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Healing Potency of Different Honey on Wound and Skin Infections Collected from Three Selected Hospitals in Nigeria

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Abstract **Original Research Article**

The remarkable activity of honey varieties in inflammatory complications is increasingly favorable due to its ability to induce antibodies to produce cytokines in eliminating bacterial infection and other related skin irritations. We investigated this assertion earlier documented in different studies about the potency of honey varieties in four selected hospitals within Nigeria. We also observed in this current work that the potency of honey obtained from different sources varied due to its composition of acids and proteins. Statistical technique, such as ANOVA was used to compare the mean difference of potency of honey in four selected hospitals within Nigeria. The test showed that the mean difference of the potencies of honey in three selected hospitals are not significant (*P>0.05*). The result of our *in-vitro* studies showed that honey had powerful antibacterial activities against different species of bacteria. We thus, concluded and suggested that among the countless varieties of honeys produced worldwide, some might have superior antibacterial activities that were yet to be discovered.

Keywords: honey, Skin Infections, *in-vitro*, *Healing Potency*.

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INTRODUCTION

Honey has its property and also varies in its chemical constituent on different types of varieties [1]. Due to its remarkable effect and activity honey has a lot of potent compounds used in the elimination of skin inflammation and wound complications [2]. Glucose oxidase provide glucose to leucocytes which is essential for the respiratory burst that produce hydrogen peroxide which is suggested to give rise to its antibacterial activity and also possible elimination of microbes. Many, substance suspended in this content such as phenolic acids leads to its high acidic content and also increased pH [3]. Amino acids suspended in different honey varieties helps in regenerating tissues. Most people experience sharp pain after application of honey on affected lesions [4, 5], this is due to the acidic content of honey coming in contact with the nerve ending of the skin surface or lesions [6]. Research shows that different honey varieties have shown enormous potency in elimination of microbes such as bacteria and fungi with a distinction of proliferating cell tissue [7, 8], regenerating tissue and also modelling of skin exposed surfaces. Cytokines are produced during wound healing process and also modelling such as clotting of blood [9]. Honey as an ant- inflammatory agent helps in slowing destruction to the cell and induces rapid and spontaneous healing process [10, 11]. Proliferation of B-lymphocytes and T-lymphocytes in cell culture is stimulated by honey at concentrations [12] as low as 0.1%. In patients suffering from malignant wounds, improvement with respect to wound size and cleanliness was seen after treatment with honey-coated bandages [13]. Similarly, honey dressing quickened rates of healing in pressure wounds [14]. Honey has also been used to lessen foul odors emanating from wounds which cause a social barrier for patients and may lead to isolation [15]. Therefore, gamma irradiation was introduced to destroy occasionally seen spores in honey, while having no adverse impacts on honey's beneficial properties [16, 17]. In addition [18], honey dressing has economic advantages to the patient. Rapid healing reduces hospital stay and dressing material and surgical costs.

METHODS

Each honey sample is tested on skin inflammatory and wound complication. The affected lesions are taken care of by first aid treatment which helps in removing debris, dirt and pathogenic organisms from its surface [19]. Then, the honey used is applied first on a dressing in order to avoid irregular spill of the substance. After application [20], the dressing is transferred unto the affected area and left for about 3 to 4 days to enhance production of antibodies, regeneration and tissue modelling of the lesion or skin surface [21, 22]. The earlier dressing is removed and replaced by another dressing to keep the wound at normal temperature [23]. The techniques are both used for skin and wound complications. But [24], on the other hand, many skin complications are caused by *Staphylococcus aureus* which is found in the innermost part of the skin [25, 26]. When found, the bacteria is isolated from the skin and placed in a media growth medium such as BA (blood agar). The sample is incubated aerobically for 24 hours, using an incubator. After incubation, the sample forms colonies of bacterium grow [27]. In order to examine the sample for clarification Catalyst's test [28], coagulate test and gram staining test is used to ensure that the bacterium is clearly *S. aureus*.

RESULTS

A total of 3 samples were used in order to assess their potencies respectively. Statistical techniques such as ANOVA is used to compare the Mean difference of the potencies of honey on wound and skin infections in three selected hospitals in Nigeria.

Table-1: Shows the phenolic acidic levels (percentages) of different honey obtained from three selected Hospitals in Nigeria and Applied son wound surfaces; as shown below ;-

	North central (Abuja)	South west (Ibadan)	South east (Nsukka)
Hospitals	X_1	X_2	X_3
	96.7	93.4	92.3
	93.2	91.2	90.5
	99.7	92.7	94.6
	97.5	94.8	93.7
	98.8	97.6	95.7
TOTAL	485.9	469.7	466.8
Mean	97.2	93.9	93.4

The test above is carried out as 5% level of significance
F-ratio= 1.175, P- value or $F_{tabulated}$= 6.93
The test above shows that the $F_{tabulated}$ is greater than the F-ratio
($F_{tabualted}$ > F-ratio)

We conclude that the mean difference between the healing potencies of different honey on wound and infection among three selected hospitals is not significant.

Table-2: An overview chart of different chemical constituent found in honey among three selected hospitals

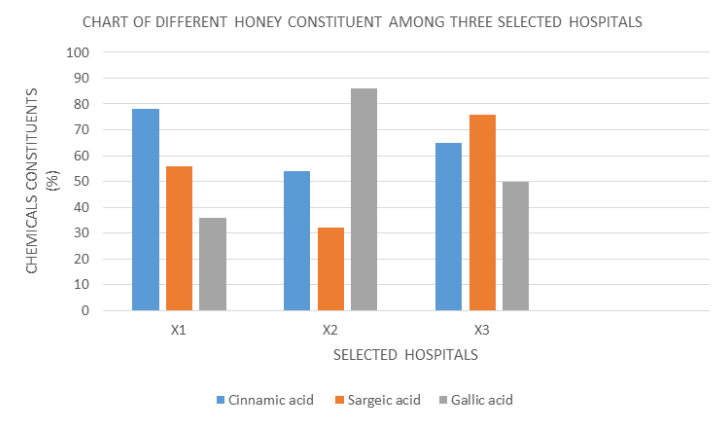

Table-3: Shows the average composition of honey (in g)

Components	Average composition(g)
Carbohydrate	82.4
Fructose	38.5
Glucose	31.0
Sucrose	1.0
Other sugars	11.70
Dietary fiber	0.20
Fat	0
Proteins	0.3
Water	17.1

DISCUSSIONS

In modern times, honey potency in medical field has been enormous in dealing with many wound and skin complication caused by microbes [29]. Due to its acidic nature, many microorganisms are not seen wandering in its mixture [30] but aids in elimination of certain microbes. Healing properties are in many areas even in traditional medicine for gastric ulcer and also in relieving pain. Manuka honey in recent times constitutes mostly of high acidic content, Jarrah honey is used in ant fungal inflammation of skin and so on [31, 32]. Similarly, skin and wound inflammation is caused sometimes by itching and also chemicals that are introduced on the skin surface. Many of skin dreaded diseases in some parts of the world may respond negatively to chemicals used on them for repair and possible healing process [33]. Honey constituent of about 200 substances, including amino acids, vitamins, minerals and enzymes [34, 35], but it primarily contains sugar and water. Sugar accounts for 95–99% of honey dry matter [36]. The principal carbohydrate constituents of honey are fructose (32.56 to 38.2%) and glucose (28.54 to 31.3 %) which speed the rate of healing due to its suspended acidic and chemical components [37]. Medically, honey has been proven to eliminate microbes such as bacteria and fungi from the skin and also organ that have exposed lesion damages [38].

CONCLUSIONS

In conclusion, honey potency has shown increased distinction among other selected healing agents in the field of medicine [39]. Production of hydrogen peroxide from glucose oxidase induces an enormous antibacterial properties found in honey which remove or sieve off bacteria. In field of medicine [40], honey has different varieties which show great potency on wound and skin inflammation. There are countless varieties of honeys being produced worldwide [41, 42], and some may have superior antibacterial activities. It can be concluded from in vitro studies that honey has powerful antibacterial activity against different species of bacteria [43]. Many bacteria including aerobes and anaerobes are very sensitive to honey due to its acidic components. The substances which have about a pH of 6 and thus destroys most microbes [44]. Recent studies have assess the useful and beneficial effect of honey on wound and skin inflammation with many methods that have been put in place to ensure proper use of honey varieties on wound and skin inflammation [45, 46]. Many possible finding and discoveries are still yet to unfold more of the healing potency of different honey and still require more of useful innovation and research inventions [47].

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