

(Q<sub>0</sub>)

(2005/10/10 2005/5/23 )

(CoQ<sub>0</sub>)  
(B.R.B) - (C)  
. (9-2)  
(reversible)  
pH=2 8.7×10<sup>-5</sup> - 1.9×10<sup>-6</sup>  
/ -0.235 - 0.325  
(Ag/AgCl,Sat.KCl)

## Cyclic Voltammetric Determination of Coenzyme (Q<sub>0</sub>) Using Graphite Electrode

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### ABSTRACT

The anodic oxidation and cathodic reduction of coenzyme Q<sub>0</sub> (CoQ<sub>0</sub>) were studied using cyclic voltammetry (CV) at graphite electrode (C) in Britton -Robinson buffer (B.R.B) of pH ( 2-9). The result shows that the charge transfer processes were reversible

over all pH range. The method is used to determine CoQ<sub>0</sub> in concentration range ( $8.7 \times 10^{-5} - 1.9 \times 10^{-6}$ ) M at pH = 2 with a reduction potential of - 0.325 V and - 0.235 V for reduction and oxidation processes versus Ag / AgCl sat. KCl reference electrode.

(CoQ)

. (Bohinki, 1987)

(Ramasarma, 1985)(Ramasarma)

Q

1974 (CoQ)

([http://www.drweil.com/u/QA/QA\\_4006](http://www.drweil.com/u/QA/QA_4006); " (CoQ)

Andrew Weil, M.D., 2004)

(Diabetes)

([Http://www.yahoo.com/science,chemistry,Clinicalchemistry](http://www.yahoo.com/science,chemistry,Clinicalchemistry), 2001)

(CoQ) (Gotz et al., 2000) (Gotz)

(CoQ)

(Sulaiman et al.)(SWV( (Al-Emari, 2001)( DPP )

.CoQ<sub>0</sub>

( )

.(C) (CV) (CoQ<sub>0</sub>)

:

: (Fluka)

CoQ<sub>0</sub> 10<sup>-3</sup> . Coenzyme Q<sub>0</sub> (CoQ<sub>0</sub>) .1

. 10 CoQ<sub>0</sub> 0.00182

...(Q<sub>0</sub>)

0.04M Britton-Robinson-buffer (B.R.B) - .2  
 (Perrin, (pH = 1.8)  
 .(10<sup>-3</sup>) NaOH 0.1N 1974)

ST72 (Potentiostat)

(R.B.2) Waveform Generator

Gerhard Bank Electronic

(X-Y recorder)

(Chemical Electronics)

( 025)

. Brayans 29000

-

(Pt)

( 5)

(Ag/AgCl.sat.KCl)

. 15

(CoQ<sub>0</sub>)**-1**(CoQ<sub>0</sub>)5.0×10<sup>-5</sup> (CV)

(1 )

( pH=7)

-

:

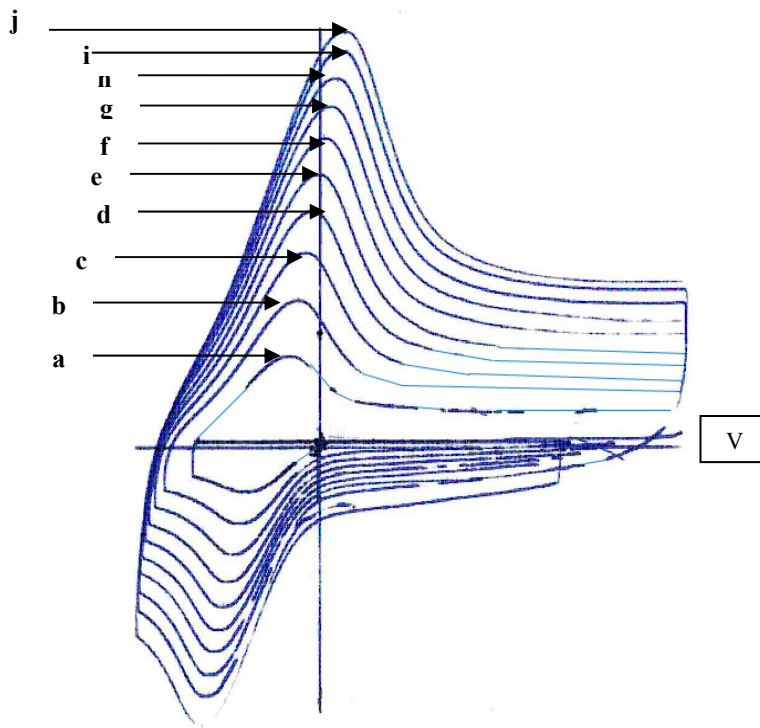
$$\Delta E = E_{\text{Cathode}} - E_{\text{anode}} = 0.03 \text{ V} = 0.059/n, \text{ then } n = 2e^-$$

-

0.059

(Smith, 2004), (Adams, 1969)

(CoQ<sub>0</sub>)

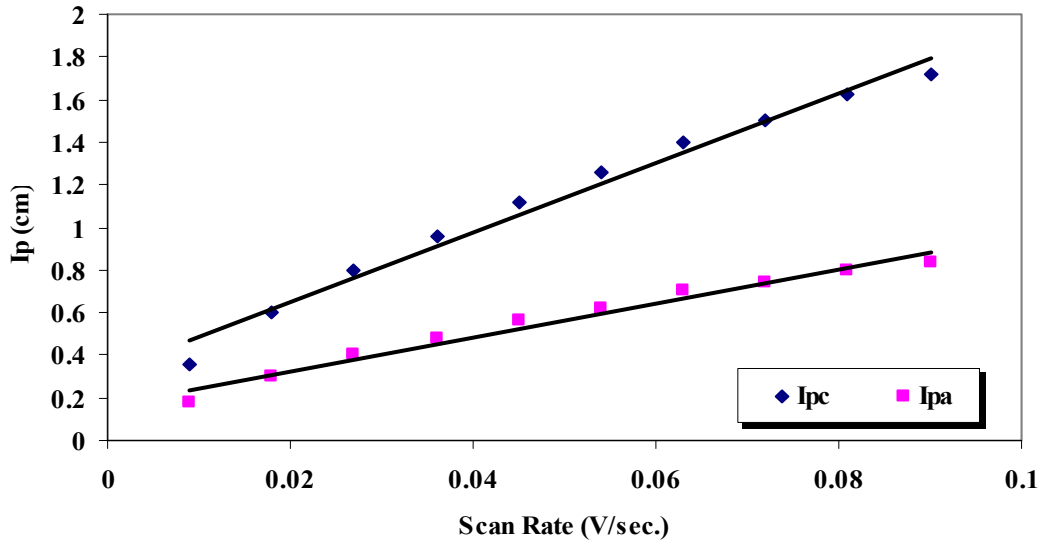


$a=0.009$   $CoQ_0$  : 1  
 i  $h = 0.072$   $g = 0.063$   $f = 0.054$   $e = 0.045$   $d = 0.036$   $c = 0.027$   $b = 0.18$   
 .( /  $j = 0.09$   $= 0.081$

$10^{-3}$

(B.R.B) (CoQ<sub>0</sub>)  
 ( I<sub>pC</sub> ) ( I<sub>pA</sub> ) / (0.09 - 0.009)  
 ( I<sub>pA</sub> ) ( I<sub>pC</sub> ) (2 )  
 0.9786 0.9829 = ( r )  
 . (Adams, 1969)(E-process only) ( )

...(Q<sub>0</sub>)



(Co Q<sub>0</sub>)

: 2

:

-2

(CoQ<sub>0</sub>)

-

pH

$5.0 \times 10^{-5}$

(pH= 2 - 9)

.1

(CoQ<sub>0</sub>)

:1

| pH                               | 2.0  | 3.0   | 4.0   | 5.0   | 6.0   | 7.0   | 8.0   | 9.0    |
|----------------------------------|------|-------|-------|-------|-------|-------|-------|--------|
| Ep <sub>a</sub> , V              | 0.15 | 0.1   | 0.03  | 0.015 | 0.025 | 0.006 | -0.15 | -0.155 |
| Ep <sub>c</sub> , V              | 0.31 | 0.275 | 0.185 | 0.16  | 0.092 | 0.03  | -0.14 | -0.15  |
| Ip <sub>c</sub> /Ip <sub>a</sub> | 1.09 | 2.1   | 2.4   | 2.1   | 1.72  | 1.93  | 1.88  | 1.87   |

(Ep<sub>a</sub>)

(Ep<sub>c</sub>)

pH

0.9359 , 0.9642 = (r)

(3 ) Ep<sub>a</sub> Ep<sub>c</sub>

-0.044

-0.069

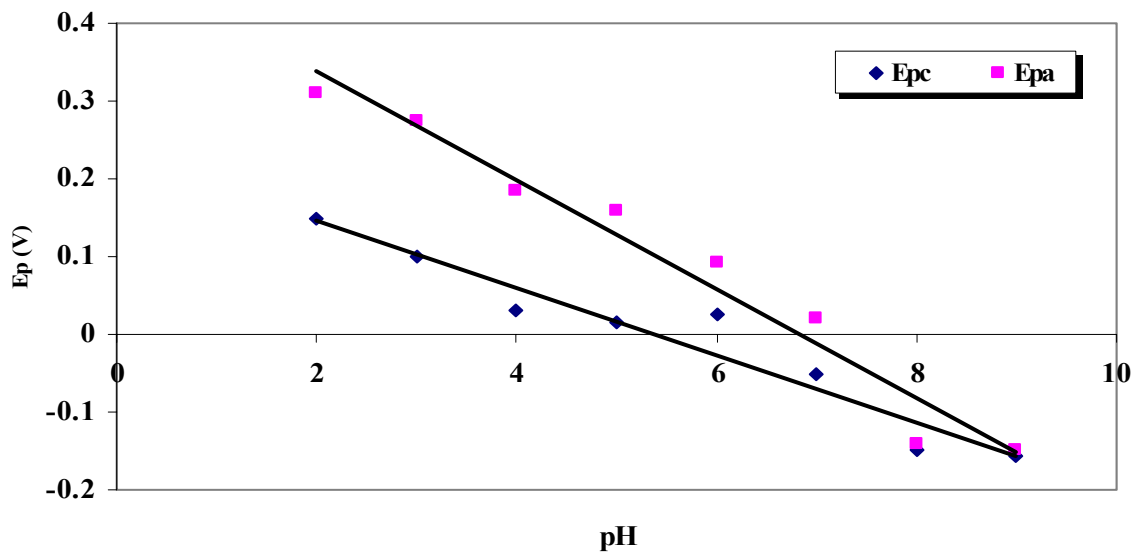
. / 0.009

Hillson

0.059

E<sub>1/2</sub>

.(Al-Naimi, 2001)



.(CoQ<sub>0</sub>) : 3

(1.09) 2

$I_{pc}/I_{pa}$

%90

:(CoQ<sub>0</sub>)

-1

(CoQ<sub>0</sub>)

$I_{pa}$

(4 ) pH=2

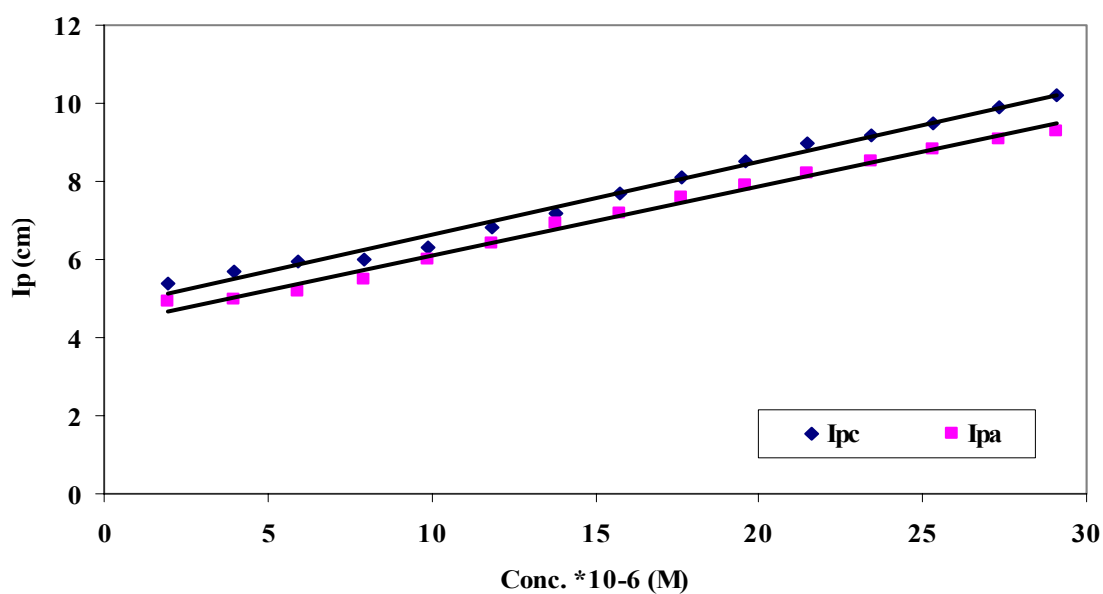
(Diffusion)

0.9897 0.9927

$I_{pc}$

( $1.9 \times 10^{-6}$ )

CoQ<sub>0</sub>



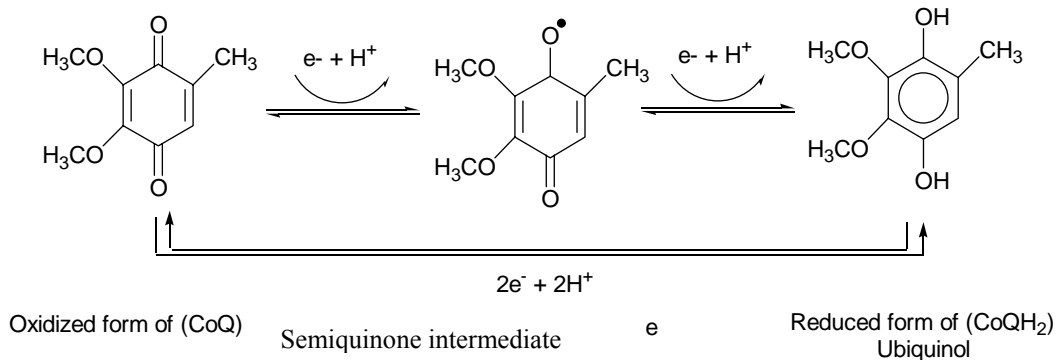
.(pH=2.0) (CoQ<sub>0</sub>) : 4

:

(Stryer, 1996)( Smith, :

CoQ<sub>0</sub>

2004)



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