

# Antibacterial activity of a herbal preparation to treat sore throats

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## Introduction

Sore throats are one of the most commonly seen conditions in general practices. The disease encompasses any upper respiratory tract infection most often caused by viruses or bacteria in which pain in the throat is the predominant symptom,[1] mostly accompanied by inflammation and swelling of the pharyngeal region. Only about 10–20% of patients with a sore throat are streptococcus positive in the throat. Most patients have viral infections and benefit from symptomatic treatment alone and do not need an antibiotic treatment [2]. An ideal treatment for acute sore throats should have antiviral, antibacterial, antiinflammatory and immune modulatory properties. Herbal medicines with as multicomponent mixtures can satisfy these needs. In these experiments we investigated the antibacterial activity against bacteria which play an important role in infections of the respiratory tract of a combination of an echinacea and sage.

## Material & Methods

### Tested bacteria strains

Gram positive	Gram negative
<i>Staphylococcus aureus</i> ATCC 6538	<i>Klebsiella pneumoniae</i> ATCC 10031
<i>Streptococcus pyogenes</i> ATCC 12344	<i>Moraxella catarrhalis</i> clin. isolate
<i>Streptococcus pneumoniae</i> ATCC 33400	<i>Haemophilus influenzae</i> ATCC33391

### Test preparations

Test preparations were an ethanolic fresh plant Echinacea purpurea (95% herba/5% radix) concentrate (DEV=1:12; batch N°011980), a fresh plant salvia tincture (DEV=1:17; batch N° 011870), peppermint oil (batch N°2003.03.0225) and the combination of all three preparations which corresponds to a combination product for treatment of acute sore throats. The combination consisted of (m/m) 34 % salvia tincture; 0.5 % peppermint oil; 6.84 % echinacea concentrate; 1.5 % Cremophor RH 40; 57.16 % water.

### Methods

The determination of the minimal inhibitory concentration and the minimal bactericidal concentration were carried out with the micro-dilution method.

The Kill kinetics can be used to make statements about the time course and the quality of the activity of different concentrations of an antibacterial agent. The test organism is incubated with the active agent and/or the preparation for a defined time period. Characteristic kill curves are obtained by plotting the CFU/ml versus time. A bactericidal effect is considered to have been achieved when 99.9 % of the bacteria in the test preparation have been killed by the antibacterial agent, which corresponds to a reduction by 3 log steps of the microbial density. As reference standard was used here 0.125% Chlorhexamed which contains 10mg chlorhexidine per 10ml solution.

## Results

Figure 1: Minimal bactericidal concentration of echinacea and salvia of their combination

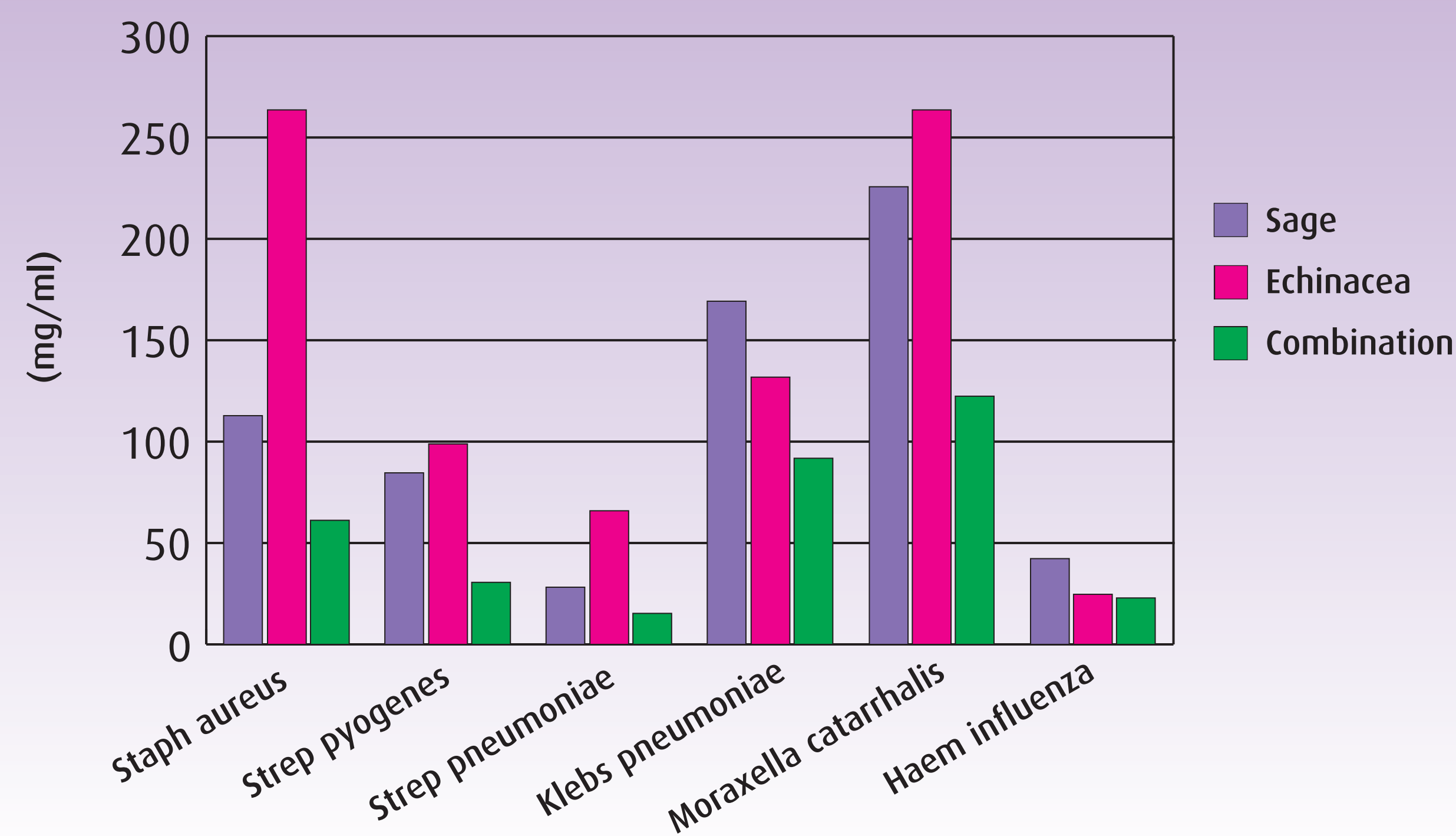


Figure 2: Minimal inhibitory concentration of echinacea and salvia and its combination

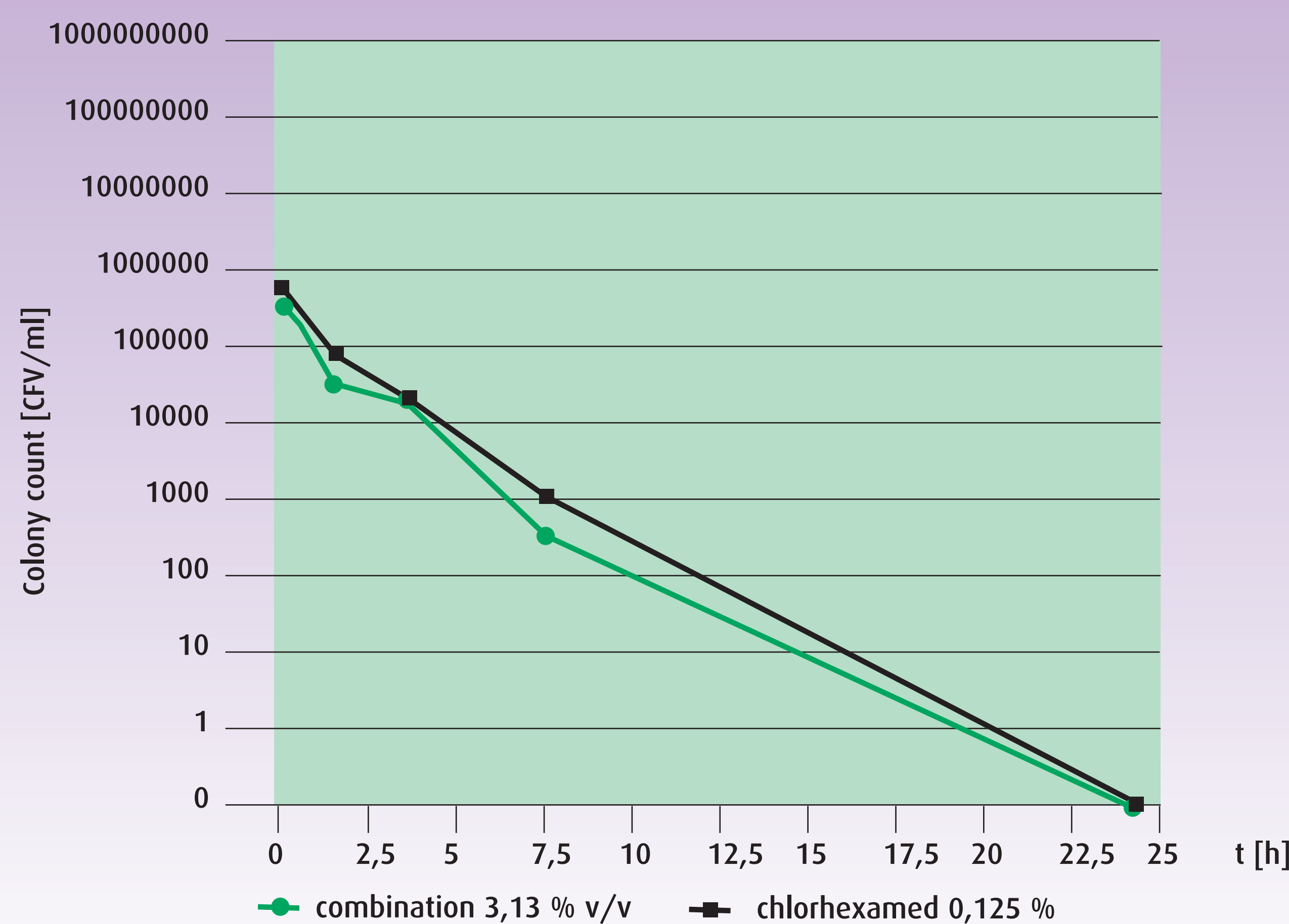
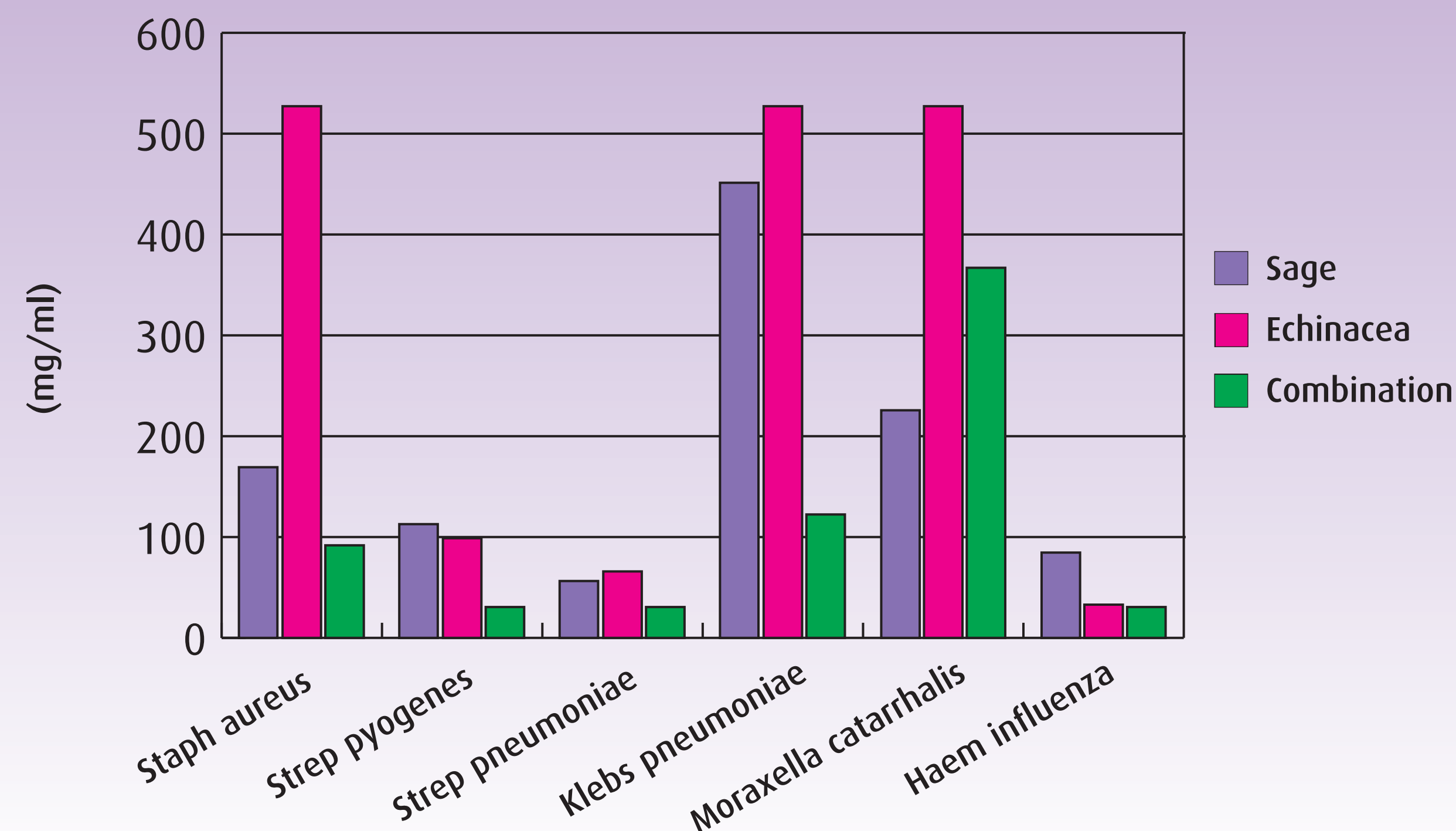


Figure 3: Time kill curves of S.pneumoniae for the combination and 0.125% Chlorhexamed as control. The log 3 reduction time for the combination is 12.5 hours, for chlorhexamed 13 hours.

## Conclusions

- The combination of an Echinacea purpurea concentrate with a salvia tincture showed against most of the assessed microorganisms which play a pivotal role of infections of the respiratory tract synergistic effect compared to the single constituents.
- The kill kinetics with S. pneumoniae showed similar results like the reference standard chlorhexidine.
- These results prove that the combination of echinacea and salvia has an antibacterial activity and that it is therefore recommendable for the treatment of sore throats where particularly the prophylaxis of secondary infections is pivotal.

## Literature

- van Driel ML, De Sutter A, Deveugele M, Peersman W, Butler CC, De Meyere M, De Maesseneer J, Christiaens T: Are sore throat patients who hope for antibiotics actually asking for pain relief? Ann Fam Med. 2006 Nov-Dec; 4(6):494-9.
- Vincent MT, Celestin N, Hussain AN: Pharyngitis. Am Fam Physician. 2004 Mar 15; 69(6):1465-70. Review.



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