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Honey dressing on pilonidal sinus wound healing

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This study aimed to through more light on the effect of Saudi Arabia sample as a dressing on pilonidal sinus wound healing, antibacterial activity, and cytokines level. The results revealed that the pH of 3.56 of tested honey, where glucose was 378mmol/l also the specific gravity was 1.435, while total phenolic content and total flavonoid content and DPPH radical scavenging activity were (32.15 mg GAE/100 g honey), (54.27 mg RE/100 g honey) and (127.83 mg/ml) respectively.

The mean duration of pilonidal sinus wounds to be ready for surgical closure was 43.5 days in the control (standard dressing) group where the honey dressing group was 28.5 days. Patents in honey group expressed less pain, oedema and foul- smelling discharge when compared with standard dressing group.

Total bacterial count was 9 × 109 at the begging of the experiment then it reduced after the application of standard dressing traditional therapy to (9 × 105) and honey treatment group (9 × 102) after 21 days post-treatment. There was a significant ($p<0.05$) reduction in serum, TNFα (-52), IL6 - 46), and IL-17 (-60) relative to the corresponding pre-treatment values.
From the overmentioned results, it could conclude that Saudi Arabia Qatada (Acacia hamulosa) honey bioactivities had been good wound repair due to promoting the growth of tissues and reduction of total bacterial count and inflammation.

بسم الله الرحمن الرحيم

IN THE NAME OF GOD

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وَأَوْحَىٰ رَبُّكَ إِلَى ٱلنَّحْلِ أَنِ ٱتَّخِذِى مِنَ
ٱلْجِبَالِ بُيُوتًا وَمِنَ ٱلشَّجَرِ وَمِمَّا
يَعْرِشُونَ ﴿٦٨﴾ ثُمَّ كُلِى مِن كُلِّ ٱلثَّمَرَٰتِ
فَٱسْلُكِى سُبُلَ رَبِّكِ ذُلُلًا يَخْرُجُ مِنۢ
بُطُونِهَا شَرَابٌ مُّخْتَلِفٌ أَلْوَٰنُهُۥ فِيهِ
شِفَآءٌ لِّلنَّاسِ إِنَّ فِى ذَٰلِكَ لَءَايَةً لِّقَوْمٍ
يَتَفَكَّرُونَ ﴿٦٩﴾

Holy Quran

- Where the Holy Koran has a long Surah (chapter) with the name of bees (No. 16, Surah Al Nahl). The God Says “ God inspired bees to live in mountains, trees and that they construct. Ten eat from fruits and follow the ways of the God. Hence comes out of their bellies, syrup of different hues, in which there are cure for people. In this there is a proof of those who think deeply”.

- قال الله تعالى" بسم الله الرحمن الرحيم
وأوحى ربك إلى النحل أن أتخذى من
الجبال بيوتا ومن الشجر ومما
يعرشون ثم كلى من كل الثمرات
فأسلكى سبل ربك ذللا يخرج من
بطونها شراب مختلف ألوانه فيه
شفاء للناس إن فى ذلك لآية لقوم
يتفكرون " (النحل : **68** و **69**)

Acacia plant

- Acacia is a large-stemmed tree in regions with abundant water.
- Most acacias are bright yellow flowers with a pleasant aroma,
- some have white flowers.
- On some plants, the very small flowers gather to form whole balls.
- Others in Africa give a useful gum known as gum Arabic.

Introduction

- Acacia honey is extracted from the acacia tree,
- its long life.
- The tree is about 30 meters high,
- and the flowers appear on it with a mellow yellow color.

Acacia honey

- It is one of the best types of honey in the world.
- Acacia honey better than all the others honey due to
  - It is less allergenic
  - It has a very slow crystallization capacity.

Acacia honey

- It has many wonderful benefits,
  - it acts as an antimicrobial
  - disinfectant
  - it treats wounds
  - It has antioxidant properties.

Acacia honey qualities

- Acacia honey is light golden in color.
- Its aroma is delicious and attractive.
- It tastes very sweet.
- Its texture is very liquid.
- No sugar crystals appear in it.
- Its taste is loved by both children and adults.

Nutritional value of acacia honey

- It contains the sugars
  - glucose, sucrose and a high percentage of fructose
- It contains many vitamins as vitamin C.
- Minerals, such as magnesium
- In addition to its high content of powerful plant compounds such as flavonoids, which act as antioxidants

Beneficial effect of acacia honey

- Treats first degree burns.
- Removes skin cracks
- Relieves menstrual pain.
- Gives the skin freshness
- Removes skin pigmentation.
- Increases the body's immunity.
- Treats chronic colon diseases.
- Relieves acidity.

Beneficial effect of acacia honey

- It is used in the preparation of many sweets
- Sweetening drinks such as: tea, herbs, milk, and yogurt.
- Body General tonic
- Reduces gastrointestinal irritation.
- Muscle booster
- Laxative
- Painkiller.

Beneficial effect of acacia honey

- lowers blood pressure
- Maintaining energy levels
- sleep problems
- Suitable for diabetics
- Rich in minerals, most notably magnesium

Beneficial effect of acacia honey

- Rich in vitamins, especially vitamin C.
- wound healing
- Beneficial for the skin
- Treatment for respiratory problems
- Helps treat erectile dysfunction.
- It helps treat male infertility.

Beneficial effect of acacia honey

- improves sperm quality.
- antioxidants
- Improves brain function
- Antibacterial
- antifungal
- It helps heal wounds
- treats acne
- Liver detoxification
- stress treatment

Acacia honey has potential biological and health activities which include:

- antioxidant
- immuno-modulatory effect
- antiproliferative
- neurological properties
- reproductive
- antimicrobial
- wound healing
- anti-inflammatory

Pilonidal sinus (PNS)

- pilonidal sinus (PNS) is a small hole or tunnel in the skin
- It causing the formation of a cyst or abscess.
- it becomes infected,
- it may ooze pus and blood and have a foul odor
- The lesions may contain hair and skin debris

Pilonidal sinus (PNS)

- Three per 10,000 people per year had an incidence of affection.
- The occurrence in females less often in males
- while the young adults are commonly affected

Treatment of Pilonidal sinus (PNS)

- Treatment mainly performed by treating the area with an antiseptic, as an iodine-based solution,

- After making a small incision in the skin by using a sterile sharp needle or lancet to allow the pus fluid to drain out through the incision

Treatment of Pilonidal sinus (PNS)

- The novelty of this research done due to antibiotic drug resistance
- This is needing a natural product to apply such a case as pilonidal sinus as honey.
- Many researchers used honey for diabetic ulcers and surgery

Aim of work

- This study through more light on the effect of Qatada *(Acacia hamulosa*) from Saudi Arabia on
  - pilonidal sinus wound healing,
  - antibacterial activity, and
  - cytokines levels, primary outcome

- While the secondary outcomes were considered as
  - side effects of dressing methods
  - and healing time

- . side effects of dressing methods,
  - signs of local or systemic infection
  - deterioration of wound,
  - and satisfaction of patients.
- If the wound was healed, up to 60 days or earlier, all participants were monitored.
  - Complete epithelialization,
  - no discharge, and wound closure were considered to be wound healing.

- From all patients in both groups,
- blood samples (5 ml) were withdrawn from each patient to
- determine serum cytokines levels
  - TNFα,
  - IL6,
  - IL-17
- before and after treatment.

Material and Methods

Honey used

- Fresh Saudi Arabia monofloral Qatada (*Acacia hamulosa*) honey
- sample (5 kg) was obtained from, 2022 flowering season
- From Alnahal aljwal, Saudi Arabia.
- honey sample was kept At 2– 8°C the until tested in a sterile universal glass container.

- Collected honey analyzed to evaluate
  - physicochemical proprieties
  - total phenolic,
  - total flavonoid,
  - free radical scavenging activity
  - Antimicrobial activity

Physicochemical analysis

According to•

1. IHC Method 1. Determination of determination of moisture, refractometer method
2. Gulf Technical Regulation: Honey, GSO 147:2008, Edition 2

Flower source

- Microscope

Measure content

- **Measure the moisture content of bee honey**

by

- **Refractometer**

Measurement of the sugar content (fructose, glucose and sucrose) of honey

- High quality liquid chromatography with refractive index reagent RI
- HPLC-RID
- .

Measurement of the hydroxymethylfurfural (HMF) content of acacia honey

- High quality liquid chromatographic analysis with LED Array detector HPLC-DAD

Measuring the free acidity content of honey

(Free Acidity)

By calibration and using a device pH meter

at pH 8.2

Diastase enzyme

Spectrophotometer at a wave length of 620 ± 5 nm.

Electrical conductivity

- **Electrical conductivity measuring device .(Conductivity meter)**

Treatment protocol

- In this study randomized patients were conducted;
- standard dressing (normal saline used as a diluent of povidone-iodine solution 10%)
- Honey dressing (fresh Saudi Arabia Qatada).

- All patients resident with at least 2 months of surgical experience,
- received appropriate antibiotics
- the pilonidal sinus was debrided surgically.
- During the debridement and under aseptic conditions swaps were taken from the wounds for bacterial culture sensitivity.
- The optimum profile of blood glucose was kept.

- A trained nurse has carried out wound dressing started on the first post-observation day.
- Initial cleaning of the wound with normal saline was done.
- On the wound thin layer of honey then covered with sterile gauze
- and a bandage was applied in the honey dressing.
- While the wound was first cleaned with normal saline,
- it the then covered with povidone-soaked gauze in the control (standard dressing).

- All wounds blindly assessed every day by a surgeon with the material of dressing.
- Wound assessment ended either ready for surgical closure or needed further debridement.
- the swab was taken from the wound for culture and sensitivity testing

- when the assessing surgeon declared the wound was ready for closure.
- The Visual Analog Scale was performed for evaluation of wound healing activity.
- Complete healing of the wound was the primary outcome

- Secondary outcomes were considered as
  - side effects of dressing methods
  - and healing time,
- Side effects of dressing methods,
  - signs of local
  - or systemic infection deterioration of wound,
  - and satisfaction of patients.

- If the wound was healed, up to 60 days or earlier,
- all participants were monitored.
  - Complete epithelialization,
  - no discharge,
  - wound closure were considered to be wound healing.
- From all patients in both groups

Serum cytokine levels

- From each patient withdrawn 5ml of blood samples to separate sera samples were done.
- The sera samples were divided into aliquots
- Stored at -70 till used for assessment of the by ELISA kits (kits purchased from Bio-vision Co., China)
    - TNFα,
    - IL6,
    - IL-17
- before and after treatment

Determination of bacterial count (CFU)

- Under aseptic condition swabs from wounds were taken
- These swabs were incubated at 37°C for 24 in nutrient broth.
- Then cultured, in duplicates dilutions on neomycin blood agar using 100µl of the diluted specimen for each plate
- was incubated on 5% CO2 for 24-48 h at 37°C.
- The bacterial isolates were confirmed microscopically and biochemically
- The bacterial colonies were counted

Total Phenolic Content (TPC)

- Phenolic Content was evaluated by Folin-Ciocalteu reagent,
- based on the method described with some modification to determine total phenolic content (TPC).
- Mean TPC value of triplicate assays and expressed as milligram of gallic acid equivalent (GAE) in the gram of honey was reported

Total Flavonoid Content (TFC)

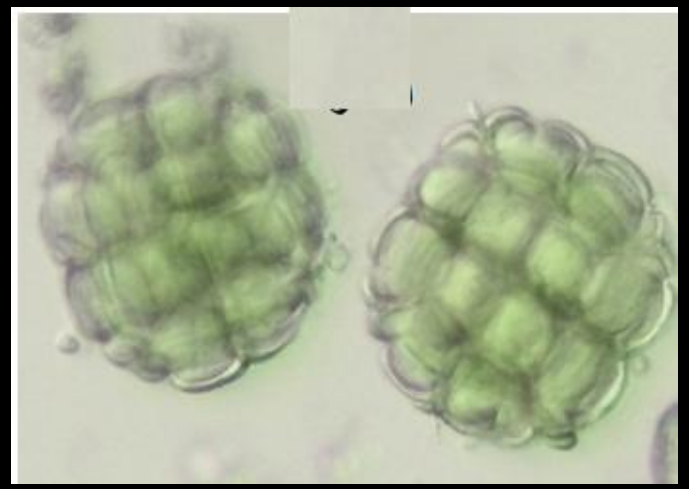
- The Mean TFC value of triplicate assays and expressed as milligram of rutin equivalent (RE) in the gram of honey was reported

Free Radical Scavenging Activity

- The free radical scavenging activity of Saudi Arabia Qatada(Acacia hamulosa) honey sample was detected DPPH assay (1,1-diphenyl-2-picrylhydrazyl-) was determine as described by

Results

Acacia pollen



The physicochemical properties of Saudi Arabia Qatada

- Honey used in dressing included
- Specific gravity of 1.435,
- pH of 3.56
- Glucose level 378mmol/l.
- The contents of total phenolic 32.15 mg GAE/100 g honey
- Total flavonoid 54.27 mg RE/100 g honey
- The TFC/TPC was 1.68 (Figure1).
- DPPH radical scavenging activity was 127.83 mg/ml

Effect of Saudi Arabia Qatada (*Acacia hamulosa*) honey on steps of healing of open method of pilonidal sinus

Wound before treatment

Wound after one day

Wound infiltrated with necrotic tissue

Effect of Saudi Arabia Qatada (*Acacia hamulosa*) honey on steps of healing of open method of pilonidal sinus

Wound with little necrotic tissue

Contraction of the wound

Effect of Saudi Arabia Qatada (*Acacia hamulosa*) honey on steps of healing of open method of pilonidal sinus

Wound rich by granulation tissue

Wound more contracted and more ranulation tissue

Effect of Saudi Arabia Qatada (*Acacia hamulosa*) honey on steps of healing of open method of pilonidal sinus

Wound covered by skin

Complete healing

Effect of Saudi Arabia Qatada (*Acacia hamulosa*) honey on steps of healing of open method of pilonidal sinus

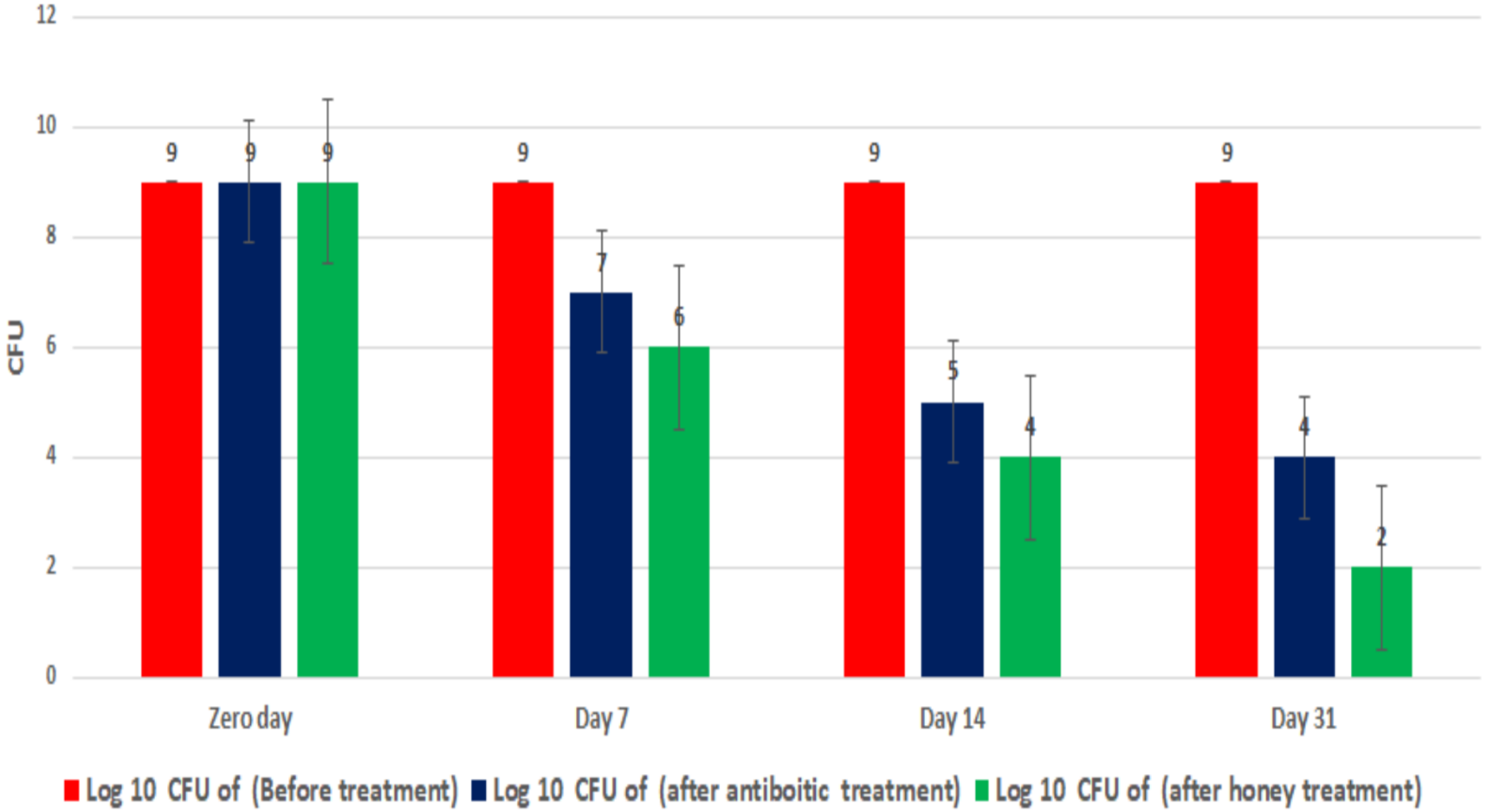


Figure 3. Log10 bacterial CFU and treatment with Saudi Arabia Qatada honey sample.

Effect of Saudi Arabia Qatada (*Acacia hamulosa*) honey on steps of healing of open method of pilonidal sinus

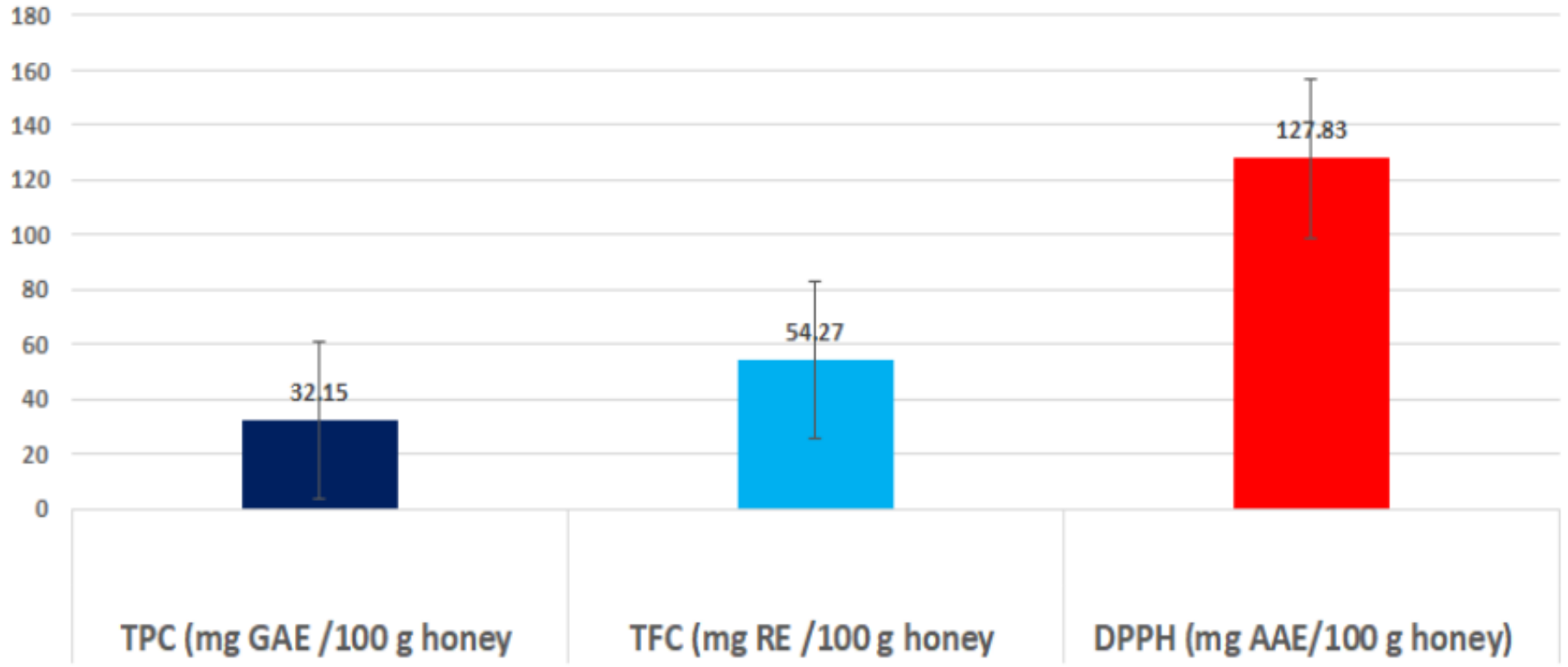


Figure 1. Total phenols, total flavonoids and DPPH in Saudi Arabia Qatada honey sample.

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