

Persistence of *Legionella pneumophila* serogroup 1 into water system installations



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INTRODUCTION

Legionella pneumophila serogroup 1 is the principal agent of Legionnaires' disease (LD) and the more frequently isolated from the environment. Persistence of the bacteria into water system installations has been demonstrated in LD hospital associated (Kool, 1998), which had been disinfected several times.

OBJECTIVES

This study compares the molecular pattern of different epidemiological markers and the susceptibility to disinfectants of *L. pneumophila* sg 1 strains, recovered along several years of water system installations of 3 LD building associated, which were hyperchlorinated several times.

MATERIAL

L. pneumophila sg 1

11 from a HOSPITAL (1984-2000)
7 from a SHIP (1998-2002)
4 from a HOTEL (1992-1998)

(Environmental isolates)

DISINFECTANTS

Sodium Hypochlorite
Biogüimon (benzalkonium chloride)
Sanosil Super 25 (hydrogen peroxide and silver nitrate)
Spectrus NX 1102 (2,2-dibromonitropropionamide)
Neoseptal KK (chloromethylisothiazolone)

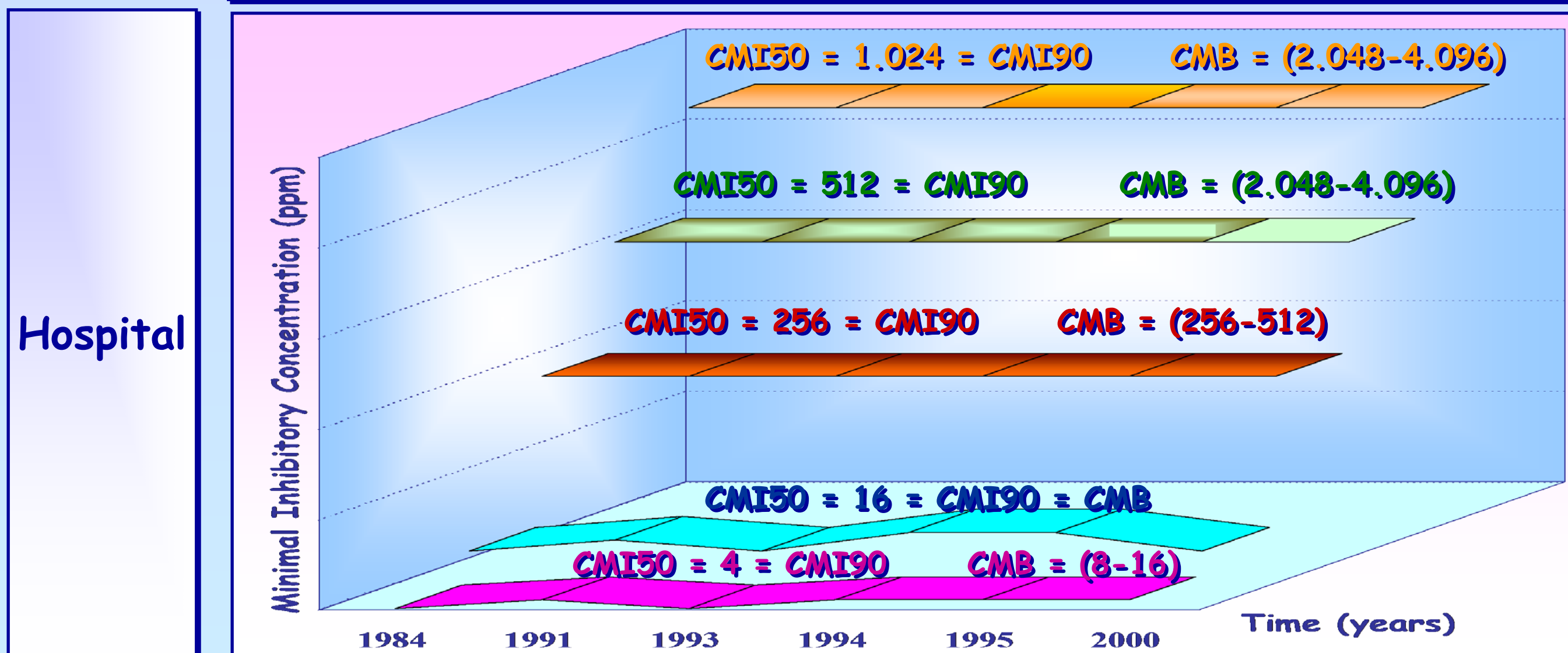
(Plaguicidas Register of Spanish Health Ministry)

METHODS

- ✓ **AFLP** (Amplified Fragment Length Polymorphism): (Fry et al, 2000)
- ✓ **PFGE-SfiI** (Pulsed Field Gel Electrophoresis): (Lück PC, 1992)
- ✓ **AP-PCR** (Arbitrarily Primed PCR): (Gomez-Lus P, 1993)
- ✓ **MIC** (Minimal Inhibitory Concentration): Minor concentration of disinfectant without visible growth after 48h treatment at 30°C of $N=(1-3) \times 10^8$ cfu/mL. Determined by Macrodilution Method in BYE broth. (NCCLS, 1990)
- ✓ **MBC** (Minimal Bactericidal Concentration): Minor concentration of disinfectant with cfu/mL < 0,1% N. (NCCLS, 1987)

RESULTS AND DISCUSSION

Susceptibility Test (MIC 50, MIC 90 and MBC)

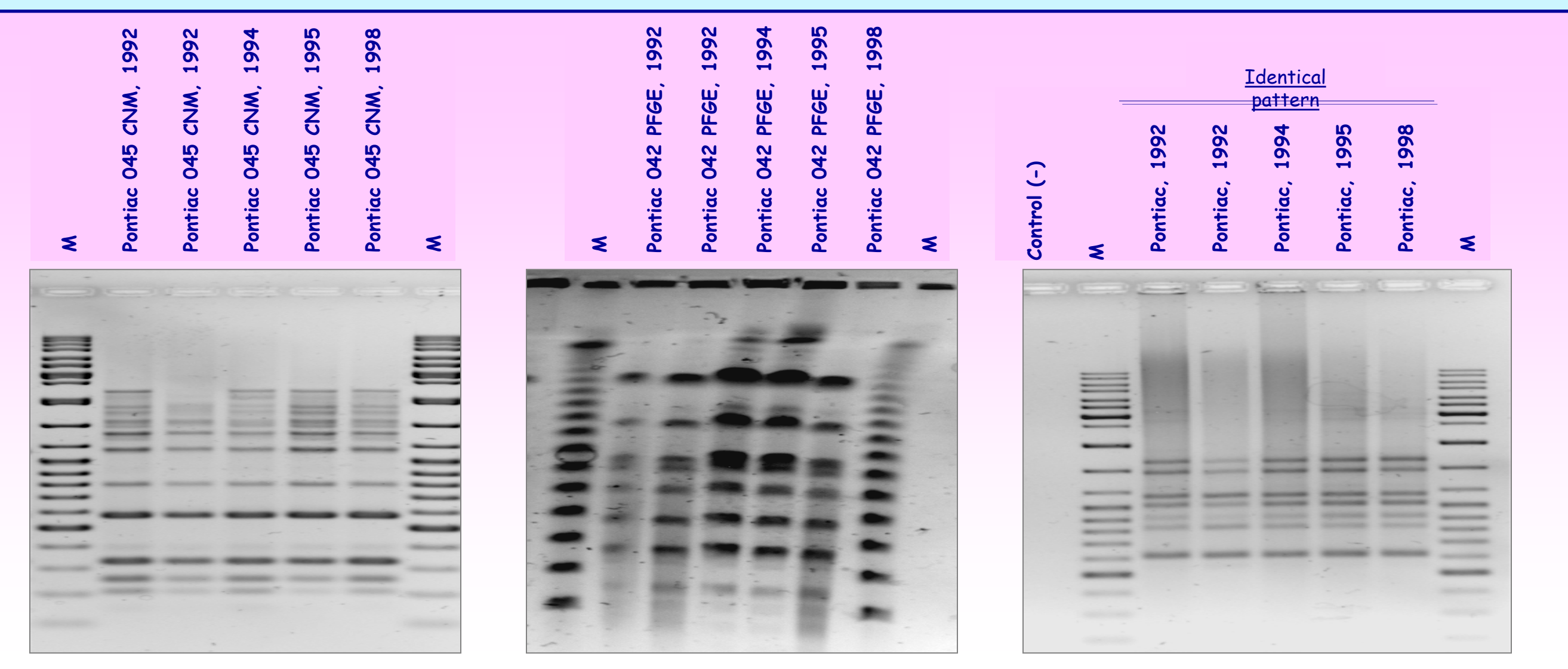
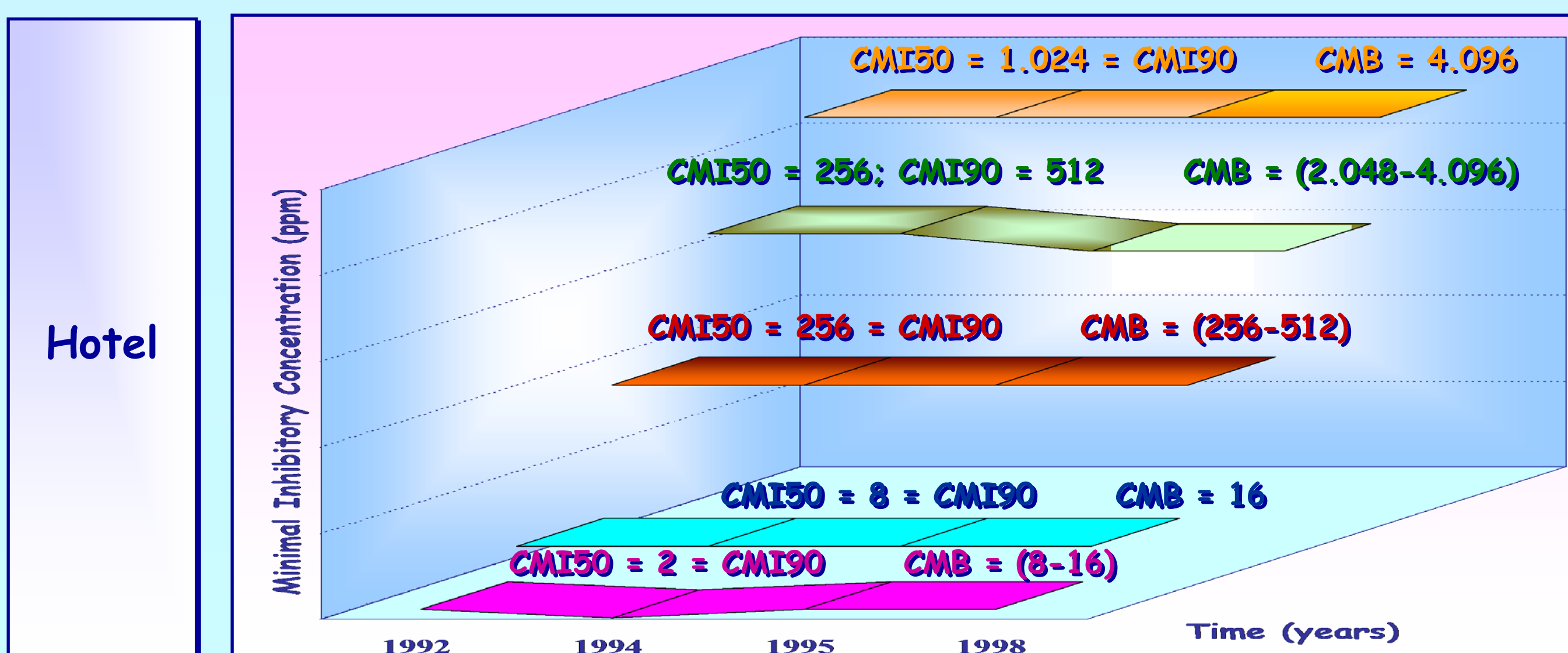
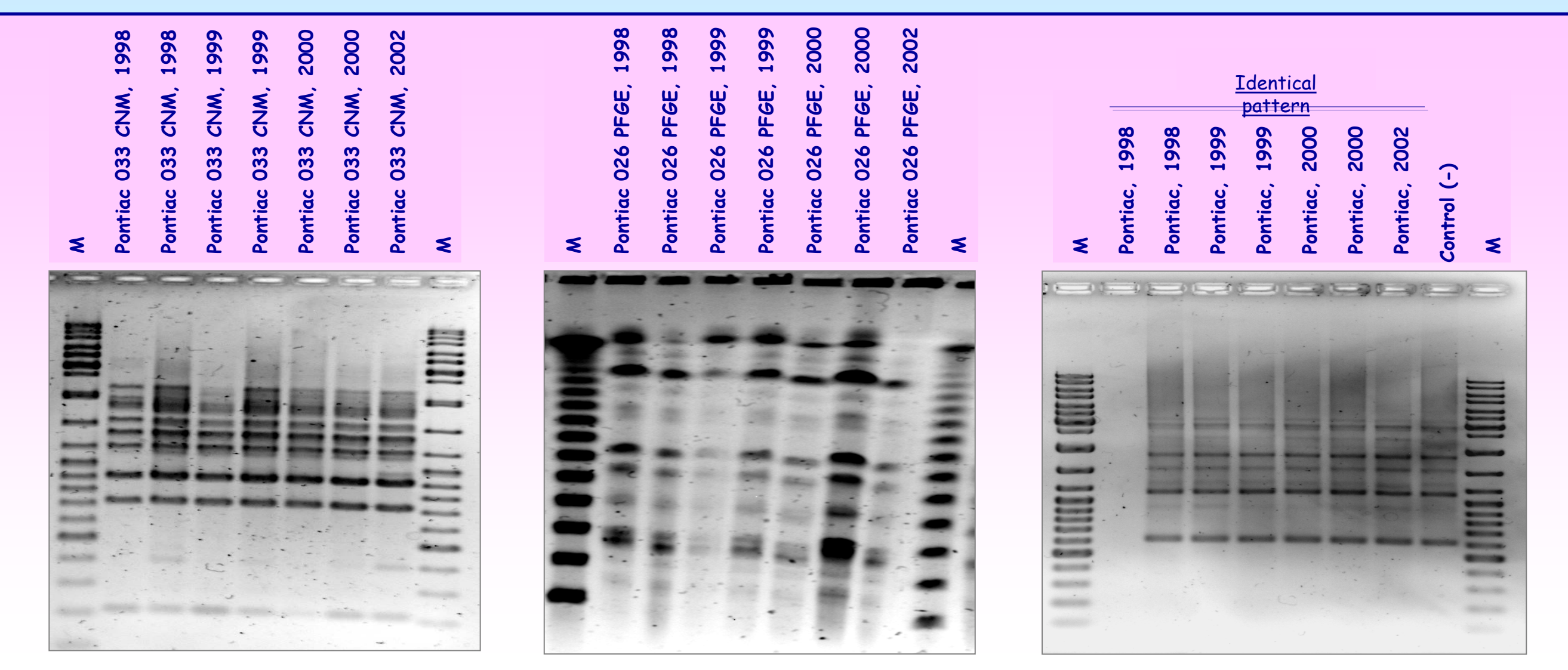
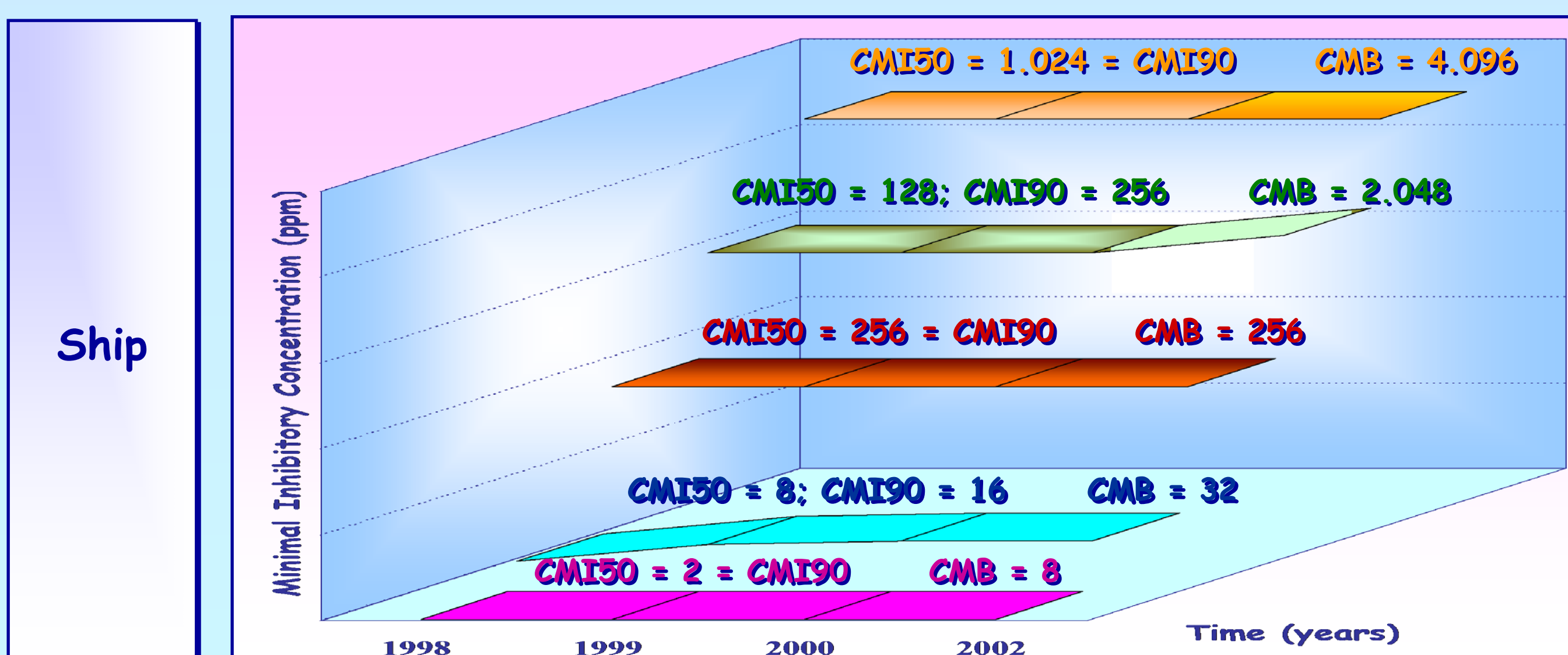
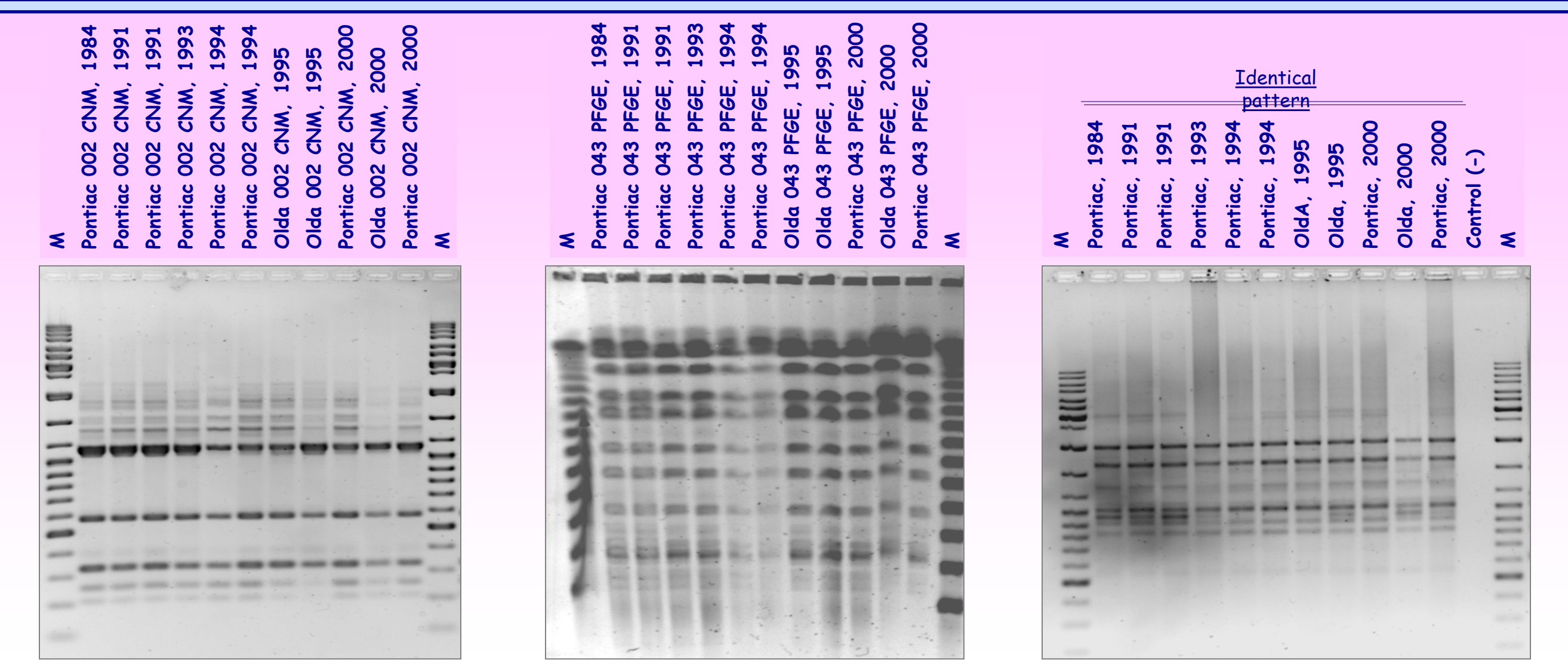


Molecular Analysis

AFLP

PFGE-SfiI

AP-PCR



MIC₅₀ and MIC₉₀ values were very similar for all strains recovered from the same building along the years. MBC values increased no more than 4 twofold dilutions with regard to MIC values.

Identical AFLP, PFGE-SfiI and AP-PCR patterns were detected for all strains recovered from the same building along the years.

CONCLUSIONS

- ✓ A clon of *L. pneumophila* serogroup 1 persisted along the years in the water system installation of 3 different LD building associated, in spite of successive hyperchlorinations.
- ✓ Susceptibility of each clon to disinfectants did not change, in spite of these treatments.
- ✓ All disinfectants showed bactericidal and inhibitory activity. Chlorine was the least effective

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