THE PATENTS ACT, 1970

COMPLETE

SPECIFICATION

SECTION 10

TITLE

"A BIOACTIVE NONWOVEN WOUND DRESSING LOADED WITH CHITOSAN- SODIUM ALGINATE - MANUKA HONEY"

APPLICANT

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The following specification particularly describes the invention and the manner in which it is to be performed.

FIELD OF THE INVENTION

The present invention involves the development of a bioactive, bilayer viscose-bamboo needle punched nonwoven wound dressing loaded with chitosan, sodium alginate and manuka honey, where needle punched nonwoven is used as a secondary layer and chitosan-sodium alginate-manuka honey was used as a wound contact layer, which may be used as burn wound dressing.

TECHNICAL BACKGROUND

Due to the advent of antibiotic resistant bacteria, wound care market is expanding year by year significantly. Hence, multidirectional research and development lead to the intensification of newer wound dressings with specific desirable properties according to the wound type. Now the emergence of biomaterials paved new directions in the research on wound care and wound dressing materials. Chitosan and sodium alginate, due to their biocompatibility, low cytotoxicity, excellent biodegradable properties and antimicrobial activity, are prominently used in wound care products. As well as being an effective antibacterial agent, manuka (*Leptospermum scoparium*) honey also accelerates healing of a wound with excellent wound healing properties. Even though, honey and chitosan have got a number of medicinal properties that make them appropriate as a wound dressing, there are a lot of practical considerations. Honey exerts many beneficial actions on the wound surface only if it remains present. The attempts to hold honey on the surface of the wound remain cloudy because honey becomes a very runny liquid, when it comes to body temperature.

The present innovation is related to the development of a new form of wound dressing, by holding honey on the wound surface in different form and also which has a combined effect of manuka (*Leptospermum scoparium*) honey, chitosan, sodium alginate and needle punched nonwoven.

Many prior attempts were made to utilize chitosan, sodium alginate and honey as a wound dressing separately (WO2012/136082, WO2002/102276 and CN102406958B). But none of the inventions propose the idea of combining all the above materials in specific proportion, thus by changing the form of honey and can be used as a bioactive, bilayer wound dressings for burn wounds as viscose/bamboo needle punched nonwoven for secondary layer.

SUMMARY OF INVENTION

The present invention is directed to formulate an effective wound dressing by combining the effect of chitosan, sodium alginate and manuka honey. It consists of two layers namely, the viscose/bamboo needle punched nonwoven as a secondary layer and chitosan-sodium alginate-manuka honey film as a wound contact layer.

Wound contact layer was developed in the form of a film using, chitosan, sodium alginate and manuka honey, by casting technique. Wound contact layer incorporated with secondary layer was then analyzed for the properties like mass per unit area, thickness, folding endurance, tensile strength, elongation, water vapor transmission rate, swelling ratio, antibacterial efficacy against *Staphylococcus aureus* and *Escherichia coli* and burn wound study.

The special feature of this invention is holding honey in film form using chitosan and sodium alginate biomaterials, thereby combining the effect of chitosan-sodium alginate and honey and effective healing of burn wound.

BRIEF EXPLANATION OF THE DRAWINGS

The above and other objects of the present invention will become readily apparent by reference to the following detailed description when considered in conjunction with the accompanying drawings wherein:

FIG. 1 is an explanation view showing the secondary layer (2) in which the wound contact layer (1) is attached with.

FIG.2 is pictorial view showing the appearance of bilayer wound dressing.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

As per the embodiment illustrated in Fig.1, wound contact layer (1) was prepared using casting technique. A 1.75% chitosan aqueous solution was prepared in distilled water that contained lactic acid 1% (w/v) as solvent and stirred for 2 hours. Sodium alginate 1.75% (w/v) solution was prepared using distilled water and stirring using a magnetic stirrer for 12 hours. Both chitosan and sodium alginate solution were mixed together using magnetic stirrer. Then drop wise addition of 5ml of 5% sodium bicarbonate was carried out. The solution was stirred using magnetic stirrer for 15hours after addition of 15% (w/v) glycerol and 13% (w/v) honey. The resultant solution was filtered and left to stand until the air bubbles get disappeared. Then required quantity of the solution was casted onto the petri dish. The petri dish was maintained in the oven at 40ºC for 24hours. The prepared films were rinsed with 500ml of 1M NaOH solution and then washed with distilled water. Then, these transparent, flexible films were stored at 25±1ºC and relative humidity 60-65% in an airtight glass container until further use.

Subsequently, viscose/bamboo needle punched nonwoven fabric was placed onto the mixture. The mixtures were then dried in an oven at 40º C for 24 hours. The prepared dressing was then analyzed for the properties like mass per unit area, thickness, folding endurance, tensile strength, elongation, water vapor transmission

rate, swelling ratio, antibacterial efficacy against *Staphylococcus aureus* and *Escherichia coli* and burn wound study.

The present invention provides a bilayer wound dressing, which accelerates the wound healing time. The dressing also prevents bacterial infection to a great extent.

I Claim

1. A wound dressing comprising of :
    a. A wound contact layer and
    b. A secondary layer
2. The wound contact layer claimed in claim 1 wherein consists of closer to at-least 1.75% (w/v) chitosan, closer to at-least 1.75% (w/v) sodium alginate and closer to at-least 13% (w/v) honey .
3. The primary layer claimed in claim 2, wherein is formed as a film by casting technique.
4. The secondary layer as claimed in claim 1 wherein made of cloaser to 70%viscose/30%bamboo needle punched nonwoven of closer to 170grams per square meter, supports the wound contact layer and acts as an absorbent layer.
5. The secondary layer as claimed in claim 4, which holds the dressing in place and supports the film.

Abstract

The present invention relates to development of a new form of wound dressing, which holds honey on the wound surface by developing a film comprising chitosan, sodium alginate and honey. The wound dressing was prepared in two layers, in which the wound contact layer (1) in the form of film in the above said combination and the secondary layer (2) in the form of viscose/bamboo needle punched nonwoven. a safety device comprising of the sensing unit. The combined effect of chitosan, sodium alginate, honey and nonwoven accelerates the healing of burn wounds. Thus the amplification of usage of manuka honey in film form as a wound contact layer along with nonwoven, is a forward step in the field of bioactive wound dressings.

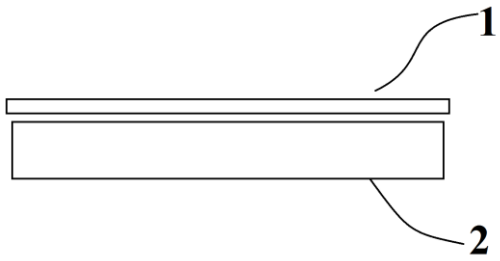

Figure 1

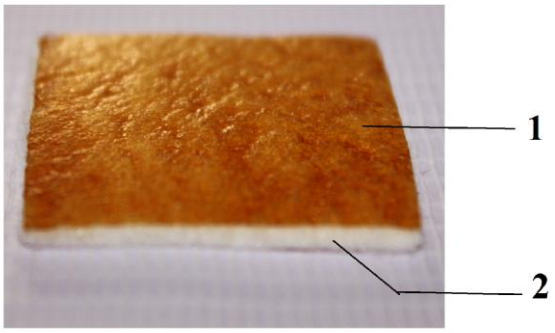

Figure 2

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NO.OF SHEETS: 1
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