

In vitro

Struvite

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Proteus mirabilis

(UTI)

pH

Invitrogenesis of Renal Struvite Stone

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ABSTRACT

The study aimed designation of a continuous culture of *P. mirabilis* which isolated from urine of patients with renal stones and Urinary Tract Infections (UTI) by using artificial urine and similar conditions to that of human urinary system, the bacterium exhibit ability to form struvite stone crystals. Then a number of chemical tests were done on a precipitate that formed and the results showed that it consists of calcium,

magnesium, phosphorus in addition to investigation on bacteria in it. The effects of alkaline, acid and neutral materials were studied, the precipitates were soluble in acidic and neutral solutions but not in alkaline. A comparison was carried out on the quantity of precipitate with time and the ability of bacteria to stimulate crystallization in surplus urine from the continuous culture was tested in different pH values, the quantity of crystals formed depend on calcium and magenisium concentrations in urine.

(%70)

Proteus

.(Coker et al., 2000; Rodman, 1999; Lerner et al., 1989)

(%90)

struvite

P. mirabilis

P. mirabilis

Biofilms

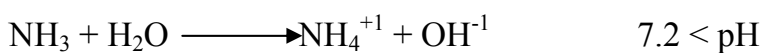
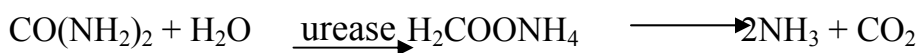
.(Sabbuba et al., 2003; Rozalski, 2002)

[Ca₁₀ - (MgNH₄PO₄.6H₂O) struvite

struvite

:

(PO₄)₆.CO₃] apatite



(7.2)

pH

(pH > 9)

..... Struvite

7.2 pH struvite

.(Maxwell, 2003; Mathoera et al., 2002; Kramer et al., 2000)

) (CPS) Capsule Polysaccharide

anionic

) LPS *P. mirabilis* (

(Mg⁺² Ca⁺²

struvite

.(Torzewska et al., 2003; Perepelov et al., 1999)

P. mirabilis

struvite

P. mirabilis

P. mirabilis

(Koneman et al., 1997; Collee et al., 1996)

Brain

10 37 (BHI) Heart Infusion Broth

()

B A

(Mathoera et al., 2002)

pH meter (5.8)

(Griffith et al., 1976)

MgCl₂.6H₂O (1.627) CaCl₂.2H₂O : : (A) :
 (4.0) KCl (2.50) NH₄Cl (5.75) Na₂SO₄ (11.50) NaCl (1.627)
 .(31.25) Urea (2.75) Creatine
 A ³ (1250)
 (0.45) (Millipore Membrane)

Sodium Oxalate (1.625) Sodium Citrate : : (B) :
 .(31.25) Urea (7.0) K₂HPO₄ (0.050)
 (B) ³ (1250)
 (0.45) (Millipore Membrane)

/
 (1) *P. mirabilis*
 15 (121)

P. mirabilis

P.mirabilis
 (5.8 = pH) ³ (800) (1985) Mclean

) ³ 8 %1 .(Torzewska et al., 2003)

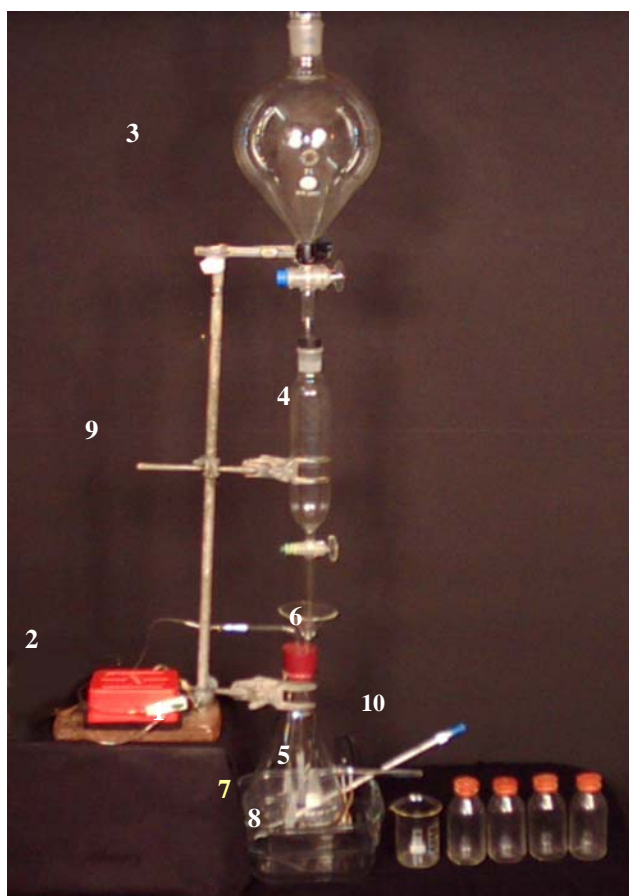
(Clapham et al., 1990) ³ /cfu (10⁵) bacteriuria

BHI 10 *P. mirabilis*

Waste Urine

β^3 (60)
 .(Torzewska et al., 2003) . /0.075

37



: 1

:

-2

-1

β^3 (250)

-4 β^3 (2000)

-3

β^3 (60)

-6

$^\circ(37)$

-5

/(0.075)

-7

-8

-10

-9

(qallenhamp – spectronic 21)

Turbidity

()

(pH)

600

(8)

(24)

(12)

(24 12 8 4)

struvite

P. mirabilis

(8-1)

³ (60)

³ (60)

() (5.8 = pH)

P. mirabilis

(24 12 8 4)

(24)

(°37)

.....

Struvite

:

pH ³ (75) ³ (25) ³ (1)

Eriochrome Black T .(10)

(0.01 M) Na₂ EDTA

.(Rand et al., 1976)

:

³ (4)

³ (25) (Rand et al., 1976)

(10)

(7) (9 = pH)

(5.8 = pH)

.(Mclean et al., 1985)

() (24 12 8 4)

8.5 (3) (2)

9.5

0.40 12

(9.5)

7.3 (0.2) pH (7.3) pH
 (Mclean et al., 1985) 9.0
 .0.5 0.2

(1)

struvite

P. mirabilis

(24) (12 8)

.(2)

.....

Struvite

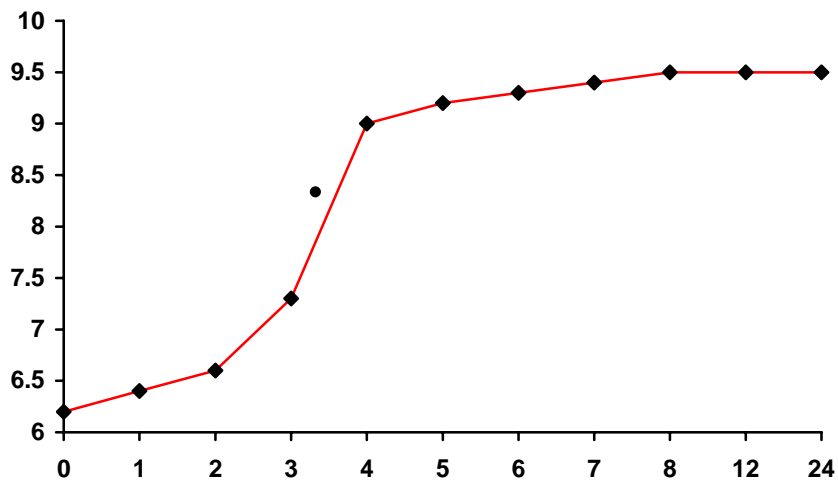
(X)

(3)

(24)

(4)

.(1979) Boistelle Abbona

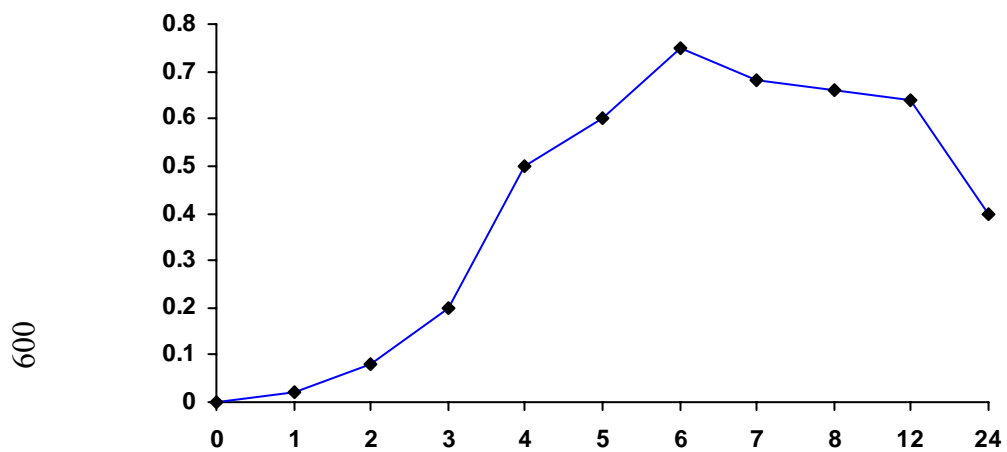


(pH)

: 2

P. mirabilis

()



: 3

struvite *P. mirabilis*

(8-1)
pH ³ (60)

³ (60) (1)

(5.8 = pH)

23-16) (24)

(

9.5 pH

(Abbona and Boistelle, 1979)

(23-16) (0.2-0.1)

pH

.(5)

struvite .pH

P. mirabilis

pH struvite

.(Hruska, 2004; Maxwell, 2003; Hedelin et al., 1985)

.(6)

(7)

.(8)

(8)

struvite

..... Struvite

P. mirabilis (1997) Ebisuno

pH struvite

(1998) Komura

struvite

P. mirabilis

: 1

		()
(Turbidity)	(pH)	
0	6.2	0
0.01	6.3	1
0.04	6.5	2
0.14	7.0	3
0.35	8.2	4
0.55	9.1	5
0.67	9.25	6
0.71	9.35	7
0.66	9.45	8

P. mirabilis

24 ° 37

P. mirabilis

24 12 8 4

(9) .(Koneman et al., 1997; prescott et al., 1996;)

P. mirabilis

:

.(10)

Wine red

(10 = pH)

Eriochrome Black T

(0.01 M) Na₂EDTA

(Na₂EDTA)

Rand

EDTA

.(1976)

:

(11)

.(Rand et al., 1976)

(1985)

Mclean

Energy dispersive x-ray analysis

.apatite struvite

struvite

.(12)

(5.8 = pH)

(7)

.(13)

..... Struvite

(1976) Rand

struvite

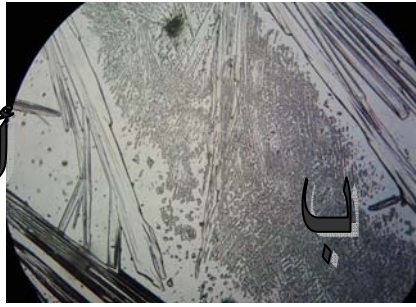
struvite

.(Joseph, 2005; Kodma, 2004)

(14) (24 12 8 4)

(1985) Mclean

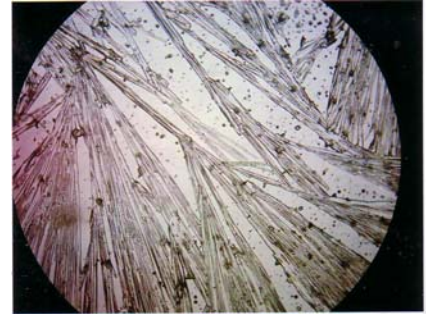
(1994) Mclean



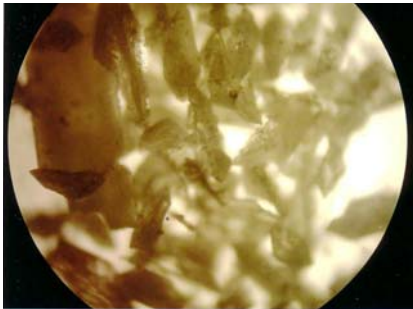
(1)



(2)



(3)



(4)



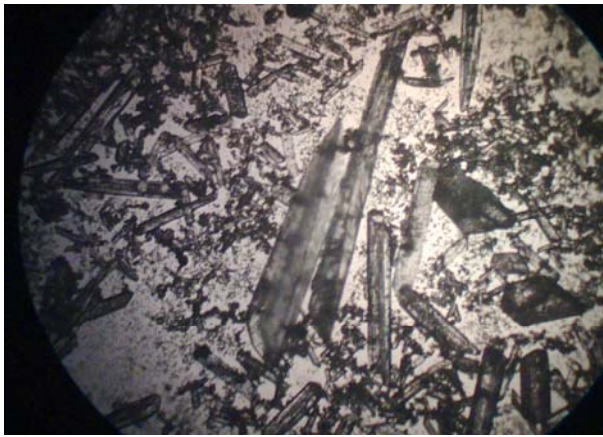
(5)



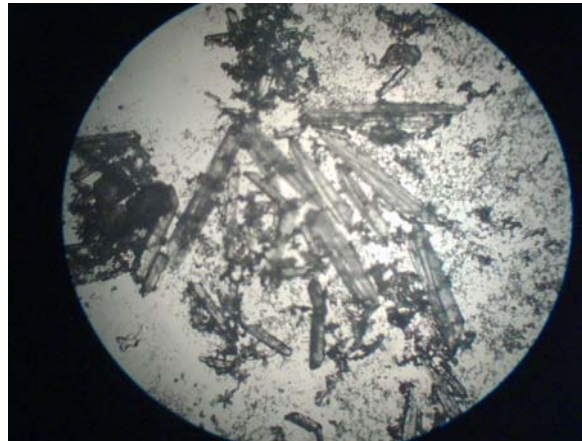
(6)

.
)

: 8 -1
 : 1
 : (400X)
 struvite : 2
 : 3
 (100X
 : 4
 (100X)
 : 5
 : 6



(7)



(8)

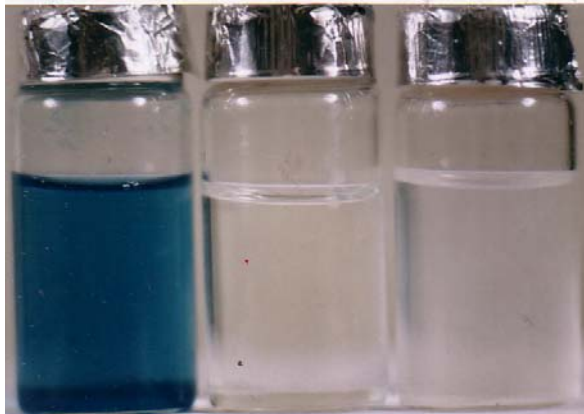


(9)

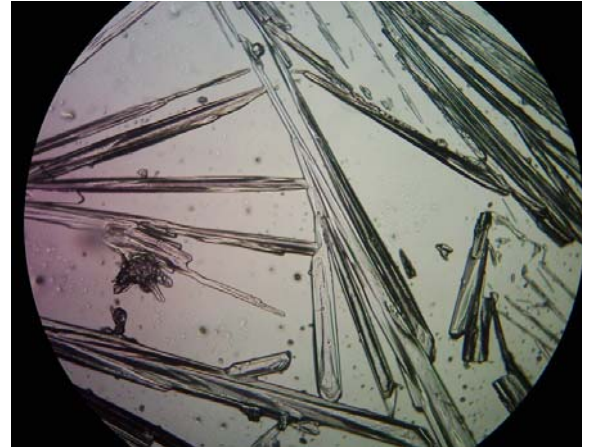


(10)

: 7
 (100X)
 : 8
 (100X)
P. mirabilis : 9
 : 10



(11)



(12)



(13)



(14)

(100X)

(100X)

8 4)

: 11

: 12

: 13

: 14

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