 hr,24 hr,48 hr, 72 hr

2.8. Hypoglycemic activity in normal rats-

Fasting Blood Glucose level (FBGL) was found within the range of 80-90mg/dl in all the groups at 0 hr .Single administration of alloxan for the induction of diabetes. The blood glucose level is in the range of above 200mg/dl is considered as diabetic. After the confirmation of that the rats were diabetic, then induced wound by incision wound model.

2.9. Incision wound model-

Firstly all the animals of each group were anaesthetized using chloroform. The dorsal fur of the animals was shaved with shaving razor or scissor and the anticipated area of the wound to be created was outlined on the back of the animals onthe dorsal thoracic region 1 cm away from vertebral column on the anesthetized mouse. The thickness of the excision wound was 2 cm in widthwere created along the markings using toothed forceps, scalpel, and scissors. Hemostasis was achieved by blotting the wound with cotton swab soaked in normal saline. The entire wound was left open.

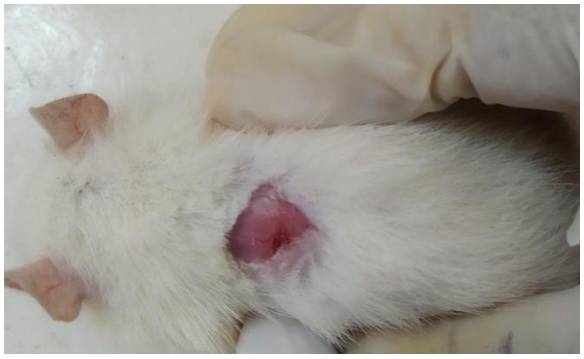


Fig.2 : Showing 2cm incision on animal dorsum

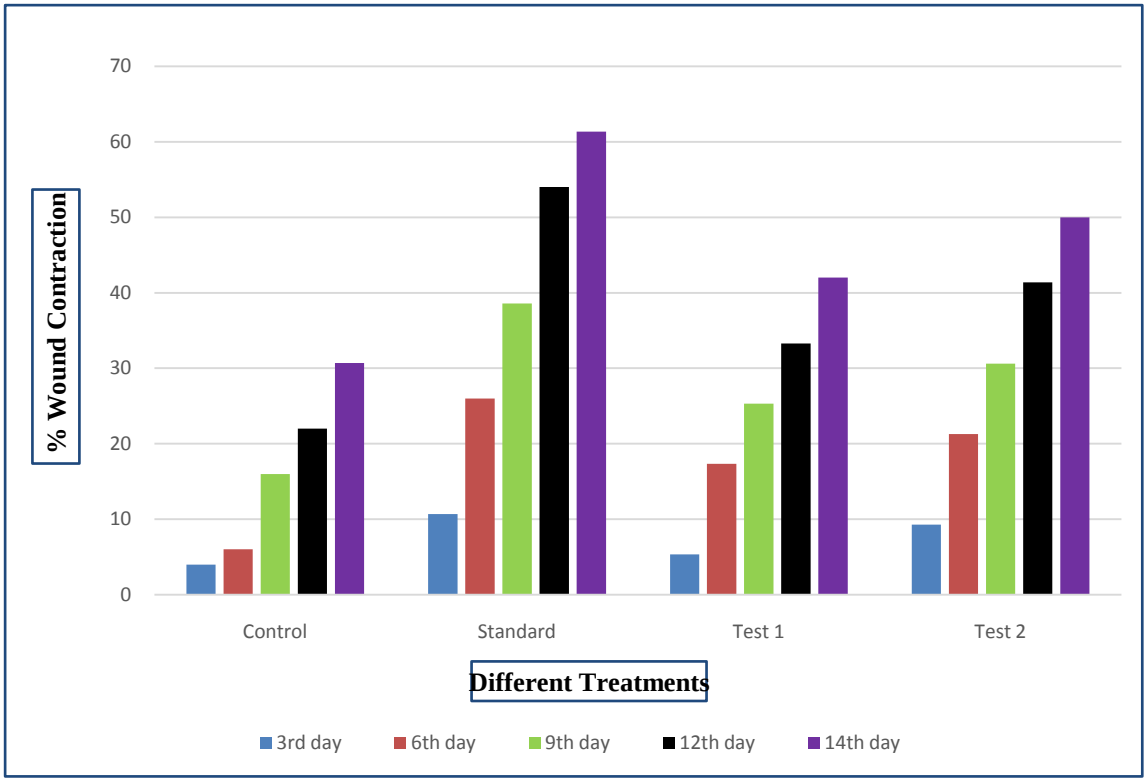
Cucumis extract cream were applied daily up to 15days, when wounds were cured thoroughly,the wound contraction was measured using scale and visual appearence.[7,8]

Fig.3 :Wound diameter in rats after application of *Cucumis sativus* cream

S.No.	Treatment	Period of epithelializa-tion	% wound contraction on 3rd day	% wound contraction on 6th day	% wound contraction on 9th day	% wound contraction on 12th day	% wound contraction on 14th day
1.	control	20 days	4±0.22	6±0.22	16±0.2	22±0.2	30.68±0.22
2.	Standard	12 days	10.68±0.2	26±0.22	38.6±0.2	54±0.22	61.36±0.33
3.	Methanolic extract Cream (150mg/kg) [Test 1]	14 days	5.36±0.2	17.36±0.2	25.3±0.2	33.3±0.2	42±0.34
4.	Methanolic extract of Cream (300mg/kg) [Test 2]	14 days	9.3±0.2	21.3±0.2	30.6±0.2	41.36±0.2	50±0.22

Results are expressed as mean ± sem.*p>0.05, **p<0.01 as compared to control

Table 2 : Effect of extract Cream of *C. Sativus*on incision wound model



Trend 1 :- Percent Wound Contraction

3.CONCLUSION

India is enriched with wide variety of herbal plants with medicinal activity and these can be converted in pharmaceutical preparation that can be used in various diseases. Wound healing activity of various herbal plants during diabetes have recorded some valuable effects as well as they minimize risk of infections on wounds. Diabetes is a chronic disease which in the result of insufficient amount of pancreatic β cells. This cause difficulties in healing of wounds. Slower healing of wound during diabetes is the worst problem of people now a day. In this review find the various herbal plants which are used in diabetic wound healing. These drugs contains some active constituents which helps to heal the diabetic wounds.

The present study conclude the extract of Cucumis sativus (seed) is show significant effect on diabetic wound induced by alloxan induced diabetes model & incision wound model. It is an effective diabetic wound healing agent. Cucumis sativus exhibited wound contraction.

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