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THE EFFICACY OF HONEY DRESSING FOR WOUND HEALING : A CLINICAL OBSERVATION STUDY

ANTIBACTERIAL SYSTEM IN HONEY

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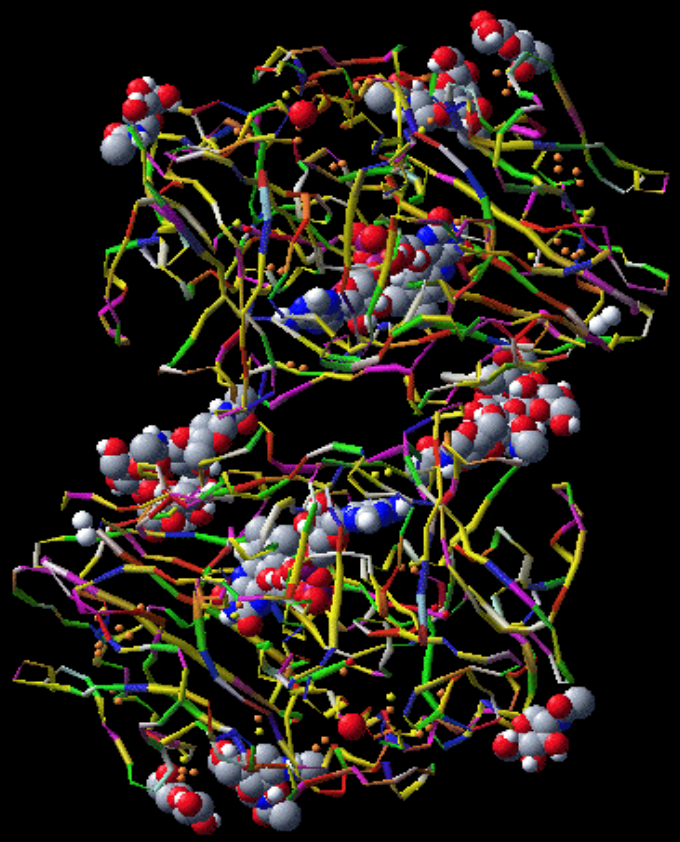
THE ANTIBACTERIAL "SYSTEM"

1993

HIGH SUGAR CONCENTRATION (~ 76 %)	ACIDITY (pH=3.60)
	*S.Aureus & E.coli*
Glucose Oxidase + glucose = Hydrogen Peroxide H_2O_2 + Vitamin C	Organic Antibacterial Compounds

GLUCOSE OXIDASE

250 ps Molecular dynamic simulation from the published crystal s
G Wohlfahrt, S Witt, J Hendle, D Schomburg, H M Kalisz, H J Hecht



Glucose Oxidase

↓

glucose

↓

Hydrogen Peroxide (H_2O_2)

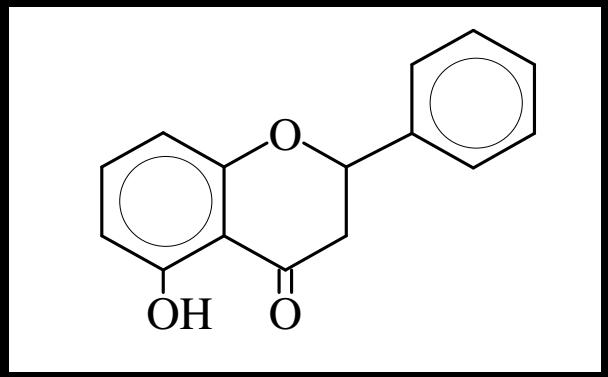
+

gluconic acid

HYDROGEN PEROXIDE ACTIVITIES

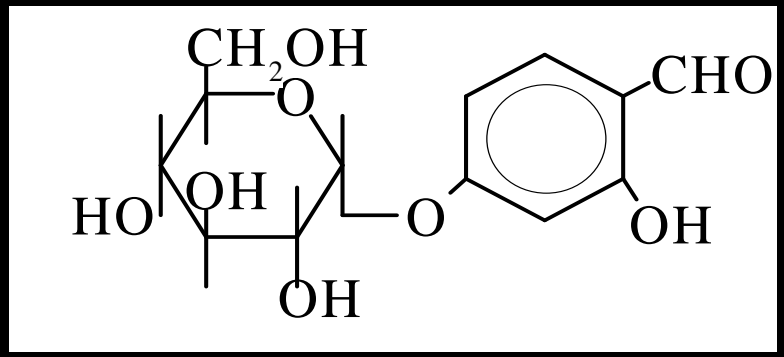
- KILLS BACTERIA, VIRUSES AND FUNGUS
- *(Reactive hydroxy radicals($^{\cdot}OH$),P.Molan 1992)*
- STIMULATES CELL PROLIFERATION
- *(Al-Jady & Kamaruddin 2003)*
- INCREASES THE INSULIN RECEPTOR KINASE ACTIVITY*(Koshio,O. et al,1988)*

FLAVONOID, POLYPHENOL, AND GLUCOSIDE(*Antibacterial activities*)



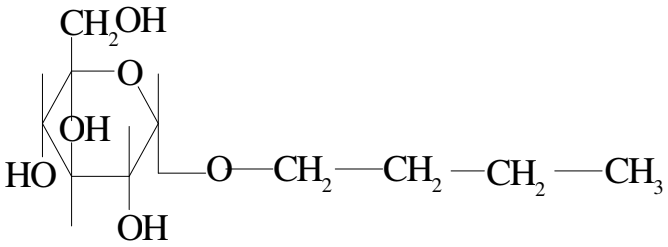
5,4-Dihydroxyflavonone

L.Sivanaesan and M.Y.Kamaruddin, 1989



2,-Hydroxyl-4-glucopyranosyl benzyldehyde

P.Nadaraj and M.Y.Kamaruddin 1990



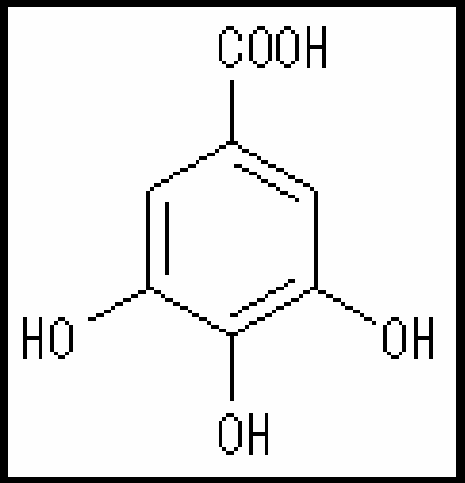
α-Butyl-glucopyranoside

M.Y.Kamaruddin and R.M.G.Roberts 1993

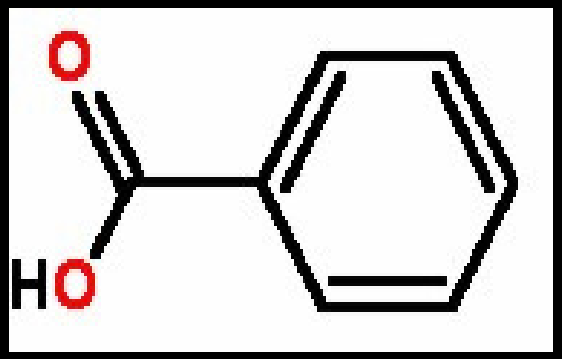
Published in:
Proceedings of the International Conference on Tropical Bees and The Environment. 11-15th.Mac 1995, Holiday Inn, Pedu Lake, Kedah, Malaysia.

PHENOLIC ACIDS (*Antibacterial and antioxidant activities*)

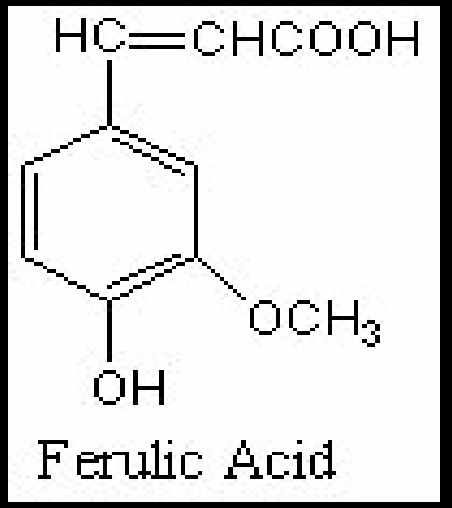
Published in Turkish J.Medical Scien
33(2003) 229-236

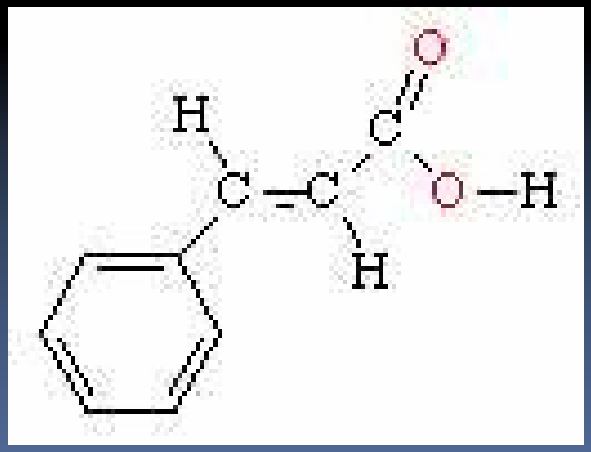


Gallic acid

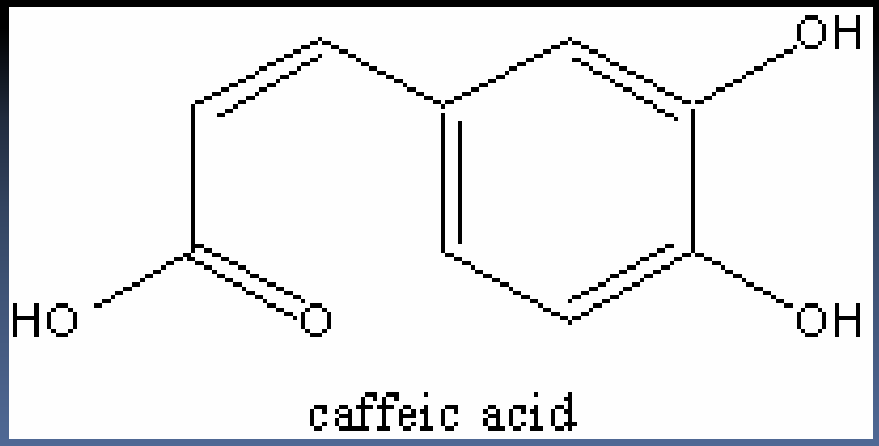


Benzoic acid





Cinnamic acid



A.M.Aljady and M.Y.Kamaruddin 2003


CLINICAL OBSERVATION STUDY
COLLABORATIVE RESEARCH
WITH ORTHOPAEDIC SURGEONS
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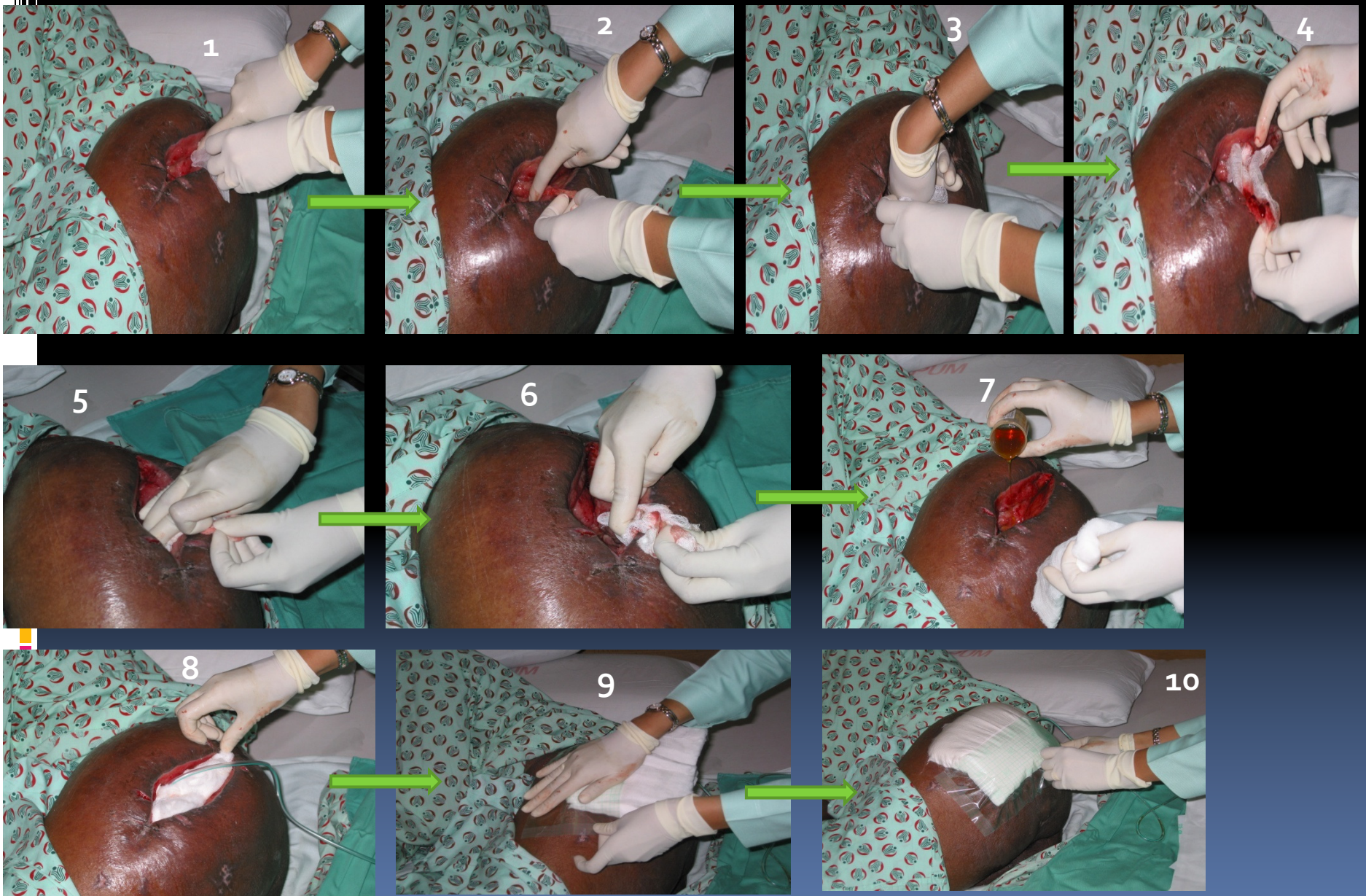
Honey dressing

- Honey dressings were performed on 102 patients with wounds and ulcers that had failed to heal with conventional treatment.
  - The conventional wound treatments: oral or intravenous antibiotic, wound debridement and wound dressing with saline, povidone-iodine or modern wound dressing.
  - Wounds were defined as having failed to heal after being treated with conventional treatment for up to one month.

Daily Honey dressing



Clinical Observation

Wound appearance:

- Necrotic tissues were replaced with granulating tissues & foul smelling wounds were odourless after 2nd week.
- Decreased oedema within the soft tissues around the wounds.
- Exudates & pus reduced with eradication of infection & improvement of tissue perfusion
- Majority of patients were discharged by the 3rd week.

Clinical Observation

Wound parameters & wound contraction:

* Rate of wound contraction highest between 2nd & 3rd week. 95% reached <0.5 cm of wound depth before discharge.
* * A number of patients with diabetic wounds were saved from amputations with honey dressing followed by skin grafting procedures.

Discussion

The Role of Antibacterial property

- All the wounds treated in our study were colonized before honey treatment.
  - **14 different types of organisms** were isolated including 2 resistant to Methicillin(**MRSA and MRSE).**
- **All organisms were eradicated by 2nd week of topical honey application.**
  - **The effectiveness of honey in sterilizing the wounds is a major contributing factor in the wound healing processes.**

Different types of organisms isolated from wounds before honey treatments in University Malaya Medical Centre

No	Organisms	Number of Patients
1	Methicillin Resistant *Staphylococcus aureus* (MRSA)	16
2	*Pseudomonas aeruginosa*	14
3	*Staphylococcus aureus*	12
4	*Klebsiella pneumoniae*	11
5	*Proteus* spp.	11
6	*Streptococci* spp.	9
7	Methicillin Resistant *Staphylococcus epidermidis(MRSE)*	7
8	*Enterococcus* spp.	7
9	*Bacillus* spp.	3
10	*Staphylococcus epidermidis*	2
11	*Nisseria* spp.	2
12	*Acinitobacter baumannii*	2
13	*Serratia marescens*	2
14	*Citrobacter* spp.	2
	Total	102

Diabetic wound

(Before honey treatment)
26 years old male, chronic non healing diabetic wound with multiple amputations.
Referred post disarticulation of right hip for non healing wound for past 2 years on conventional Rx.

(Week 1): Large wound (16 X 20cm; 7cm deep) in close proximity to perineal region, exposed acetabular cup; weeping with foul smelling exudates, necrotic slough at the bases, areas of soft tissue necrosis at the peripheries. Multiple organism isolated. Painful; bed bound for 2 years.

(Week 2): Profound granulation of the wound with reduction of exudate and foul smell. Loose slough which were easily removed without surgical debridement. No areas of necrosis. Acetabular base appears healthy. Contact bleeding. Decreased pain with reduction of oedema.

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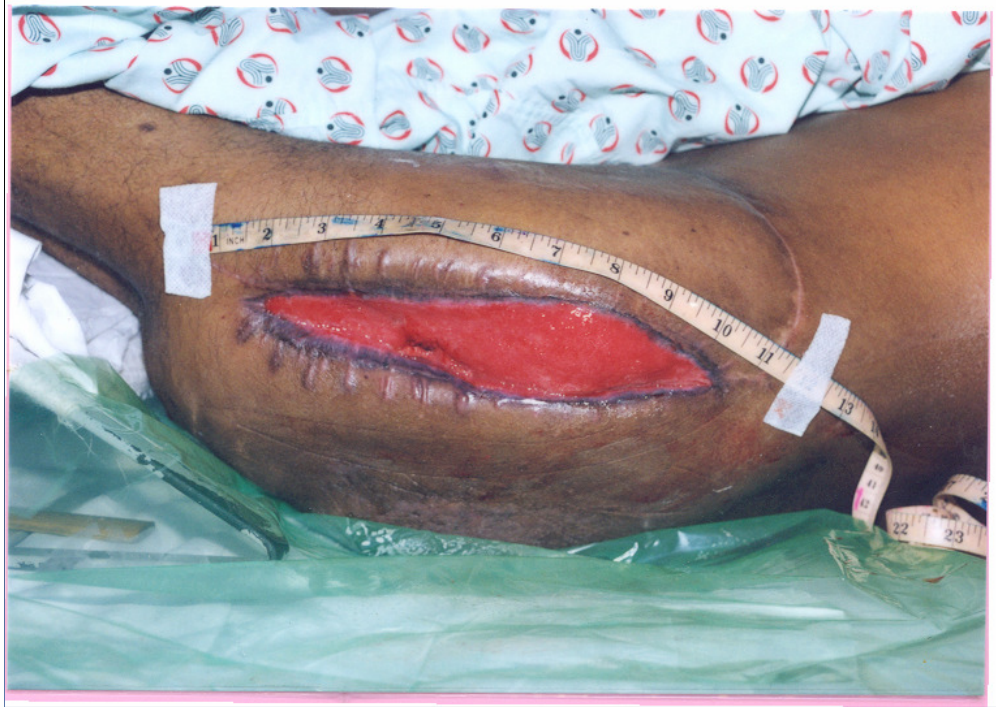
(Week 3): Healthy tissue cover continues resulting in decrease of depth; reduction of wound size most apparent at this week. Wound is moist but no exudates noted; no more pathogen isolated from swab. Planned for skin grafting in view of extensive

(Week 4): Post skin grafting. Wound continued to heal well despite honey dressing not used anymore. Patient discharge to outpatient wound care facility on saline dressing.

(Week 1): 50 year old male, left hemiparalysis secondary to ischaemic cerebrovascular event. Developed left trochanteric pressure sore, which is continuously extending for past 1 year. Wound 20 X 7cm, copius exudates and pus; foul smelling, upper end of femur and trochanter outline palpable. Large area covered with slough with deep pockets posterior to femur; extending towards deep fascia. Osteomyelitic changes noted on X ray. Myonecrosis between trochanter and iliac crest.

(Week 2):Marked improvement in wound appearance; absence of slough; no surgical debridement needed. Rapid granulation of the surrounding tissues. Femur head and proximal shaft has more muscle coverage, posterior pockets becoming shallow. Myonecrosis resolved with new muscle formation. Wound bleeds on contact.

(Week 3): Wound dimension has dramatically decrease over 1 week. Granulation tissue growth has obliterated the pockets and made wound more shallow. Oedema subsided, no more exudates. More muscle coverage of the exposed bone. Epitheliailization beginnig to occur from periphery. Wound swab negative for growth.



(Week 4): Further reduction of size and depth. Granulation tissue filling up the bases. Repeat X ray of the left hip and femur showed no osteomyelitic changes. Patient has started physiotherapy sessions. Clinically no need for skin grafting as wound shows accelerated healing rate.

(Week 1): 40 years old male; traumatic laceration on the lateral aspect upper arm; 10X 5cm; 5 cm deep. Painful. No neurovascular injury, referred early. *Staph aureus* & *Bacillus* isolated from wound. Minimal oozing from wound base, blood clots ; minimal slough at wound base. Exposed muscle.

(Week 2) Marked reduction of size and depth; healthy granulation tissues filling up the wound. No bleeding. Infection cleared. Wound more defined, less pain.

(Week 3) Further improvement of the wound appearance. Depth less 0.5 cm; patient able to move upper arm. Epitheliailization from the peripheries.

HOW HONEY HEALS WOUNDS

"ANTIBACTERIAL SYSTEM" STERILISED THE WOUND

ENERGY FROM GLUCOSE

H_2O_2

NOT LESS THAN 181 DIFFERENT COMPOUNDS

ANTIOXIDANT COMPOUNDS (antiinflammatory)

NUTRIENTS(AMINO ACIDS,LIPIDS,VITAMINS)

MINERALS AND TRACE ELEMENTS

Animal model Study showed that HONEY INCREASED…

- COLLAGEN CONTENT
- PROTEIN CONTENT
- DNA CONTENT
- RATE OF WOUND CONTRACTION
- URONIC ACID CONTENT
- HEXOAMINE CONTENT
- RATE OF EPITHELIALIZATION
- MEAN % OF HEALED AREA
- SERUM IRON CONTENT
- ALBUMIN LEVELS
- WEIGHT OF ANIMALS
- (Oral Feeding)

IN SUMMARY

- HONEY :
- Kills bacteria at site of wounds
- Debrides (clean up) wounds
- Replace sloughs (dead cells) rapidly
- Enhances granulation & epithelialization
- Absorbs oedema (swellings)
- Reduces further infection, overcome offensively smelly (seriously infected) wounds
- Reduces need for skin graft treatment

Conclusion

- Our study has shown conclusively that honey dressing has healed 102 infected wounds that have failed to heal with conventional treatment.

- This was the largest observation study with 100 % success undertaken at University Malaya Medical Centre.

Conclusion

- Honey is inexpensive, easily available and above all is extremely effective. It does however require **more human touch** to perform honey dressing as compared to modern dressing.

- Based on these results, it is highly recommended pure honey be accepted by conventional medicine.