

Cetylpyridinium Chloride(CPC), NaF Ursodeoxycholic acid(UDCA) in Vitro

1 . 2 . 2 . 3 . 3 . 3

1 ,
2
³LG

I. 1)
가 2)
가 가

가 , collagen 3) ,
45 , 4)
82%가 mediator

가 cytokine 가
가 3).

500 가 1), 4),

10 - 20

Actinobacillus actinomycetem - 5,6).
comitans, Porphyromonas gingivalis,
Prevotella intermedia, Bacteroides forsythus,
Peptostreptococcus micros, Fusobacterium
sp. spirochete Treponema sp.

가 가
가 2).

bisbiguanide(chlorhexidine), phenol (thymol, eucalyptol, triclosan), quaternary ammonium compound (cetylpyridinium chloride), (sodium lauryl sulfate), (mutanase, glucanase, amyloglucosidase, glucose oxidase), methyl salicylate, sodium benzoate, metal ions (zinc, copper, stannous), (sanguinarine) 가 7).
 Quaternary ammonium compound cetylpyridinium chloride(CPC)

가 Actinobacillus actinomycesemcomitans ATCC 33384, Bacteroides forsythus ATCC 43037, Fusobacterium nucleatum subsp. vincentii ATCC 49256, Prevotella intermedia ATCC 25611, Porphyromonas gingivalis ATCC 33272 Treponema denticola ATCC 33521 .
 5 ml

CPC 가 .
 , 가
 가 8,9). UDCA(ursodeoxycholic acid) , , 10-13).
 가 .
 CPC 가 가
 CPC UDCA 가 100
 Listerine .

. A. actinomycesemcomitans BHI (Brain heart infusion; Difco Laboratories, Detroit, MI, USA) 1:150 2
 . B. forsythus 1:15
 N - acetyl muramic acid (5µg/ml), hemin (5µg/ml), menadione(0.5µg/ml) PY (Peptone - yeast) 7 ,
 F. nucleatum, P. intermedia, P. gingivalis hemin(5µg/ml) menadion(0.5µg/ml) BHI 1:20 2 ,
 T. denticola OMIZ - Pat 14)
 1:20 3
 (N2 80%, H2 10%, CO2 10%)
 .
 2.

II.

1. CPC, NaF UDCA 가 (LG)
 phenol methyl salicylate

Table 1. Major ingredients of mouthrinses

Mouthrinse products	major ingredients
Denta Gargle	cetylpyridinium chloride 0.05%, NaF 0.02%, UDCA 0.005%
Listerine	thymol 0.064%, menthol 0.042%, eucalyptol 0.092%, methyl salicylate 0.060%,

Listerine (Warner - Lambert Co.,
Morris Plains, NJ, USA)

1.0

Table 1

5 - 13

PBS(, pH 7.4)
1:5, 1:10, 1:20, 1:40, 1:80, 1:160, 1:320

MID(maximum

15ml 5ml inhibitory dilution)

100µl

1

III.

100µl

5ml

6

PBS

가

Listerine

가

B. forsythus

1ml

100µl

가

Table

900µl

5ml

2

가 600 nm 1.0

P.

(P. intermedia, P. gingivalis)

intermedia

P. gingivalis

Table 2. Age of bacterial culture inoculum and incubation time after treatment with mouthrinses

Bacteria	Age of culture inoculum(days)	Optical density at 600 nm	Incubation time after treatment(days)
A. actinomycetemcomitans	2	1.0	5
B. forsythus	7	0.1	10
F. nucleatum	2	0.8	5
P. intermedia	2	1.8*	13
P. gingivalis	2	1.3*	10
T. denticola	4	0.1	10

*Bacteria were diluted to 1.0 for treatment with mouthrinses

Table 3. Maximum inhibitory dilution(MID) of mouthrinses against 6 major periodontopathogens

Bacteria	Mouthrinses	
	Denta Gargle	Listerine
A. actinomycetemcomitans	1:40	< 1:5**
B. forsythus	1:80	< 1:5**
F. nucleatum	1:20	< 1:5**
P. intermedia	1:160	1:5
P. gingivalis	1:80	< 1:5**
T. denticola	1:80	< 1:5**

**The bacterial growth was inhibited by a 1 - min exposure to Listerine, but not inhibited at 1:5 diluted con -

15).
가 1.0 . B. forsythus Thymol eucalyptol phenol
가 methyl salicylate
Listerine 100
. Table 가
3 가 Listerine 가
1 16) , , ,
5
Listerine P. intermedia
가 가 7). CPC
. F. nucleatum 가
가 P. intermedia 가
MID가 1:20 가 가
1:160 가
. A. actinomycetem - 8,9,17). CPC
comitans MID 1:40, B. forsythus, P. chlorhexidine digluconate
gingivalis T. denticola MID 1:80 Candida sp. CPC MIC (mini -
. mimum inhibitory concentration)가
18). Radford 19) CPC
IV. 6 2
가 . 6
CPC (가)
가
Listerine .
가 .
가 .
가 P. gingivalis P. intermedia
Listerine 10 20) .
가 .
chlorhexidine Listerine 가
. F.
가 가 , nucleatum MID가 1:20 가 ,
, , 가 가
P. intermedia .

^{27,28)} in vitro
 P. inter - MIC가
 media P. gingivalis
 가
 가 1.0
²⁹⁾ in vivo
 , substantivity probe 가
 가 가 ³⁰⁾
 substantivity가 CPC/UDCA in vitro
 chlorhexidine 가 가 in
^{21,22)} substantivity vivo 가
 , V.
 가
^{23,24)} 가 가 A. actinomycetemcomi -
 tans, B. forsythus, F. nucleatum subsp. vin -
²⁵⁾ 가 가 cola CPC UDCA
 (가) phenol
 가 methyl salicylate
²⁶⁾ (Listerine)
 가
 가
 Listerine 1. 가 Listerine
 in vitro 1
 가 가
 Listerine 2. 5
 CPC 가 Listerine P. intermedia
 가 CPC 가
 UDCA NaF 가
 가 ,
 가 , - F. nucleatum Listerine
 가 1:5 가
 , biofilm planktonic form - 1:20

- A. actinomycetemcomitans
Listerine 1:5
가
1:40
- B. forsythus, P. gingivalis T.
denticola Listerine
1:5
가 1:80
- P. intermedia Listerine
1:5 , 가
1:160

VI.

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- Abstract -

In Vitro Antibacterial Effect of a Mouthrinse Containing CPC (Cetylpyridinium Chloride), NaF and UDCA(ursodeoxycholic acid) against Major Periodontopathogens

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The antibacterial efficacy of a mouthrinse (Denta Gargle) containing CPC (cetylpyridinium chloride), NaF and UDCA (ursodeoxycholic acid), on major periodontopathogens, was in vitro examined and compared with that of Listerine by a broth dilution method. The bacteria tested were *Actinobacillus actinomycetemcomitans*, *Bacteroides forsythus*, *Fusobacterium nucleatum* subsp. *vincentii*, *Prevotella intermedia*, *Porphyromonas gingivalis* and *Treponema denticola*. The growth of all the bacteria were completely inhibited by a 1 - min exposure to the both mouthrinses.

When diluted at 1:5 or more, all bacteria analyzed but *P. intermedia* were not inhibited by Listerine. In contrast, Denta Gargle showed highly increased maximum inhibitory dilutions (MID) against all periodontopathogens included in this study, with MIDs ranging from 5 - fold (*F. nucleatum*) to 160 - fold dilutions (*P. intermedia*). The MIDs against *A. actinomycetemcomitans*, *B. forsythus*, *P. gingivalis* and *T. denticola* were 1:40, 1:80, 1:80 and 1:80, respectively.

Key words: Mouthrinse, Cetylpyridinium chloride, Periodontopathogens, Maximum inhibitory dilutions (MID)