

# Honey

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## Valorisation

### Relevance

Most physicians have to deal with the prevention and treatment of infections and inflammations. The annual incidence of infection of the outer ear canal (external otitis) is about 1% of the population of the general practitioner<sup>1</sup> and up to 10% at the otolaryngologist<sup>2</sup>. Chronic ear infection, due to an underlying condition, as eczema or after ear operations, have a high socioeconomic impact and cause significant health care costs<sup>3</sup>. In this patient group, the chronic or recurrent treatment with antibiotics causes an additional problem, which is bacterial resistance. The increase of bacterial resistance, together with a decrease in the development of new antibiotic agents, illustrated the need for new antiseptic strategies, as mentioned earlier.

This thesis focuses on the use of the antiseptic agent honey, and its clinical relevance for patients with chronic ear infections. The refinement of medical honey for clinical use does not only offer a new treatment for patients with chronic ear infections, but additionally contributes to the important development of new alternatives in the fight against bacterial resistance.

The results of this thesis offer an overview of the clinical applicability of medical honey in otorhinolaryngology, provide insights in properties and working mechanisms of different sorts of honey, and prove safety and effectiveness of honey treatment in patients with chronic ear infections.

### Target population

The results of this thesis are relevant for health care professionals, patients, as well as companies interested in drug research and development. Both clinical, and the histopathology study show for the first time, that honey can be used as a treatment in chronic ear infections. This is very important for care professionals and patients. For patients with chronic ear eczema or a chronically infected open mastoid cavity, this treatment offers a new safe strategy, which can be used after the failure of other therapies or as an additional treatment without disadvantages known from 'conventional' treatments. Health care professionals are offered a whole new antiseptic strategy. Medical honey and honey droplets are available to buy and ready to use.

In addition, the results of this thesis can be important for companies (profit and non-profit), who are involved in the development and refinement of antiseptic agents. We provide additional information on possible working mechanisms of

different sorts of honey, but also present an overview of a broad applicability (in our review) and show the additional option of safe use in ear infection in the form of a gel and droplets.

### **Products**

In this thesis we focused on three different products. Medical honey in its source form, honey gel, and honey droplets. To understand underlying working mechanisms, it was chosen to investigate the antiseptic effects and antioxidative potential of peroxide (Revamil) and non-peroxide (Manuka) medical source honeys. For clinical use honey was also tested in droplet (Otomel) and gel (Nasumel) form.

### **Innovation, realisation and costs**

In the systematic review, which is provided in this thesis, it was shown that there is no scientific literature about the use of medical honey as a topical treatment in ear infection. The clinical studies, which are presented in this thesis, are the first showing usefulness and safety of honey in these conditions. All products are already available, ready to use, with a simple applicability. We proved that honey droplets and honey gel are safe, with only minor adverse events. The costs of both, honey eardrops and honey gel, are low and comparable to common eardrops used for ear infections.