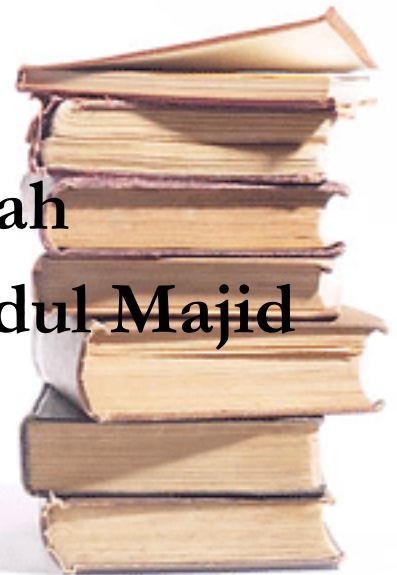


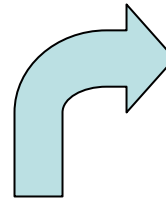
OPTIMIZATION OF PAPAIN-BASED WOUND CLEANSER

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WHY PAPAIN-BASED WOUND CLEANSER?



WOUND
CLEANSER
FORMULATION

- To incorporate the cleansing effect + the debriding activity into a single product.



PAPAIN
ENZYME



Wound cleansing effect

Why?

- To clean the surface of the wound by removing bacteria, mold, fungus, necrotic debris, blood clots, dirt and eschar.

Purpose:

- To prevent infection
- Promote healing of injured tissue.



Wound debridement

What?

- removal of necrotic or nonviable tissue from the wound surface.

How?

- the use of proteolytic enzyme formulations
- Or known as enzymatic debridement



PAPAIN as a proteolytic enzyme

- Proven clinically and laboratory that it does not harm viable tissue surrounding wound.
- Potent activity against denatured protein
- Range: 3.0 to 12.0(wider range compared to bromelain)



Consequently,

- action of papain-based wound cleanser in proper cleansing and hastening the closure of excisional skin wounds is to be enhanced.



Objective :

- to optimize the desirable characteristics in papain-based wound cleanser that not only will clean the wound but also promote the healing of the wound.



Scopes

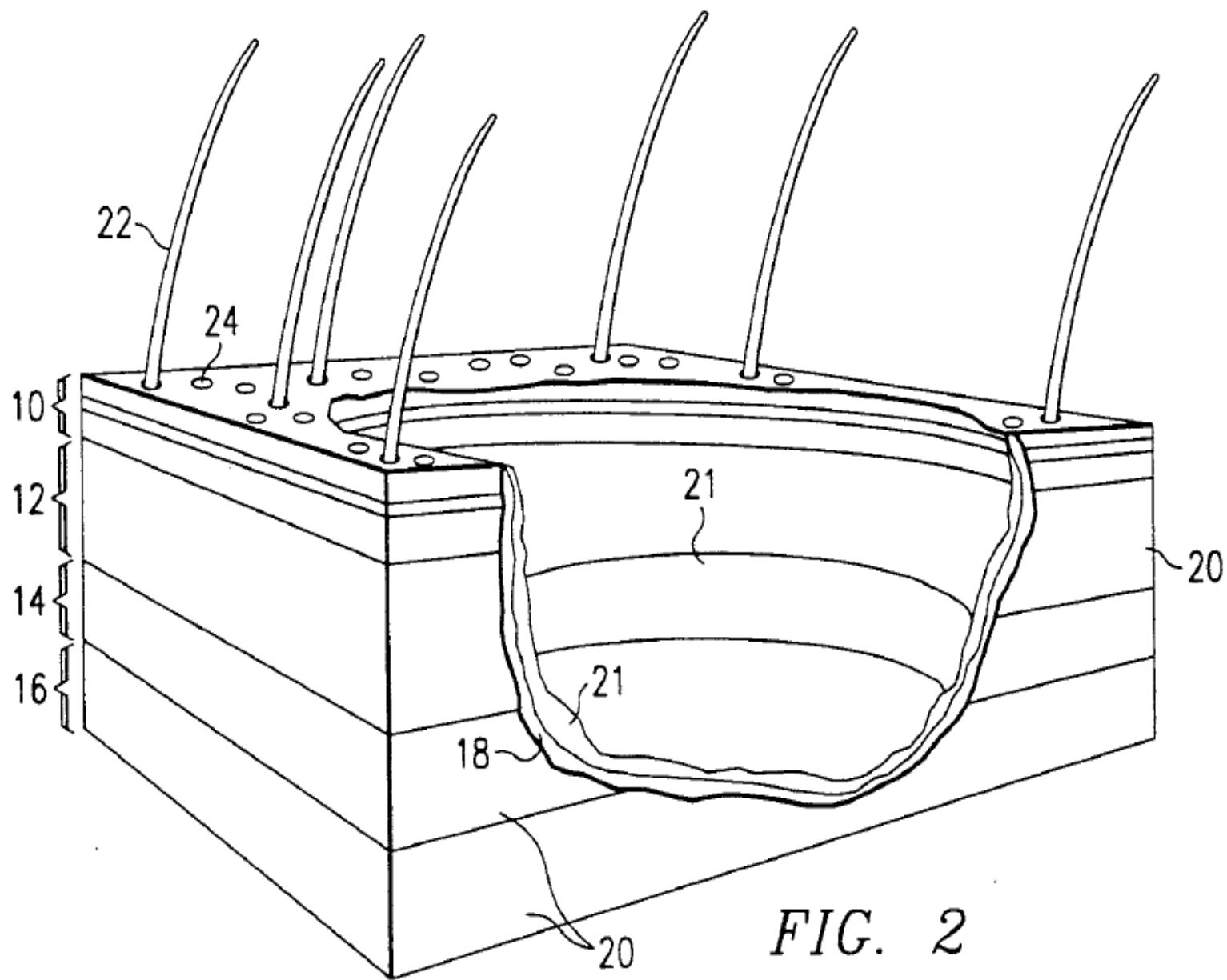
- Formulating a non-toxic and physiologically compatible papain-based wound cleanser in aqueous form.
- Macroscopic analysis to measure the wound closure and rate of wound recovery.



WOUND?

- ✓ a break in the epithelial integrity of the skin.
- ✓ However, the disruption could be deeper : extending to the dermis, subcutaneous fat, fascia, muscle or even the bone





Methodology

1. Formulating wound cleanser
2. Experimental procedure
3. Raw area measurement + macroscopic assessment.



Wound cleanser formulation

ingredient	function
1)GLYGERIN	emollient
2)MANNITOL	humectant
3)COCO - BETAINE	surfactant
4)ALPHA- TOCOPHEROL	Vitamin-E



5)SORBIC ACID	preservative
6)DEIONIZED WATER	High purity water
7)PAPAIN	Debriding agent
8)ALOE-VERA GEL	Reduce swelling
9)8-HYDROXYQUINOLINE	Cosmetic biocide



Group	Function
Surfactant	= Assist cleaning the wound
Humectant	= Stabilize moisture at the wound site
Emollient	= Soften or soothes dry skin
Cosmetic biocide	= Reduce microbial action at the wound site
Vitamin E	= Promotes tissue re-growth, reduce scar



Vitamin C = increase collagen synthesis-
aid in wound healing + neutralize free
radicals

Papain = digest protein at wound site

Aloe-vera = Soothe skin, ease pain, reduce
inflammation

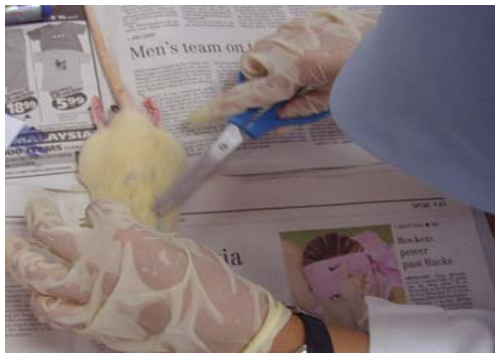


2. Experimental procedure

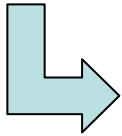
1. Anaesthetization



2. Preparing the rat



3. Creating a wound



Pattern= 3 x 1.5 cm

4. Apply medication based on groups

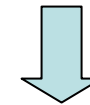


How to apply
cleanser



How to apply
gel

5. Reapply medications daily



6. Observations on day 5,10,15,20.

1. Control group (CG)



2. Cleanser group (G1)



3. Gel group (G2)



4. Cleanser+gel group (G3)



Raw Area Measurement:

1. Wound tracing
2. Planimetric

Macroscopic Observation:

1. Scabs.
2. Contraction.
3. Secretions.



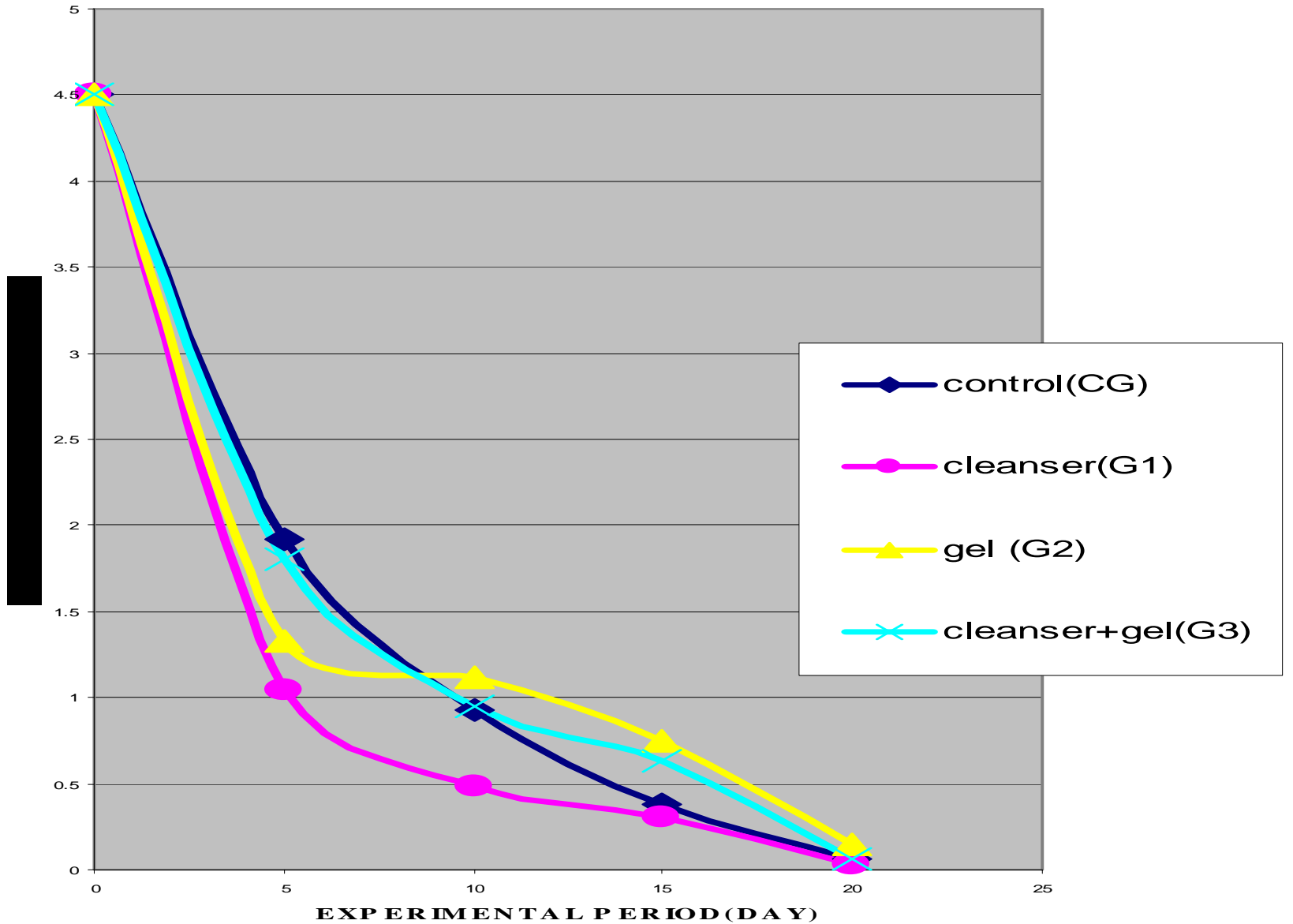
Results + Discussion

Group	Wound Healing Rate
1. CG	++++
2. G1	+++++
3. G2	++
4. G3	+++





+ = Minimum

+++++ = Maximum

MEAN VALUE OF RAW AREA VS EXPERIMENTAL PERIOD



Macroscopic analysis

GROUP	SCABS	SECRETIONS	CONTRACTION
1. Control (CG) 	++	+/+++	+++
2. Cleanser (G1) 	+++++	++/++++	+++++
3. Gel (G2) 	+/+++	++	++
4. Cleanser+gel (G3) 	++	++/++++	+++

+ = MIN, +++++ = MAX

1. Control (CG)



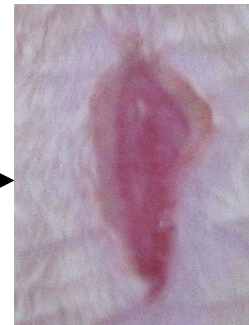
Wound at day 1



Wound at day 5



Wound at day 10



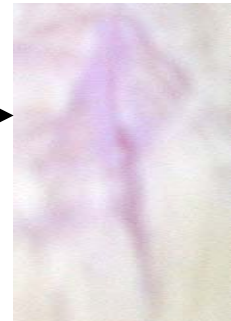
Wound at day 15



Wound at day 20



2. Cleanser (G1)



Wound at day 5

Wound at day10

Wound at day 15

Wound at day 1



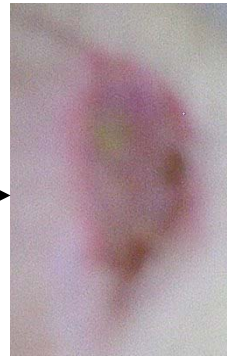
3. Gel (G2)



Wound at day 1



Wound at day 5



Wound at day 10



Wound at day 15



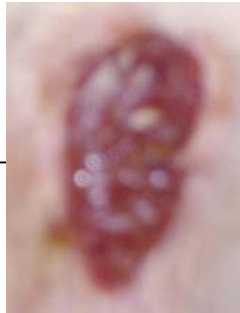
Wound at day 20



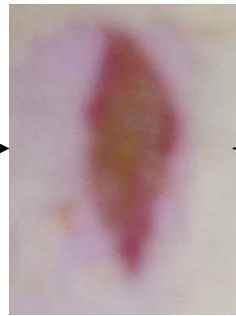
4. Cleanser + gel (G3)



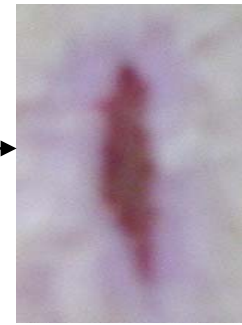
Wound at day 1



Wound at day 5



Wound at day 10



Wound at day 15



Wound at day 20



Conclusion...

1. Cleanser is proved to be efficient in promoting wound healing compared to others.
2. Cleanser works best on its own :-
[Excess treatment modalities may increase damage to tissue injury thus delay wound healing]



Recommendations

- Use larger wound size to observe the healing rate
- Different type of wound to observe debriding action:
 - full thickness excisions
 - partial thickness burn
 - partial thickness excisions with chemical ablations
- Microscopic assessment.



- THANK YOU

