

PHARMACOLOGICAL EVALUATION OF CINNAMON AND EUCALYPTUS EXTRACT IN WOUND HEALING ACTIVITY IN THE EXPERIMENTAL ANIMALS

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Abstract

Ayurveda is a therapeutic framework that has been around for around 5000 years and is prevalently rehearsed in India. Diet and natural medicines are important for the arrangement, however the attention is on the body, psyche, and soul in general in disease anticipation and fix. "Wound" is portrayed as an opening or breaking of skin brought about by physical aggravation. Wounds harm a few tissues, including the cellar layer (BM) that lies under the epidermis and the dermis, which is comprised of fibroblasts, extracellular framework (ECM), nerves, veins, and lymphatics. From the outfield close to Gwalior, the Eucalyptus leaves and Cinnamomum bark were accumulated in (Uttar Pradesh). Methanolic and ethanolic extract were prepared by soxhlet extractor. Extracts were stored in ~4°C. The assessment of wound recuperating depended on explicit qualities like injury compression. Methanolic concentrates of Cinnamomum and ethanolic concentrates of Cinnamomum, just as Methanolic extricate Eucalyptus and ethanolic concentrate of Eucalyptus, displayed solid injury recuperating capacities however were less proficient than Cinnamomum removes, as per early pharmacological examinations. Major advantages of the system include ease of preparation, good floating ability, high encapsulation efficiency and sustained drug release over several hours. From this study it was concluded that formulation offers prolonged gastric residence time and continuous release of the medication over an extended period of time thus oral bioavailability of the drug and subsequent efficacy is improved.

keywords: herbal, Cinnamomum bark, Eucalyptus leaves, wound healing.

Introduction

Since old occasions, individuals have tried to nature for fixes to their ailments. Likewise with creatures, the utilization of helpful spices started because of sense.[1] Iatrochemistry was created in the sixteenth century, however plants had been utilized for treatment and anticipation for quite a long time.[2]

In antiquated civilizations, the human-plant communication was grounded and viewed as perhaps the most enduring.[3] It used to be that most clinical cures were made with plant segments or unrefined concentrates and blends. The vast majority of the present prescriptions come from plants and are incredibly fruitful in the treatment of an assortment of hazardous sicknesses.[4]

Natural meds are characterized as "customary" when they have had a long history of utilization, and this is certainly valid for some things that are alluded to be "home grown drugs" Indian

conventional medication: Ayurveda is a therapeutic framework that has been around for around 5000 years and is prevalently rehearsed in India. Diet and natural medicines are important for the arrangement, however the attention is on the body, psyche, and soul in general in disease anticipation and fix. The home grown market in India is developing quickly and is expected to arrive at a worth of Rs. 14,500 crore before the year's over, with trades arriving at Rs. 9,000 crore 2014.[5,6]

Wounds

"Wound" is portrayed as an opening or breaking of skin brought about by physical aggravation. Wounds harm a few tissues, including the cellar layer (BM) that lies under the epidermis and the dermis, which is comprised of fibroblasts, extracellular framework (ECM), nerves, veins, and lymphatics. Wounds are classed as fresh injuries, contained injuries, and consume wounds dependent on the wellspring of arrangement, and as intense and persistent injuries dependent on the physiology of recuperating. It's viewed as an intense injury if the harmed skin mends in an opportune manner, bringing about the legitimate reclamation of physical and utilitarian respectability of the tissue. Wrongly mended wounds that are constant foster a neurotic stage that requires extra time and treatment to recuperate. Persistent injuries are brought about by neighborhood contamination, hypoxia, injury, diabetes, hunger, unfamiliar bodies, immunodeficiency, or medication. Almost 6 million individuals experience the ill effects of persistent injuries worldwide, as per current appraisals.[7,8]

Collection and Authentication of The Plant Leaves

From the outfield close to Gwalior, the Eucalyptus leaves and Cinnamomum bark were accumulated in (Uttar Pradesh). For the extraction, the plant leaves and bark were totally washed in faucet water, dried in the shade at room temperature for ten days, coarsely ground, and afterward went through strainer No.60.

Sorting, drying and grinding of plant parts

Water from the spigot and refined water were utilized to wash the leaves in the research facility. Other plant pieces and incidental materials ought to be killed. To be dried in the broiler for three to seven days at 40 to 50 degrees Celsius. To save time during the drying system, foods grown from the ground were squashed and taken out. Material was ground in a blend processor utilizing dry material.

Extraction methods:

Three different kinds of extracts were prepared to find out the in vitro antifungal activity.

- I.Methanolic extract
- II.Ethanollic extract

Methanolic and ethanollic extract were prepared by soxhlet extractor. Extracts were stored in ~4°C.

Determination of Physical Parameters

Each plant material has its own particular physical specifications like moisture content and foreign organic materials. [9]

Moisture content

Gauged tests of 5 grams each were set in plates that were kept up with in IR dampness adjusts for 24 hours. After a particular timeframe, the weight reduction was estimated by eliminating the plate from the instrument.[10]

Total Ash value

Subsequent to eliminating the aluminum foil and setting up the dish, it was cooked, chilled, and gauged. The dish was loaded up with 2 grams of powdered material that had been gauged. In the Muffle Furnace, the temperature was kept at around 450-500 degrees Celsius. Measure of debris assembled and gauged.[10]

$$\% \text{ Total Ash} = \left[\frac{\text{weight of ash}}{\text{weight of sample}} \right] \times 100$$

Acid insoluble ash value

Into a little container, it poured 25 milliliters of weakened hydrochloric corrosive and washed with it. Utilizing channel paper to gather the debris, it is then positioned in an aluminum bowl and warmed to 450-500°C in the instrument. debris was gathered and gauged and corrosive insoluble debris was determined from the debris.[10]

$$\% \text{ Acid-insoluble Ash} = \frac{\text{weight of Acid insoluble ash}}{\text{weight of sample}} \times 100$$

Extractive values

The synthetic segments contained in the unrefined medication can be dictated by the concentrate acquired from the rough medication. Realizing that diverse synthetic segments have particular attributes and properties implies that distinctive extraction solvents are required[11]

Water soluble extractive value

Medications with water-dissolvable parts are estimated utilizing this measurement. In a glass container, place 5 grams of powdered plant material and 100ml of dissolvable. Cool and shake for one day. Whenever it had been separated for 24 hours it was put away in a conelike flagon. I took 25 ml of it, put it on a plate, and let it vanish on a water shower, then, at that point dried it in a 105°C broiler. In the wake of cooling, the dish was gauged, and a rate not really set in stone.[12]

Alcohol soluble extractive value

With regards to removing optional metabolites, liquor is probably the best dissolvable. A glass holder was loaded up with 5 grams of powdered material and 100 milliliters of Solvent. The jar was cooled to room temperature and left for one day, with consistent shaking for the initial 6-8 hours of the examination. The substance was separated following 24 hours. Roughly 30 ml of the filtrate was moved to another bowl. It was important to think the filtrate and dry it in a 105°C stove. In the wake of cooling, the dish was gauged and a rate not really set in stone.[13]

Determination of foreign matter

Pesticides, molds, creature fecal matter and other unessential materials, for example, glass and metal ought not be available in home grown prescriptions. Harmful substances incorporate pieces of the plant expected for human utilization, which should be recognized and not surpass the WHO's rules. Utilizing an amplifying focal point and an unaided eye, picked plant material was inspected for unfamiliar materials. Gauged, the substance was determined. The way that the entirety of the plant materials were gathered by hand guaranteed that no unfamiliar material was presented, in this way the measure of unfamiliar matter was amazingly low.[14]

Wound healing activity**Excision wound model**

To deliver wounds in this specific model, wistar rodents were chosen and their dorsal thoracic hair was eliminated. Sedative specialist Diethyl Ethyl Tertiary Butoxide In clean conditions, a roundabout injury framed. There was a fast appraisal of the injury district by taking note of the areas of the wounds.[15]

The rodents are arranged into eight gatherings (n=6). The creature of gathering I treated as control and just base utilized. The creature of gathering II, III and IV, treated as Test I, Test II, Test III and treated with standred drug ,ethanol cinnamon bark extricate and with methanol cinnamon bark remove individually. Gathering V contain with ethanol eucalyptus leave concentrate and Group VI contain with methanol eucalyptus leave concentrate and gathering 2 standard medication Povidone iodine. Treatment was utilized one time in a day for 26 days. The perusing was noted on four days span. The injury region was estimated by utilizing following paper technique.[16]

Wound Contraction and Epithelization time

During the mending system, the injury region contracts. This shrinkage is alluded to as "compression." Four-day stretches are utilized to decide the quantity of days essential for full mending without scarring. The accompanying recipe is utilized to decide the level of wound compression[17]

Closure = [(wound area on corresponding day-wound area on day zero)/(Wound area on day zero)] x 100

Physico-Chemical Evaluation of Crude extracts

Phyto-medication depends intensely on plants as one of its most fundamental segments, and these prescriptions are gotten from an assortment of plant parts. For wellbeing experts, pharmacological information on different substance and dynamic segments, just as essential and auxiliary metabolites, is fundamental for diagnosing and treating a wide scope of diseases. A blend of Cinnamon and Eucalyptus extricates were browsed ethnobotanical research. As indicated by our exploration audit, all plant material incorporates flavonoids, alkaloids, and steroids that advance injury recuperating.[18]

Physical Test Of Crude extract(Table 5.1a)

Crude drugs	Physical Test			
	Nature	Colour	Odour	Taste
<i>Cinnamon extract</i>	Coarse powder	Dull Yellowish brown	Pleasant	Sweet

Physical Test Of Crude extract(Table 5.1b)

Crude drugs	Physical Test			
	Nature	Colour	Odour	Taste

<i>Eucalyptus extract</i>	Coarse powder	Yellowish brown	Characteristic	Astringent
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Extractive Values(Table 5.2)

Crude drugs	Ethanol % w/w	Methanol % w/w
<i>Eucalyptus extract</i>	26.15	24.86
<i>Cinnamon extract</i>	18.56	13.65

5.4 Loss on Drying And Foreign Organic Matter(Table 5.3)

Crude drugs	Loss on drying (% w/w)*	Foreign matter (% w/w)*
<i>Cinnamon extract</i>	18.36	5.25
<i>Eucalyptus extract</i>	12.34	4.12

5.5 Total Ash, Acid Insoluble Ash and Water Soluble Ash Values (Table 5.4)

Crude drugs	Total ash value % w/w	Water soluble ash % w/w	Acid insoluble ash value % w/w
<i>Cinnamon extract</i>	~3.45	~27.5	~2.25
<i>Eucalyptus extract</i>	~2.54	~45.5	~1.22

Phytochemical Screening

Plants are known to contain an assortment of essential metabolites used by creatures and people, like sugar and lipids. They likewise incorporate an enormous number of optional metabolites that have physiological impacts. Every one of the three plants were exposed to a subjective phytochemical test, which uncovered the presence of an assortment of metabolites. Substance tests were performed on the entirety of the concentrates of the chose therapeutic plant, and the discoveries are introduced in the table beneath. Phytochemical examines uncovered that the entirety of the plants contemplated contain flavonoids, alkaloids, and steroids that help wound mending.[19]

5.6.1 *Eucalyptus* extract were undergone for chemical test and results are shown in Table below(**Table 5.5**)

S.No	Chemical Tests	Eucalyptus extract	
		Methanol	Ethanol
1.	Tests for Steroids and Triterpenoids:		

	• Liebermann's Burchard Test	-	+
	• Salkowski Test	-	-
2.	Test for Saponins:		
	• Foam Test	+	+
3.	Tests for Alkaloids:		
	• Hager's Test	-	-
	• Mayer's Test	-	+
4.	Tests for Glycosides:		
	• Borntrager's Test	+	-
	• Keller Killiani Test	-	-
5.	Tests for Tannins and Phenolic compounds:		
	• Gelatin Test	+	-
	• Ferric Chloride Test	+	+
	• Lead Acetate Test	+	+
	• Dilute Nitric acid Test	+	-
6.	Tests for Flavonoids:		
	• Ferric chloride Test	-	-
	• Alkaline reagent Test	-	+
	• Lead acetate Test	-	-
7.	7. Tests for Proteins:		
	• Biuret Test	-	+
	• Xanthoproteic Test	-	-
8.	Test for Carbohydrates:		
	• Fehling Test	-	+

“+”Found

“-“ Not Found

Cinnamon extract were undergone for chemical test and results are shown in Table below (Table 5.6)

S.No	Chemical Tests	Cinnamon extract	

		Methanol	Ethanol
1.	Tests for Steroids and Triterpenoids:		
	• Liebermann's Burchard Test	+	+
	• Salkowski Test	+	-
2.	Test for Saponins:		
	• Foam Test	+	+
3.	Tests for Alkaloids:		
	• Hager's Test	+	+
	• Mayer's Test	+	+
4.	Tests for Glycosides:		
	• Borntrager's Test	+	+
	• Keller Killiani Test	+	+
5.	Tests for Tannins and Phenolic compounds:		
	• Gelatin Test	+	+
	• Ferric Chloride Test	+	-
	• Lead Acetate Test	-	+
	• Dilute Nitric acid Test	-	-
6.	Tests for Flavonoids:		
	• Ferric chloride Test	+	+
	• Alkaline reagent Test	+	+
	• Lead acetate Test	+	-
7.	7. Tests for Proteins:		
	• Biuret Test	-	+
	• Xanthoproteic Test	-	-
8.	Test for Carbohydrates:		
	• Fehling Test	-	+

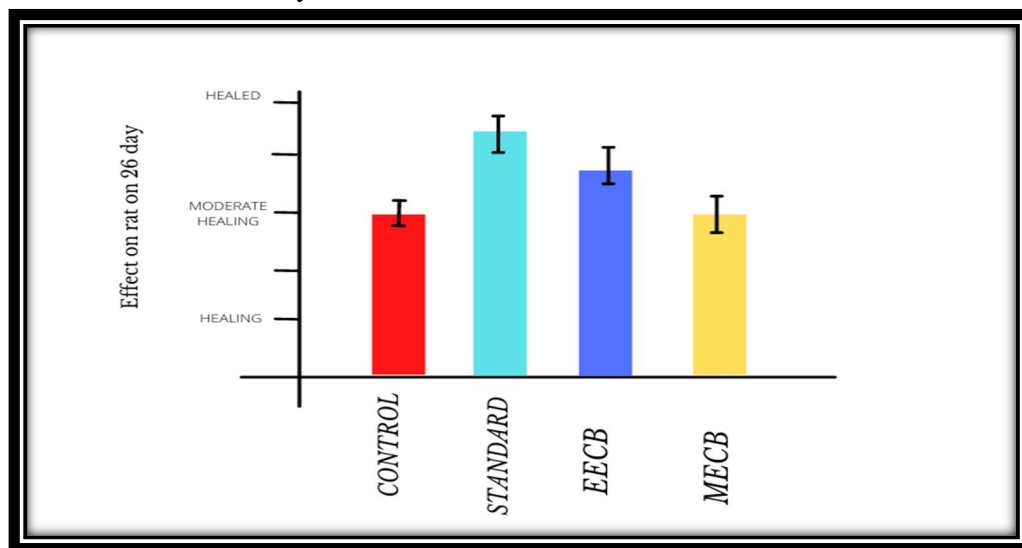
Preliminary Pharmacological Screening of Extracts

To get to the injury recuperating ability of plant removes, primer screenings of every one of the six concentrates of chosen plants were performed utilizing wistar rodents of one or the other sex. Six creatures were taken in each gathering and 5 gatherings were made in each twisted model. Gathering I was indicated as Control bunch and was treated with just straightforward balm base, Group II signified as standard and treated with 0.005% Fluticasone propionate (Glaxo SmithKline, India) salve while Group III, IV and V meant as Treated gatherings, were treated with 3 unique concentrates balm. All concentrate treatments were applied twice in a day.[20]

Table 5.7 Effect of Cinnamon extract on percent wound contraction of excision wound model in rat

S.no	Group	Effect on rat on day						
		0	6 th	10 th	14 th	18 th	22 nd	26 th
1.	Control	-	+	++	++	+++	+++	+++
2.	Standard	-	++++	++++	++++	++++	++++	++++
3.	EECB	-	+	++	+++	+++	++++	++++
4.	MECB	-	-	+	+	++	++	+++

Fig 5.1 Effect of Cinnamon extract(GRAPH) on percent wound contraction of excision wound model in rat on 26th day .



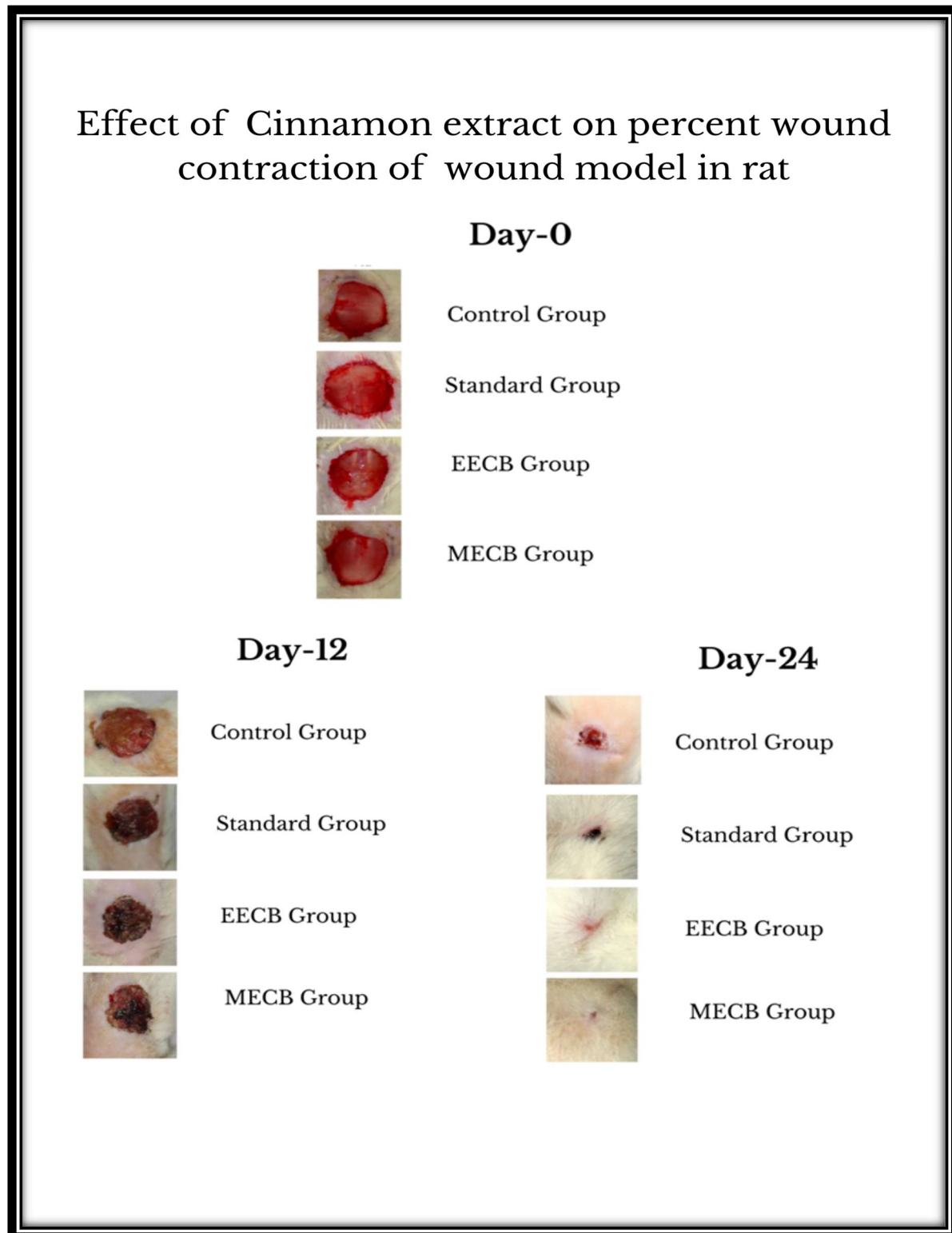
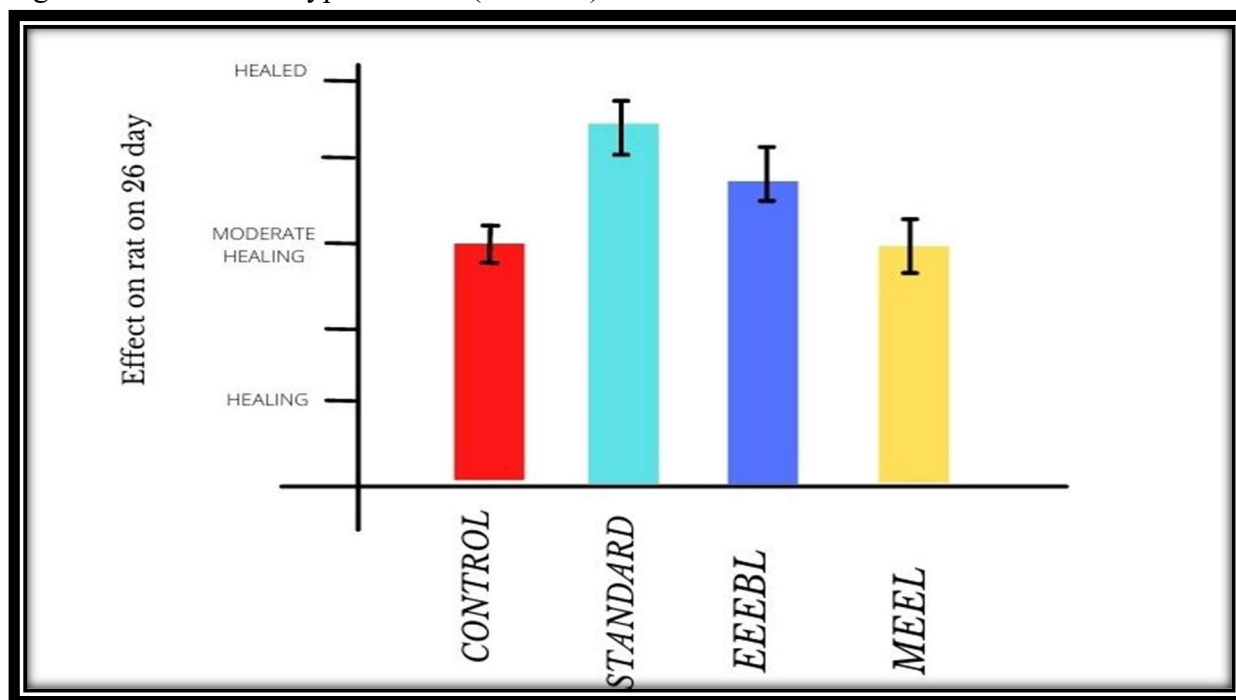


Fig 5.2 Wound Photographs

Table 5.8 Effect of Eucalyptus extract on percent wound contraction of excision wound model in rat

S.no	Group	Effect on rat on day						
		0	6 th	10 th	14 th	18 th	22 nd	26 th
1.	Control	-	+	++	++	+++	+++	+++
2.	Standard	-	++++	++++	++++	++++	++++	++++
3.	EEEL	-	+	++	+++	+++	++++	++++
4.	MEEL	-	+	+	++	++	+++	+++

Fig 5.3 Effect of Eucalyptus extract(GRAPH)



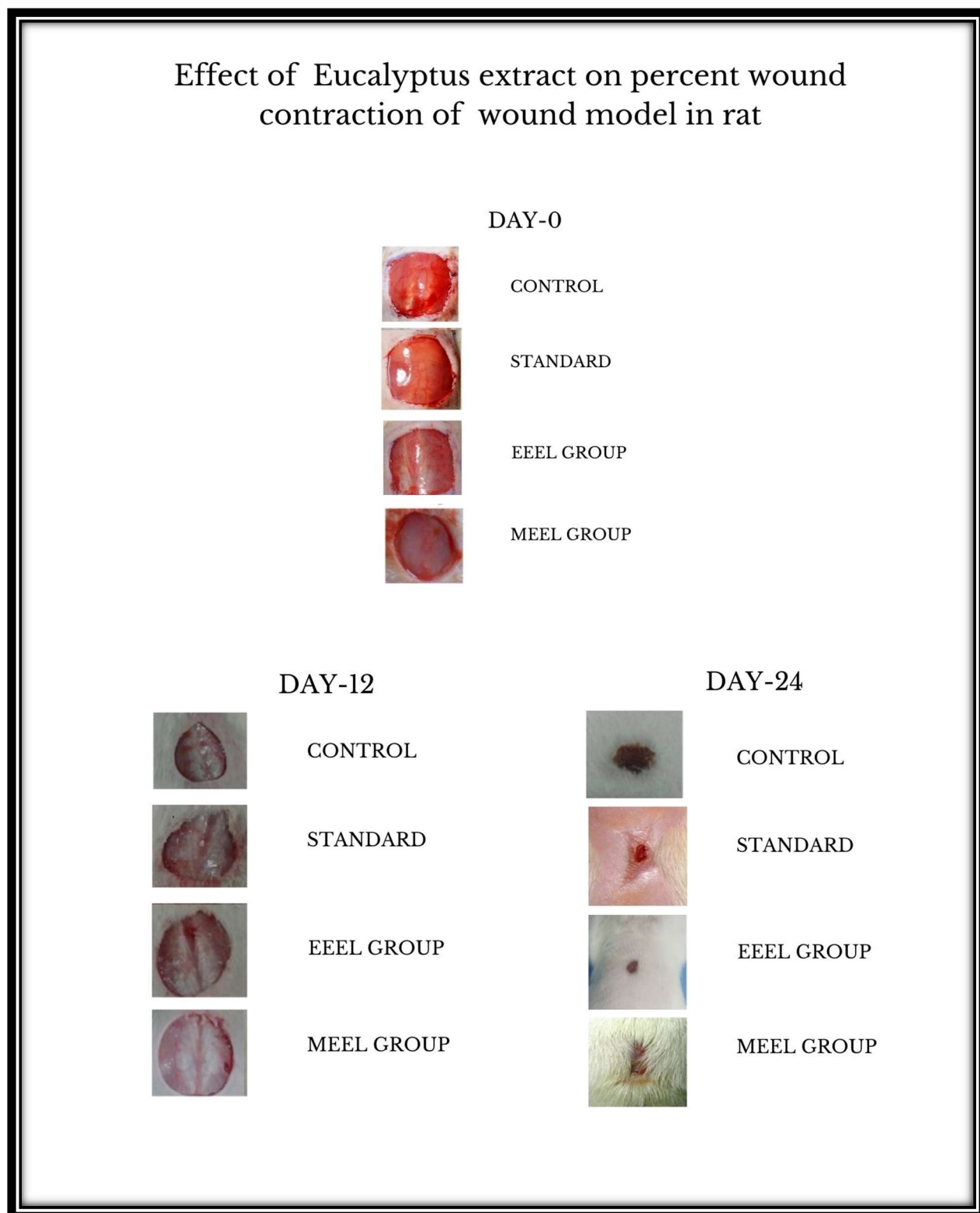


Fig 5.4 Wound Photographs

Conclusion

The skin is an imperative organ of the human body that ranges around 20 square feet. The skin goes about as a hindrance for the body, shielding it from germs, sickness, and the climate. It controls the internal heat level's. Wound mending has various issues, including contamination and embed situation. Wound mending is impacted by both nearby and fundamental causes. Flavonoids might be found in an assortment of plants, including vegetables, organic products, nuts, seeds, stems, and blossoms. It is a customary component of our eating regimen. The powdered substance was at first defatted with pet ether, trailed by rehashed extractions with different solvents as their extremity expanded. The concentrates were gathered in a vanished plate at 40°C until dry, and afterward kept at 4°C in the fridge until required. Fundamental screening of each of the two plant materials uncovered great outcomes for flavonoids, alkaloids, and steroids, and quantitative examination uncovered a more prominent extent of flavonoids, alkaloids, and steroids in every one of the three plant materials. Cinnamon primer screening brings about the presence of Flavonoids, Tannins, Glycosides, and an assortment of other auxiliary parts, as demonstrated in Table above. Eucalyptus starter screening brings about the presence of Flavonoids, Tannins, Glycosides, and an assortment of other optional parts, as demonstrated in Table above.

To decide the best twisted recuperating ability among the picked plant removes, starter pharmacological movement was finished using an extraction model. Cinnamomum methanolic concentrate and Cinnamomum ethanolic separate were found to have solid injury mending abilities and were picked for future examination. The assessment of wound recuperating depended on explicit qualities like injury compression. Methanolic concentrates of Cinnamomum and ethanolic concentrates of Cinnamomum, just as Methanolic extricate Eucalyptus and ethanolic concentrate of Eucalyptus, displayed solid injury recuperating capacities however were less proficient than Cinnamomum removes, as per early pharmacological examinations. The discoveries of the control and treatment groups were contrasted with those of the standard gathering. Twisted constrictions in extraction wounds were led for appraisal. Eucalyptus methanolic extract outflanked Cinnamomum ethanolic remove in injury healing.

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Conflict of Interest:

The authors confirm no conflict of interest

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