Concentration ppm	E_{corr}	B_a	B_c	i_{corr}	IE %	θ
0.0	-761	112	-306	0.0080	-----	---
200	-761	105	-410	0.0090	-12.5	----
500	-777	101	-364	0.0060	25.0	0.250
1000	-760	104	-357	0.0055	31.3	0.313
1500	-762	107	-336	0.0052	35.0	0.350
2000	-771	104	-347	0.0040	50.0	0.500

Table (34): Electrochemical parameters of tin in citro-phosphate buffer solutions of pH 8 in presence of vanillin.

		pH 5	pH8
phosphate		0.015	0.005
citrate		0.020	0.0095
Citro-phosphate		0.014	0.008
Ph.	honey	0.011	0.0038
	vanillin	0.006	0.006
	opuntia	0.0133	0.020
Cit.	honey	0.0156	0.0054
	vanillin	0.0057	0.0030
	opuntia	0.016	0.0050
Cit-ph.	honey	0.0096	0.0094
	vanillin	0.00094	0.004
	opuntia	0.0063	0.0150

Table (35): The corrosion rates of tin in different buffer solutions in absence and presence of the tested inhibitors at concentration of 2000ppm.

CHAPTER (3)

POTENTIODYNAMIC ANODIC POLARIZATION OF TIN IN DIFFERENT BUFFER SOLUTIONS CONTAINING AGGRESSIVE AND INHIBITIVE COMPOUNDS

Chapter 3
POTENTIODYNAMIC ANODIC POLARIZATION OF TIN IN DIFFERENT BUFFER SOLUTIONS CONTAINING AGGRESSIVE AND INHIBITIVE COMPOUNDS

Introduction

Pitting corrosion is a type of localized attack of the passivated metals. To initiate the pitting corrosion, two basic requirements should be established by the corroding system. First, the metal must be passivated by an insulating film and the second is the presence of specific anions such as Cl^-, Br^-, I^- or SO_4^{-2}, in the aggressive medium. It has been found from the study in part (1) that tin is passivated by an oxide film in the mentioned buffers phosphate, citrate and citro-phosphate. Thus, the presence of chloride ions in such buffer solutions, in contact with tin metal is supposed to initiate pitting attack. Since, tin is used in plating of the food stuff cans which usually contain a certain concentration of sodium chloride for salting, then pitting attack of tin is quite expected.

In the present part of the thesis, the effect of chloride ions on the pitting corrosion of tin is studied. The inhibitive action of some selected natural safe extracts, toward pitting corrosion of tin, is investigated. Sodium chloride is usually used at a concentration of 3.5% for foodstuff in tin cans. Therefore, a concentration of it up to 3.5% was employed in the present work to study pitting inhibition of tin by the compounds mentioned before. Finally, the mode of inhibitive action of these compounds is proposed on the basis of the known inhibition theories.

Experimental

The same cell shown diagrammatically in Fig (1) was also used for the present part.

All chemicals were of analytical grade quality, and were used without any further purification.

Potentiodynamic anodic polarization was performed for pitting corrosion measurements at a voltage scan rate of 1.0 mV/sec using Meinsberger potentiostat/ Galvanostat PS6.

The preparation of tin electrode and the buffer solutions used are the same as described in the first chapter. The inhibitors employed in this part are those used in the previous part.

No trails were made to deareate the solution. All experiments were carried out at 25^0C.