ACTA PHARMA REPORTS

Original Research Article | Journal homepage: https://pharma.researchfloor.org/ | ISSN: 3041-5381

Antimicrobial, Wound healing and Anti mutagenic Activity of Momordica charantia Leaves Extract

Agrawal, R. and Srivastava, T.

Department of Research, Priyamvada Birla Cancer Research Institute, M.P. Birla Hospital J. R. Birla Road, Satna, Madhya Pradesh, India

ABSTRACT

Momordica charantia leaves extract have been studied of using the using the antibacterial methods, disc diffusion methods, wound healing, and bone marrow micronucleus assay. The different concentrations had good antibacterial activity against different strains of bacteria in dose dependent manner. It has also shown wound healing activity on the skin of Swiss mice. And it was greater than positive control group. The micronucleus suppression in different doses was observed and it has showed significantly. The present study is important because the Momordica charantia plant is important because it cure various ailments in traditional medicine,

Keywords: *Antibacterial, Momordica charantia, Micronucleus, Wound healing activity.*

1. INTRODUCTION

Karela [Momordica Charania, family Cucurbitaceous], It is a popular vegetable that is widely grown in tropical areas., It has been reported to have multiple influences on glucose and lipid metabolism [1, 2]. It has demonstrated activity against *Helicobacter pylori* [the stomach ulcer-causing bacteria]. It has showed resistance to viral infections and had an immunostimulant effect in humans and animals, increasing interferon production and natural killer cell activity. of bitter melon against numerous cell lines, including liver cancer, human leukemia, melanoma, and solid sarcomas. [3, 4, 5] The bitter melon extract has also been reported to have antidiabetic Anticancerous antileukemic and anti-inflammatory activities [6, 7, 8]

2. MATERIALS AND METHODS

2.1 Extraction Process

The *Memordica charantia* was collected from the local garden in the month of April 2020 and were identified by competent Botanist Dr. Manoj Tripathi of DRI, Chitrakoot. The dried leaves were powdered.. The extraction was done as per the method reported.

2.1.2 Antibacterial activity

The bacterial strains were obtained from the culture stock of the Department. The method was standardized by us and used the similar methods [9, 10, and 11].

29 January 2025: Received
28 February 2025: Revised
30 March 2025: Accepted
30 April 2025: Available Online

Citation: Agrawal, R. and Srivastava, T. (2025). Antimicrobial, Wound healing and Anti mutagenic Activity of Momordica charantia Leaves Extract. *Acta Pharma Reports.*
DOI: https://doi.org/10.51470/APR.2025.04.01.38

*Corresponding Author: **Ramesh Chandra Agrawal**
Email Address: **rcagrawal.pbcri@gmail.com**

2.13 Micronucleus assay

The bone marrow aspirated from the femur bones of Swiss mice of treated and control groups, it was done as per the method reported by Schmidt [12] and by us [13.15].

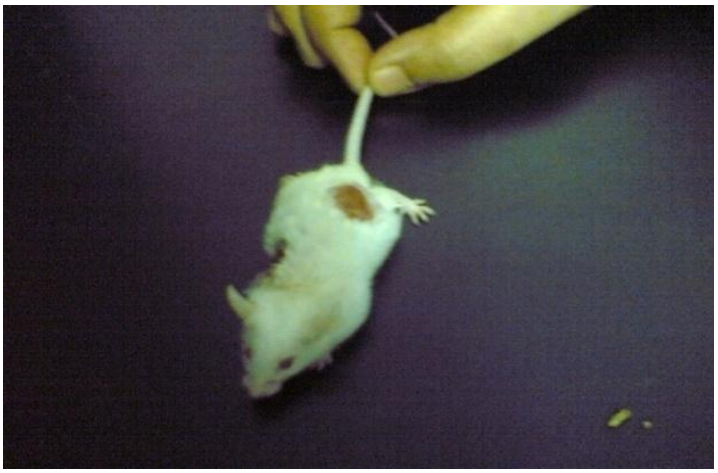
Animal model for wound healing: The wounds were created a wound healing activity was done as per the method described by Daniel et al [14]**.** Animals for this experiment were Swiss albino mice of group 3-4 months. 12 mice were used for the experiment, which were divided into 3 groups according to the treatment given.

3. RESULTS

3.1 Antibacterial Assay

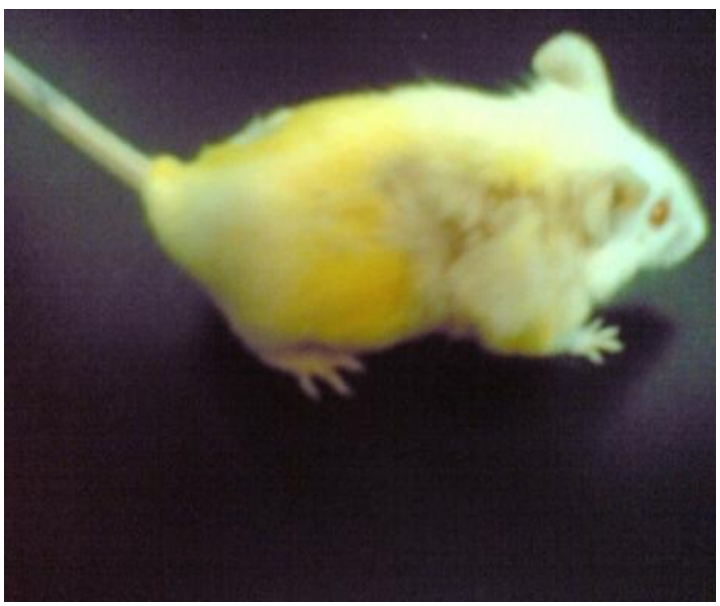
50% methanolic extract of present study revealed the antibacterial activity at the different concentrations in different bacterias as listed in table1 and 2.

WOUND HEALING MICE
BETADINE TREATED



0 days

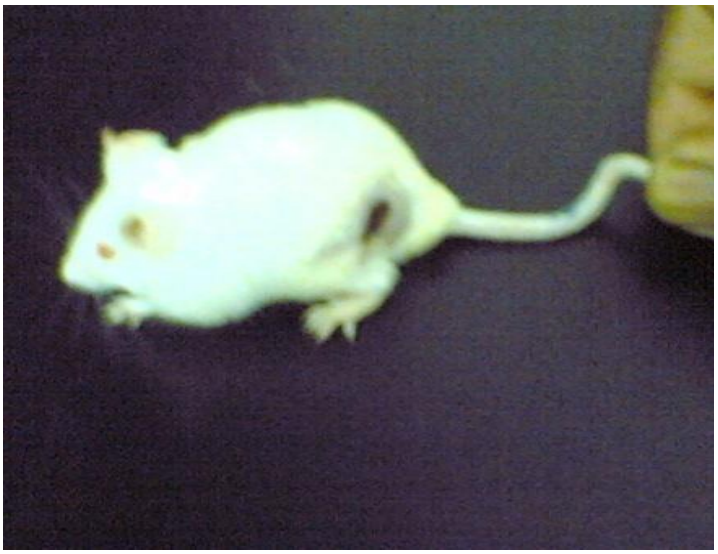
14 days



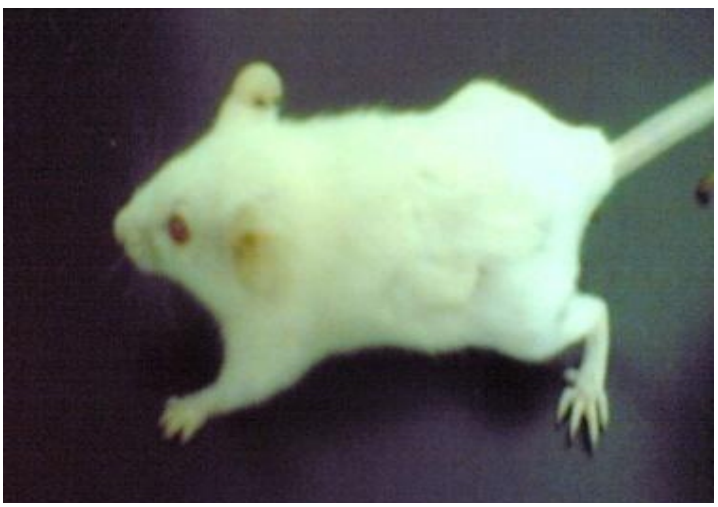
21 days

MOMORDICA EXTRACT TREATED

0 days

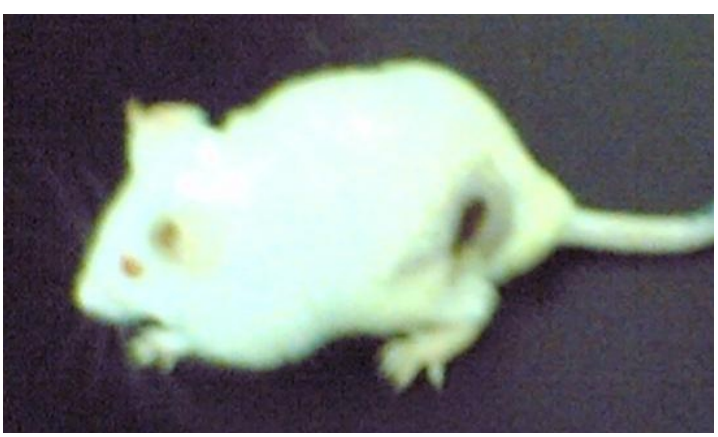


14 days

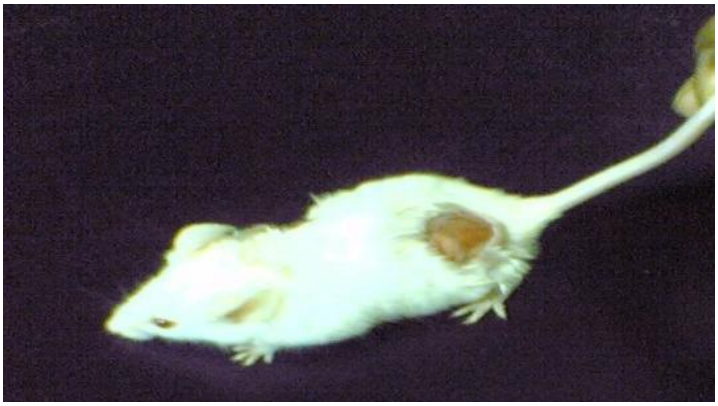


21 days

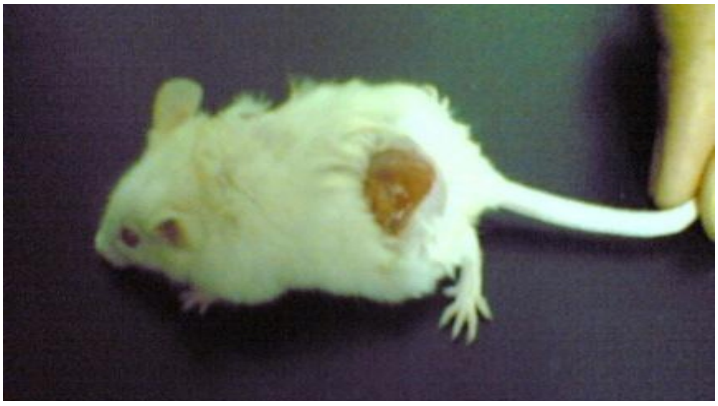
Untreated group



0 days



14 days



21 days

TABLE 1: ANTIMICROBIAL ACTIVITY OF *Momordica charantia* leaves extract

S.NO	Micro organism	Concentration Zone of inhibition in mm			
		25% conc.	50%conc.	75%conc.	100% conc.
1.	Bacillus subtilis	14	16	18	20
2	Shigella flexineri	13	15	18	19
3.	Staphylococcus epidermis	11	14	15	15
4.	Staphylococcus aureus	16	17	18	19
5.	E. coli	14	16	19	21
6.	Pseudomonas aurigenosa	10	12	14	15

The above observations suggest that different concentrations (25%, 50 %, 75 % & 100 %) were had good antibacterial activity against *different strains of bacteria* thus the extract is showing varying activity against all the microorganisms.

TABLE 2: ANTIMICROBIAL ACTIVITY OF *Momordica charantia* leaves extract

S.NO	Micro organism	Concentration Zone of inhibition in mm			
		5%conc.	10%conc.	15%conc.	20%conc.
1.	*Bacillus subtilis*	06	07	08	10
2	*Shigella flexineri*	07	08	09	10
3.	*Staphylococcus epidermis*	06	07	08	09
4.	*Staphylococcus aureus*	05	07	09	12
5.	*E. coli*	09	10	11	13
6.	*Pseudomonasauriginosa*	07	08	09	10

Table 3: Antibacterial activity against the known gram positive antibiotic

Name of microorganisms	Name Standard antibiotics [zone of inhibition(mm)]			
	TE	OF	AZ	PC
S.aureus	15	16	16	14
B. subtilis	14	16	18	14
S. epidermidis	14	18	17	17

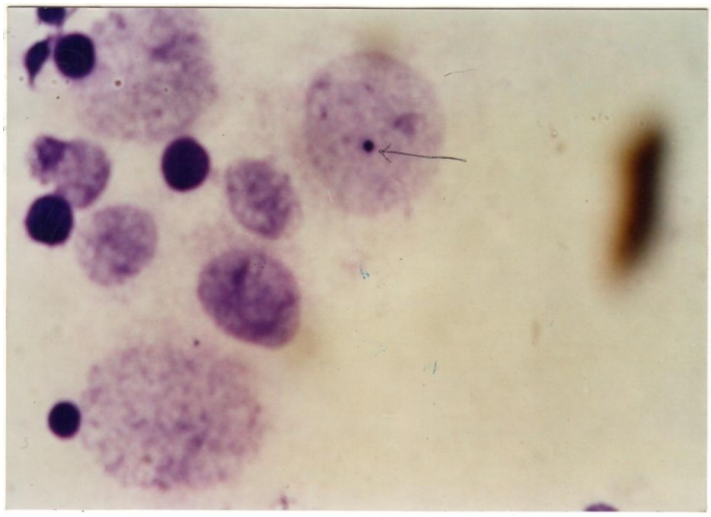
TE- Tetracycline, OF- Ofloxacin, AZ- Azithromycin & PC- Piperacilline

Table 4: Antibacterial activity of known gram negative antibiotic

Name of microorganisms	Name Standard antibiotics [zone of inhibition(mm)]			
	FU	GM	CX	NF
E.coli	12	16	8	16
S.flexineri	18	18	12	21
Ps. **auriginosa**	14	13	18	20

FU- Nitrofurantoin, GM- Gentamicin, CX- Cefotaxime & NF- Norfloxacin

(A) MICRONUCLEUS ASSAY:- The mordica extract showed antimutagenic activity which was significant in dose dose-dependent manner.



Pic. I Photograph Showing Micronucleus Formation in PCE Cells

Table 5: Effect of Momodica Charantia Leaves Extract on Mn Formation in Mouse Bone Marrow Cell

GROUP	MNPCE+SE	PCE/NCE RATIO
cyclophasphomide		
M.charantia + Cy (250mg/kg)	1.16±0.6 *	1.06±0.02 *
M. charantia + Cy (500mg/kg)	1.25±0.48 *	1.09±0.06*
M.charantia +cy (750mg/kg)	1.5±0.7*	1.1±0.07*
Solvent	0.6±0.5	1.06±0.03
Drug alone	0.75±0.4	1.04±0.02

**Denoted statistically significant as compared to the cyclophosphamide-treated group [16]*

Table 6; Effect of Momordica Extract on wound healing activity in Swiss albino mice.

Group	*Anterior side in mm*	*Posterior side in mm*
1.Betadine (Positive control)		
1-7 days	*78.18±1.6*	*75.95±2.36*
8-15 days	*24.62±4.6*	*25.97±4.7*
16-23 days	*0.00*	*0.00*
2.Momordica ext		
1-7 days	*75.14±2.05*	*75.32±1.8*
8-15 days	*18.912±3.3*	*26.12±1.5*
16-23 days	*0.00*	*0.00*
3.untreated control		
1-7 days	*82.35±2.1*	*82±1.5*
8-15 days	*53.9±2.54*	*54.53±3.2*
16-23 day	*17.4±1.5*	*20.7±1.1*

Topical application of Momordica extract at a dose of 100 ul. had shown wound healing activity on the skin of Swiss mice. The wound created by the excision method was completely healed after 15 days but in 8-15 days, the wound healing by Momordica extract was greater than Betadine-treated group (Positive control).

Discussion and Conclusion

The Significant wound healing activity was observed in animals treated with Momordica extract compared with those who received the standard and control treatment. our study was supported the findings by the findin of Sensagal, (2015,David et al 2014 Dandavate et al 2016. In excision wound modal, Momordica extract-treated animals showed a significant reduction in wound area and period of epithelization.

The present study is important because the *Momordica charantia* plant is important to cure various ailments in traditional medicine since diabetes is spreading in all over the world as an epidemic and there is no permanent treatment in allopathy; therefore, people are looking for alternative medicine for the treatment of diabetes.

REFERENCES

1. Fang, EF and Ng TB Bitter gourd (Momordica charantia) is a cornucopia of health: a review of its credited anti diabetic, anti-HIV, and antitumor properties Current molecular medicine, 2011 ,11 (5), 417-436.
2. Kumaree, KK and Prasansuklab A Bioactive Components of Bitter Melon (Momordica charantia L.) and Their Antidiabetic Response - Antidiabetic Medicinal Plants and herbal treatment 2023 I edition CRC Press.
3. Raina, K Kumar, D Agarwal R Promise of bitter melon (Momordica charantia) bioactives in cancer prevention and therapy - Seminars in cancer biology, 2016 – Elsevier,40-41.
4. Agrawal, R.C. and Beohar,T. Chemopreventive and anticarcinogenic effects of Momordica charantia extract. Asian Pacific Journal of Cancer prevention ,Vol. 11,2010 ,371-375.
5. Sur, S Ray RB Bitter Melon (Momordica Charantia), a Nutraceutical Approach for Cancer Prevention and Therapy - Cancers, 2020 - mdpi.com Vol.12 (8).
6. Fischer, P Mendes-Gomes GC El extracto de Momordica charantia modula la respuesta inflamatoria en linfocitos humanos a través de la supresión de TNF-α Ars Pharmaceutica 2022,63(4).
7. Fischer, P Mendes Gomes, GC Frasson B Momordica charantia extract modulates inflammatory response in human lymphocytes via suppression of TNF-α Etcheverr , Pharmaceutica - 2022, 63 (4) 320-334.
8. Kwatra D, Dandawate, P Padhye, S Anan t S Bitter melon as a therapy for diabetes, inflammation, and cancer: a panacea? - Current Pharmacology 2016, Vol. 63 (4) 320-334.
9. Agrawal RC. Pharmacological studies of Moringa oliefera. Asian Journal of current research 2021a;6(3):37-41.
10. Agrawal, R.C. Antibacterial and Phytochemical studies of Psidium guajava leaf extracts, International Journal of Research- Granthalaya, 2021b;9(11)
11. Agrawal RC. Pharmacological studies of Azadirachta indica leaves extract. Open acess research journal of Life Sciences. 2022;04(01):044-050.
12. Schmid W.(1975). The micronucleus test. Mutal. Res.31: 9-15.

13. Agrawal,R.C. and Kumar,S., Prevention of Cyclophosphamide induced micronucleus formation in mouse bone marrow by Indole-3- Carbinol. Food and Chemical Toxicology, Vol.36, 1999.Pg 975-977.

14. Daniela S. Masson-Meyers, Thiago A. M. Andrade, Guilherme F. Caetano, Francielle R. Guimaraes, Marcel N. Leite, Saulo N. Leite, , and Marco Andrey C. Frade Experimental models and methods for cutaneous wound healing assessment Int J Exp Pathol. 2020 Feb-Apr; 101(1-2): 21–37.

15. Agrawal,R.C. and Pandey ,Prachi: Screening of Andrographis paniculata extract antioxidant and genotoxic activities. International journal of Research- Granthalaya, Vol.7 (6),2019,132-142.