

# Antibacterial and antifungal effect of iodoform containing gauze

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## Introduction

*Staphylococcus aureus* is one of the most important pathogens of nosocomial infections and thus complicating the patient's treatment. Facultative pathogenic enterobacteria, like *Klebsiella pneumoniae*, are normally innocuous, but can lead to infection of wounds. Fungi such as *Candida albicans* are also facultative pathogens but the colonization may result in mycosis. The spread of these pathogens can only be inhibited through consistent hygiene measures and preventive disinfectant actions. The antimicrobial activity of iodoform (active agent: iodine) has been discovered early for the use in medicine. It can rapidly penetrate the cell walls of microorganisms. The mechanism of action by which iodine kills, is the damaging of microbial proteins through oxidation of amino acids and the reaction with the carbon-carbon double bond (C=C) of unsaturated fatty acids [1]. Thus, leading to disorders in protein folding and changes in membrane properties. We have tested three different iodoform containing gauzes according to the JIS L 1902 for antibacterial and antifungal activity.

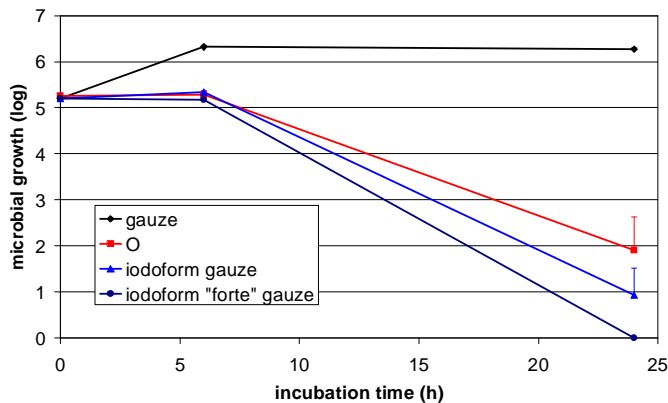


Fig. 1: Growth of *Staphylococcus aureus* under the influence of iodoform containing gauzes (mean ± SE).

## Material & Methods

*Staphylococcus aureus* (ATCC 6538), *Klebsiella pneumoniae* (ATCC 4352), and *Candida albicans* (ATCC 10231) were chosen to monitor the antimicrobial effect. According to the JIS L 1902 norm samples of 400 mg of the iodoform containing gauzes were used. Gauze without iodoform was used as reference material. The samples were incubated with the experimental pathogens up to 24h at 37°C under aerobic conditions.

### rating:

**no antimicrobial activity** = < 0.5 log microbial growth reduction  
**slight antimicrobial activity** = 0.5 - 1 log microbial growth reduction  
**significant antimicrobial activity** = >1 - ≤3 log microbial growth reduction  
**strong antimicrobial activity** = >3 log microbial growth reduction  
 (percent inhibition of microbial growth compared to gauze control)

### Lohmann & Rauscher products

Gauze: Gazin®  
 O: Opraclean®  
 Iodoform gauze: Lohmann & Rauscher Iodoform  
 Iodoform „forte“ gauze: Lohmann & Rauscher Iodoform "forte"

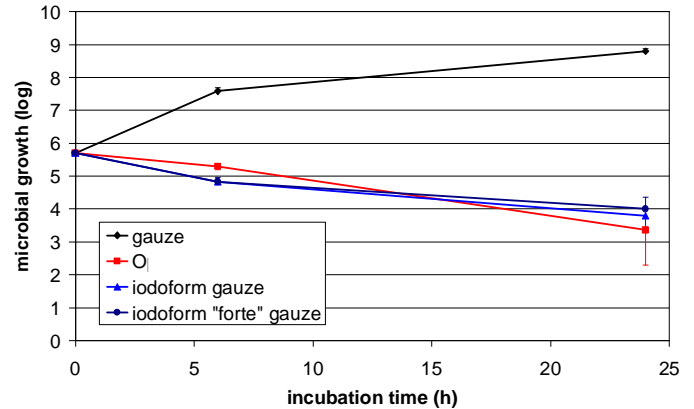


Fig. 2: Effect of iodoform containing gauzes on the growth of *Klebsiella pneumoniae* (mean ± SE)

## Results

All three iodoform containing gauzes showed a comparable strong inhibitory effect on *Staphylococcus aureus* (Fig. 1) and *Klebsiella pneumoniae* (Fig. 2). They were also able to inhibit the growth of *Candida albicans* significantly (Fig.3).

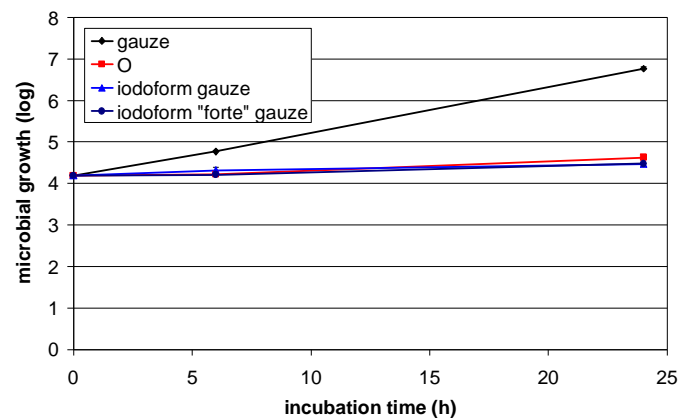


Fig. 3: *Candida albicans* growth under treatment with iodoform containing gauzes (mean ± SE).

## Conclusions

Iodoform containing gauzes exhibit a distinct antibacterial and antifungal activity. Their use for tamponade and drainage should help to prevent wound infections and treatment complications such as inflammation and syring formation.

Table 1: Results of the tests for antibacterial and antifungal activity of iodoform containing gauzes according to the JIS L 1902

	<i>Staphylococcus aureus</i>	<i>Klebsiella pneumoniae</i>	<i>Candida albicans</i>
O	strong (69,7%)	strong (61,9%)	significant (31,6%)
iodoform gauze	strong (85,2%)	strong (56,9%)	significant (33,9%)
iodoform „forte“ gauze	strong (100%)	strong (54,6%)	significant (34,4%)

## References

1. Kitagawa E. et al. Effects of iodine on global gene expression in *Saccharomyces cerevisiae*. *Biosci. Biotechnol. Biochem.* 2005; 69(12):2285-93.