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Effect of Honey in Eye Disease

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Abstract:- Honey is regarded as a therapeutical agent due to its antibacterial and inflammatory remedial or medicational characteristics; its successful use in the treatment of non-healing infected wounds has pushed its wider clinical employment for treating different ailments, including eye disorders. The honey is commonly used to treat bullous keratopathy, postoperative corneal edema, and dry eye illness. It can be used as an anti-inflammatory and antibacterial medication to treat eye problems.

The role and Impact of honey in eye disease are clarified in this review.

Keywords:- *Eye Disease, Antibacterial, Anti-Inflammatory.*

I. INTRODUCTION

The use of honey in ophthalmology is currently controversial, as we will examine in this paper.

Recently, the antimicrobial properties of honey have been rediscovered as a natural substance. A fascinating topical antibacterial agent has been developed that poses no risk of bacterial resistance growth.

Honey's efficacy as a therapy for recurring illnesses

Ophthalmology is one of honey's bright areas of application. The use of honey in the treatment of dry eye syndrome, bullous keratopathy, and darkening of the cornea following herpetic keratitis has some support. Additionally, research has demonstrated that honey clears up optical bacterial infections of the conjunctiva and lowers redness and swelling.

A sterile 25(w/ v) honey was used in our most recent investigation, and the outcome was used for the mutual treatment of a corneal ulcer brought by contact lenses.

Its high **osmolarity**, acidity (low pH), content of **hydrogen peroxide** (H2O2), and non-peroxide components, i.e., the presence of **phytochemical** components like **methylglyoxal**, all contribute to its **antibacterial function.**

A **flavonoid-rich** substitute for conventional anti-inflammatory medication is honey. Flavonoids' effects on the inflammatory process are discussed. The arachiodonic acid pathway enzymes, cytokines, and nitric oxide can all be inhibited by **flavonoids**. Pro-inflammatory gene expression regulators can be modulated by flavonoids.

In ophthalmology, manuka honey eye drops (OptimelTM eye Drops) are also employed to treat blepharitis and dry eyes.

II. IN OPHTHALMOLOGY, USING HONEY AS A PREVENTATIVE AND ANTIBACTERIAL AGENT

Certain invasive optical surgery techniques could result in a clinical setting where microorganisms have a chance to infect the eye. Topical fluoroquinolones have typically been used to prevent infections that could occur from organisms being sown into the interior area of the eye in order to lessen the risks associated with eye surgery. More incidences of postoperative endophthalmitis than any other kind of ocular surgery are specifically associated with cataract surgery. Coagulase-negative staphylococci account for a large majority of cases of postoperative endophthalmitis (48–70).

Despite having a strong antibacterial effect and easy access to the eye, fluoroquinolone resistance that has emerged quickly in orbital isolates may prevent the normal use of broad-spectrum antibiotics. A critical issue that affects the entire world is the development of antibiotic resistance in eye diseases due to prolonged antibiotic use. Our latest research has demonstrated that honeydew honey lowers the risk of endophthalmitis following eye surgery, such as cataract surgery and vitrectomy. In order to eradicate optical infections during the perioperative period, we hypothesised that honey had antibacterial properties comparable to those of ofloxacin,

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a fluoroquinolone of a different generation. Gram-positive bacteria, such as coagulase-negative Staphylococcus, as well as gram-negative bacteria associated with conjunctivitis are successfully inhibited by honey at 25(w/v) attention.In cases designated for eye surgery, there was no difference in the precautionary efficacy of the topical application of either 0.3 ofloxacin or 25 honey. Some eye disorders, such as dry eye syndrome, call for the administration of immunosuppressive medications such Cyclosporine A and steroids. In cases of dry eye, attention should be paid to optical infections because the administration of these Agents has the potential to vitiate the delicate system of the optical face. It has been established that cases with dry eyes are more likely to have conjunctival bacteria that are fluoroquinolone-resistant. Coagulase-negative Staphylococcus is the most dominant aerobic bacterium that is protected from cases of dry eye. As we mentioned in Away, optical isolates of Coagulase-negative Staphylococcus can be inhibited by honeydew honey.

Additionally, Albietz and Lenton demonstrated that, after 1 and 3 months of treatment, honey dramatically decreased the overall number of colony-forming units for the conjunctiva and eyelids of dry eye cases. Since resistant optical diseases can negatively impact eye health, honey can provide excellent defence against them. In order to demonstrate the clinical efficacy and safety of honey and its usage in ophthalmology, we support the conduct of more prospective double-blindfolded clinical investigations. It's interesting that no honey-resistant microbe strains have yet been discovered; this might be because honey's antimicrobial properties are multifaceted. Similarly, in vitro research has shown that honey can lessen bacteria pathogenicity and reverse antibiotic resistance.

Demonstrating that honey and antibiotics may have new therapeutic benefits. Oxacillin, tetracycline, imipenem, and mupirocin have been shown to have synergistic effects with therapeutically approved Manuka honey against the growth of a methicillin-resistant Staphylococcus aureus (MRSA) strain in in vitro tests. Through honey-induced downregulation of the mecR1 gene product, a transducer linked to MRSA antibiotic resistance, is a potential treatment method for oxacillin. Although substantial mutualism was also found against non-MRSA strains, which don't carry the mecA gene, other investigations indicate that the reported downregulation by Manuka honey is unlikely to be the only mechanism responsible for the synergistic action of – lactams.

III. SYMPTOMS OF DRY EYES AND HONEY

Dry eye is a multifactorial condition characterised by symptoms of pain, blurred vision, and unstable tear film, as well as implicit damage to the optical surface, increased gash film osmolarity, and inflammation. 5 to 30 percent of the population are affected by dry eye, a condition that is incredibly widespread. In light of the pathogenesis of the complaint, it's critical to stress that while dry Eye can be treated, it cannot be completely cured. Artificial gashes are the mainstay of dry eye complaint treatment; while they reduce symptoms and objective results, there is no evidence to support their ability to treat the underlying inflammation that causes dry eye complaint. Preservatives of all kinds, such as Benzalkonium chloride, reduce subsequent bacterial, mycotic, and amoebic eye infections brought on by contaminated outcomes by the use of artificial gashes. Long-term use of medications containing preservatives may result in inflammation, antipathy reaction, decreased Goblet cell viscosity, or displacement of the epithelial cell-to-cell contacts. Commercially marketed eye drops include Benzalkonium chloride in concentrations ranging from 0.004 to 0.025. Negative effects on the gash film may result from animal exploration at attention levels as low as 0.001 and from cell research at attention levels as low as 0.0001. Similarly, benzalkonium chloride, when applied at a high concentration or for a long time, may build up in the optical towel and deposit harmful substances on optical cells.

These results imply that either synthetic gashes without preservatives For addressing dry eye complaints, another dry eye solution could be suggested. In situations of glaucoma, drugs free of betalkonium chloride may lessen the symptoms of the optical face complaint. Original and/or methodical anti-inflammatory treatments can be employed in cases of advanced and severe dry eye caused by the seditious pathomechanism. Although topical corticosteroids are potent anti-inflammatory drugs, prolonged usage is not advised due to their severe impact profiles. Because honey has the required curative, antibacterial, and anti-inflammatory properties, it might be a good candidate for treating dry eye syndrome. Unfortunately, there is just one study on the use of honey eye drops to treat dry eye patterns. Jankauskiene and others 20 polyfloral Honey eye drops should be set up to have a favourable impact on the condition of the cornea and conjunctiva in situations of dry eye pattern. The treatment was initiated early in the course of this disease, when visual acuity was still normal and the corneal epithelium had not yet been damaged, and thus led to the desired results. Except for a localised smarting feeling mentioned in certain cases, no adverse reactions were proven. The acidity of honey may be to blame for this sensation. Although the precise medium and/or patch(s) responsible for this effect are only partially illustrated, honey also has anti-inflammatory properties. In an endotoxin- stimulated monocytic cell line, natural honey has been found to decrease the production of reactive oxygen species (ROS).

It provides a natural source of antioxidants, which are useful in lowering the threat posed by several seditious processes. Honey showed anti-inflammatory properties in beast models. In an infectious and seditious corneal disease. Applying honey topically to damaged corneas quickly increased healing Vascular endothelial growth factor (VEGF), transubstantiating growth factor (TGF), interleukin-12 (IL-12), and tumour necrosis factor (TNF) levels were reduced and

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epithelial repair was observed in injured corneas. Additionally, the use of honey decreased the levels of inflammatory cytokines (IL- 12), seditious cytokines (VEGF and TGF-), and chemokines (CC chemokine receptor 5 (CCR- 5)) in endotoxin- induced keratitis.

Vernal keratoconjunctivitis (VKC), a seasonal intermittent condition regarded as a seditious or antipathetic ocular complaint, has been demonstrated to respond favourably to honey in terms of reducing inflammation. A total of 60 instances of VKC were enrolled in this double-blind clinical research and split into two remedial groups. For a period of six months, the cases in the two groups were given either honey eye drops (60 in artificial gashes) or placebo (other than cromolyn and fluorometholone 1 eye drops), to be applied topically to each eye four times each day. Following the application of the honey drops, there was a substantial increase in eye pressure and a decrease in greenness and limbal papillae in the honey group compared to the placebo control group.The findings demonstrated that the use of honey drops can improve VKC and reduce limbal papillae and greenishness. One option for lowering steroid consumption is honey.

IV. AGE-RELATED CONDITIONS AND HONEY

In developed nations, cataracts and age-related macular degeneration (AMD) are the two main factors contributing to vision loss and blindness. At least 50 million people have vision problems due to cataracts, with 17 million having severe impairments. Aldose reductase inhibitors have received much research as potential cataract medications. According to reports, some flavonoids have anti-inflammatory effects in vitro because aldose reductase is inhibited. Natural honeys frequently contain flavonoids, especially dark honeys, however the amount of these biologically active molecules varies depending on the type of honey. The usage of honey eye drops for cataract treatment is a customary practise among the American tropics nations.

In a recent study, Vit and Jacob investigated the anticataract activity of 20 flavonoids using a bibulous cataract model to determine whether there was a connection between the flavonoids and the purported anticataract properties of honey eye drops. When ovine lenses were treated in 45 hypotonic HEPES (4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid) buffer for 24 hours, 4 derivatives of luteolin effectively inhibited cataract formation. This finding can be used as the main support for the apparent anticataract parcels. On the other hand, there is yet no direct evidence supporting honey's anticatalytic properties.

A clinical Investigation from 1990 found that injecting a Flower honey solution into the conjunctiva sac of individuals with developing senile cataracts helped to preserve at least some of their visual acuity.

Versus 35.5 in the control groups, in 95.5 of the cases. At attention levels of 25, 33, and 50, topical honey eye drops were administered over the period of 1, 2, and 3 months, respectively. A total of 108 cases were tracked over two to fifteen years.

AMD currently affects 11.5 percent of people in the USA. Although the precise pathogenesis of AMD is unknown, oxidative stress is acknowledged to be one of the major factors. Therefore, it is hypothesised that antioxidant treatment, especially in the early stages of the complaint, may help to limit complaint progression.

In cases of AMD, oral supplementation of a mixture of vitamin C, vitamin E, -carotene, zinc oxide, and cupric oxide was shown to reduce the risk of getting advanced AMD by 25 Relative, according to the Age-Related Eye Disease Study, a multi-center, Randomized, controlled clinical trial. On the other hand, anti-VEGF antibodies are a promising novel AMD treatment. However, this medication is very expensive, and some patients may require numerous injections. The antioxidant components of honey sparked an increase in interest. Due to its antioxidant properties, AMD with advanced stages may be less likely to develop. Only natural honeys with high phenolic content (dark honeys) and low levels of radical scavenging activity are more likely to be beneficial as an anti-AMD treatment.Sadly, there hasn't been any research done yet on honey's potential anti-AMD benefits.

V. BULLOUS KERATOPATHY AND HONEY

The cornea is permanently blown in a disorder known as bullous keratopathy. One to two cataract procedures have this issue as a side effect. The most effective treatment in the past for the typical stage of the complaint was piercing keratoplasty. Due to its relatively mild Bibulous action, the use of hypertonic saline (5 NaCl) as a medical treatment for bullous keratopathy has been of questionable usefulness. However, visual acuity is markedly improved when a hypertonic saline solution is applied in the early stages of the complaint (when just the stromal part of the corneal edoema is present). Based on these findings, it is scandalous that honey is a vital component of bullous keratopathy treatment.

Honey has a zilches motic pressure that exceeds milliosmols per kilogramme. In a clinical investigation, 16 cases of epithelial corneal edoema that weren't candidates for surgery were treated topically with natural honey, according to Mansour. Four to five times per day, a drop of honey was put on the cornea. They predetermined that the epithelial edoema would immediately resolve completely from all corneas. In two eyes, the corneal bulla receded. Although surcharging was experienced in all patients, it became less uncomfortable after several operations. Topical honey reduced bullous keratopathy discomfort, improved visual acuity, and enabled anterior and posterior member visibility in eyes with epithelial corneal

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edoema. Additionally, 24 patients with bullous keratopathy had their corneas treated with honey.

In every case, the application of honey to the cornea improved visual acuity and prolonged corneal clearing for almost an hour. Recently, Albietz and Lenton showed the benefits of standardised Manuka honey eye drops on post-operative corneal edoema that persisted for more than a month following surgery. After the initial Manuka honey eye drop instillation, a transient decrease in corneal epithelial edoema was seen in 18 cases (30 eyes). This reduction was accompanied by improvements in corneal clarity, intraocular structure visualisation, and visual perception. It was also associated with the resolution of epithelial microcysts and the collapse of epithelial bullae. A sizable controlled, prospective, randomised clinical trial is required to support these encouraging initial clinical findings.

VI. POLYPHENOLICS IN HONEY AND EYE HEALTH

Numerous phytochemicals, such as polyphenols, a group of natural compounds with a variety of pharmacological functions, are found in honey. Polyphenols, which are found in honey as residual secondary metabolites and include flavonoids and phenolic acids, have been examined for their potential use as implicit geographical and botanical labels as well as to explain the antibacterial properties of honey. Recent research reveals that flavonoids may play a role in two important components of the various mechanisms that affect eye health and vision function. In addition to their well-known role as antioxidants, flavonoids may also play this role. This is crucial for the eye because macular degeneration and other vision disorders like oxidative stress-related damage are linked to oxidative stress.

The most common methods of administering optical medications are topical, periocular, intravitreal, systemic, and oral. Through corneal or noncorneal pathways, a drug applied topically can enter the posterior chamber apkins, which functions similarly to the retina. Hesperidin/hesperetin-like flavonoids have a high bioavailability due to the fact that they were set up in high-focus conditions in all optical apkins, making topical application of these compounds more promising. A relatively recent animal study found that topical application of 0.5% quercetin eye drops can help to improve the symptoms of dry eye, not only by reducing corneal irregularity but also by increasing gash volume and restoring cell viscosity. Additionally, quercetin may be used in eye drops to treat certain conditions.

Anti-inflammatory products on the lacrimal functional unit and dry eye problem. Additionally, certain polyphenols prevent the conformation of bacterial biofilms. According to Blanco et al., green tea polyphenols interfere with the polysaccharides that make up the glycocalyx, severing their connections and preventing optical staphylococcal isolates from forming biofilms. Naringenin may be the best emulsion for the creation of antipathogenic drugs because it has recently been demonstrated to exert notable negative effort against the biofilm structure of Escherichia coli and Vibrio harveyi. One of the most prevalent flavonoids in some honeys from Central Europe has been identified as naringenin. Naringenin is present in abundance in honeydew honey, which has already undergone clinical testing as an antibacterial and anti-inflammatory drug in ophthalmology.

VII. CORNEAL WOUND HEALING WITH HONEY

The corneal epithelium acts as the body's first line of defence against environmental hazards that could cause wounds or infections. The corneal epithelial integrity is compromised in superficial corneal injuries similar to corneal bruises, which are usually brought on by mechanical injuries (similar to trauma or chemical burn). Operation of a topical antibiotic or antifungal eye drops to aid subsequent infection is the conventional treatment for corneal bruise. As was already mentioned, eye drops contain preservatives such benzalkonium chloride, which can cause the corneal epithelium to dislocate and obstruct crack repair. In the in vitro corneal bruising crack mending model, honey has been found to speed up ocular epithelial cells' crack check.

And to boost corneal keratocyte proliferation while maintaining their shape, gene, and protein expression, and normal cell cycle. As a result, honey makes a good antibacterial agent with packets for patching up cracks in the treatment of corneal bruising. However, little is known about the mechanisms and composites behind honey-intermediated corneal crack repair.

VIII. CONCLUSIONS

Eye problems are treated using either medicinal or surgical methods. An essential strategy might be applied in complex circumstances where the standard treatment for eye diseases has failed. Honey is a promising natural remedy with significant antibacterial and anti-inflammatory effects. Bullous keratopathy can be treated with it and the symptoms of dry eye complaint may be lessened. Yet there is little scientific evidence to back up these beneficial honey packages. We support randomised controlled trials to examine the effectiveness and security of honey in the treatment of disorders affecting the colour of the eyes.

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