method. The loss in mass technique is usually preferred because the quantity measured is directly related to the extent of corrosion and does not rely on any assumptions about reactions occurring during corrosion.

Figs. (3.1-3.12) represent the mass loss-time curves of different types of stainless steel (430, 304 and 316) in 2M HCl in absence and presence of different concentrations (ranging from $1x10^{-7}$ M to $1.1x10^{-6}$ M) of crown ethers (DB18C6, Kry-22DD, Kry-222 and DB24C8) at 303K. It is seen from all these figures that, by increasing the concentration of these compounds, the loss in mass values of different types of stainless steel were decreased. This means that the presence of these compounds retards the corrosion of these types of stainless steel in 2M HCl or in other words, these compounds act as corrosion inhibitors.

The linear variations of mass loss values with time in most cases of inhibited stainless steels (430, 304 and 316) in 2M HCl indicate the absence of insoluble surface films during corrosion [123]. In absence of any surface films, the inhibitors are first adsorbed on the metal surface and thereafter impede corrosion either by merely blocking the reaction sites (anodic and cathodic) or by altering the mechanism of the anodic and cathodic partial processes.

The dissolution of the three types of stainless steel on using these inhibitors might be interpreted on the basis of the interface inhibition mode [160], i.e., the inhibitors are effectively acting at the metal-solution interface. On using dilute solutions of crown ethers (ranging from $1x10^{-7}$ M to $1.1x10^{-6}$ M) in 2M HCl, an effective dimension of corrosion by the formation of an adsorbed monolayer could be brought through simple adsorption of these compounds at the metal-solution interface.

A comparative study on the dissolution of different types of stainless steel (430, 304 and 316) in absence and presence of the above mentioned crown ethers reflects some interesting features:

(1) In general, for all types of stainless steel, increasing the concentration of crown ethers (from $1x10^{-7}$ M to $1.1x10^{-6}$ M) remarkably decreases the rate of corrosion of stainless steels in 2M HCl solution as has been estimated from the loss in mass values, Figs. (3.1-3.12).

(2) The loss in mass values of different types of stainless steel in absence and presence of crown ethers obey the following order, [Figs. (3.13 - 3.16)].

$$430SS > 304SS > 316SS$$

(3) The effectiveness of crown ethers as corrosion inhibitors for all types of stainless steel varies according to the following order, [Fig. (3.17-3.19)]:

$$DB18C6 < Kry\text{-}22DD < Kry\text{-}222 < DB24C8$$

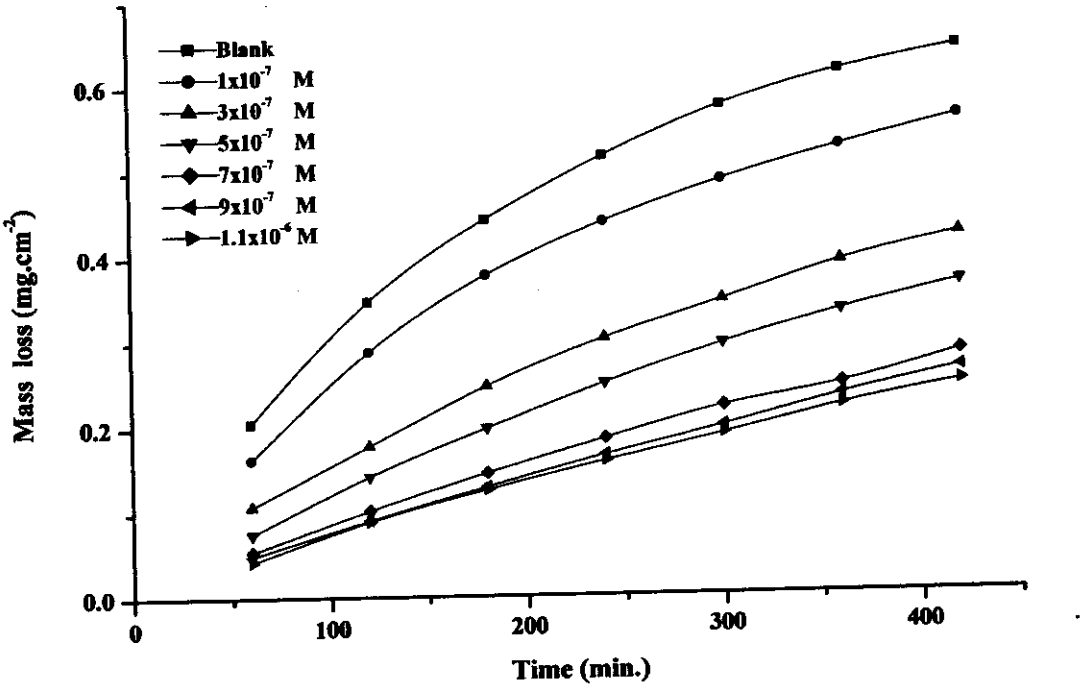

Fig. (3.1): Mass loss-time curves of 430SS in 2M HCl in absence and presence of different concentrations of DB18C6 at 303K.

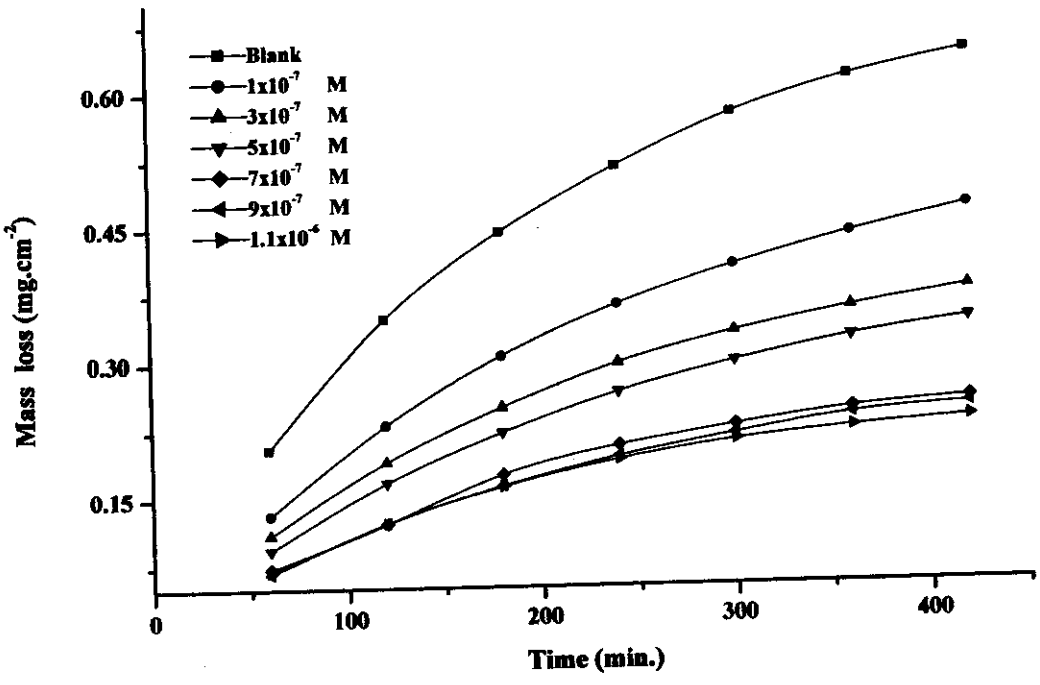

Fig. (3.2): Mass loss-time curves of 430SS in 2M HCl in absence and presence of different concentrations of Kry-22DD at 303K.

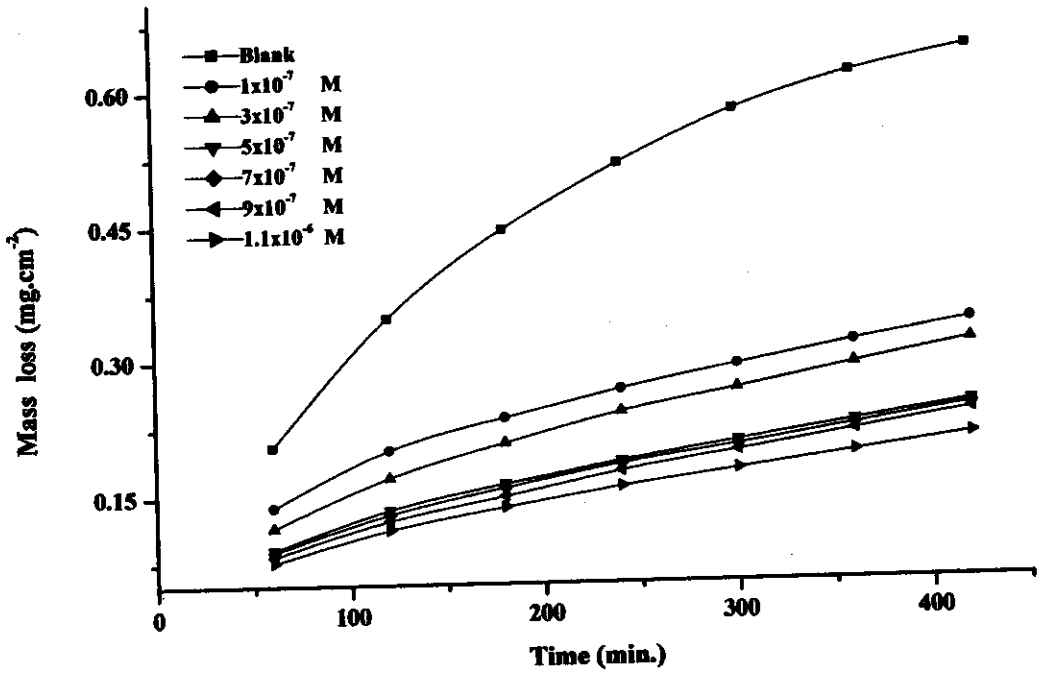

Fig. (3.3): Mass loss-time curves of 430SS in 2M HCl in absence and presence of different concentrations of Kry-222 at 303K.

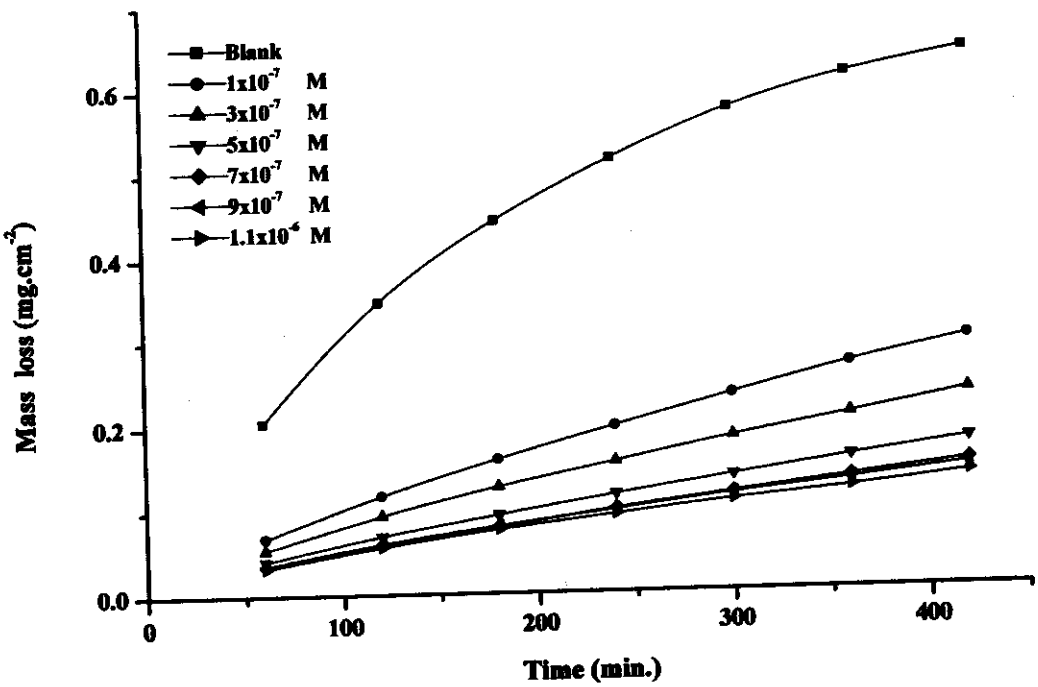

Fig. (3.4): Mass loss-time curves of 430SS in 2M HCl in absence and presence of different concentrations of DB24C8 at 303K.

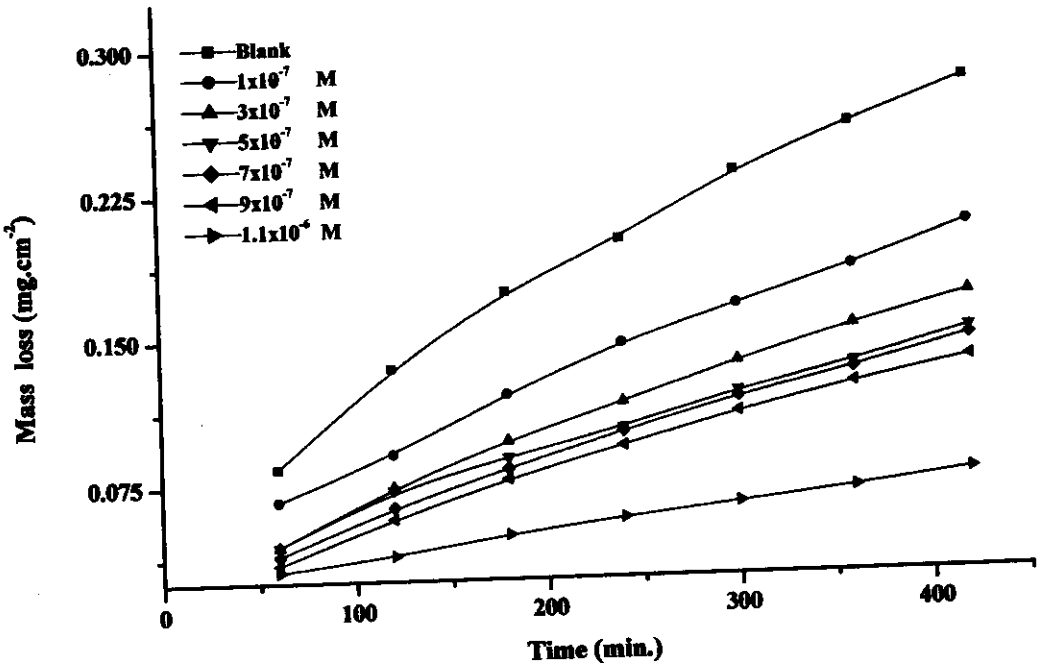

Fig. (3.5): Mass loss-time curves of 304SS in 2M HCl in absence and presence of different concentrations of DB18C6 at 303K.

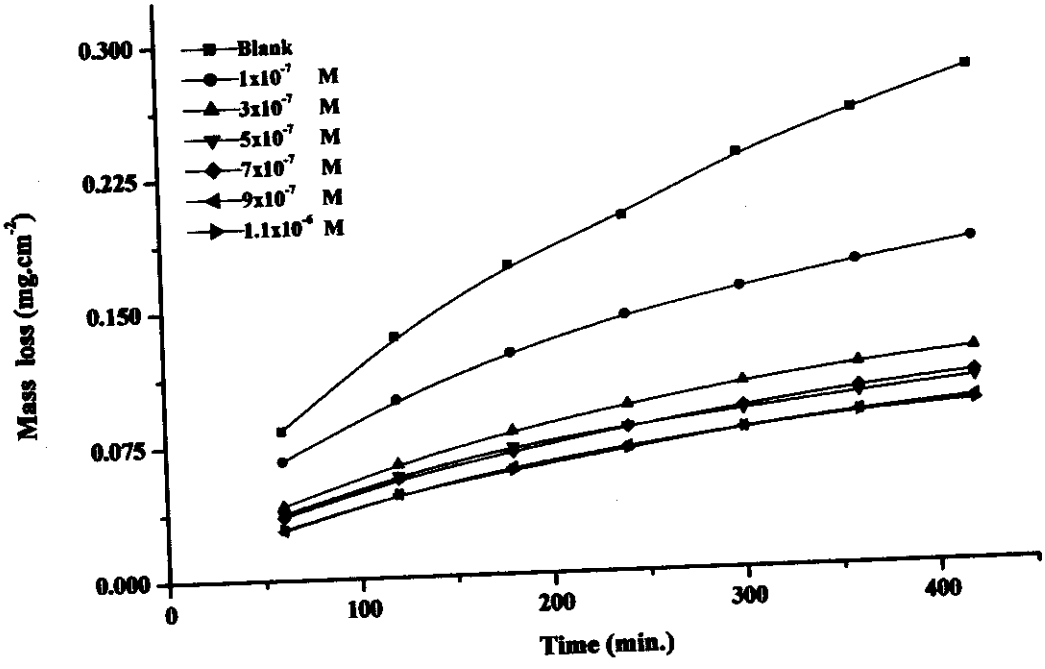

Fig. (3.6): Mass loss-time curves of 304SS in 2M HCl in absence and presence of different concentrations of Kry-22DD at 303K.

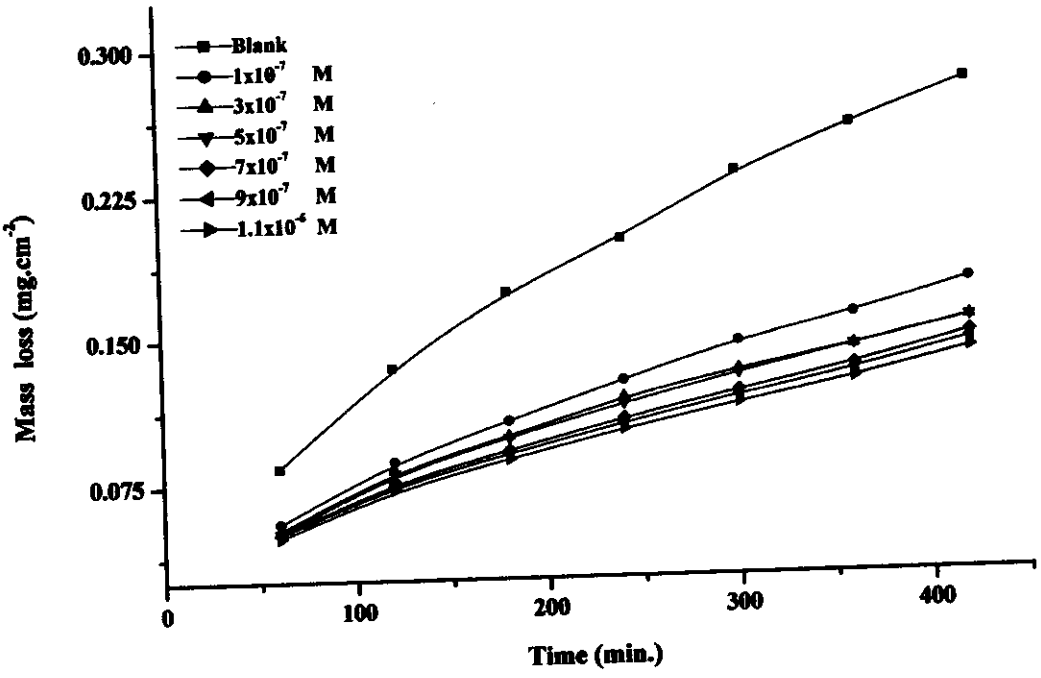

Fig. (3.7): Mass loss-time curves of 304SS in 2M HCl in absence and presence of different concentrations of Kry-222 at 303K.

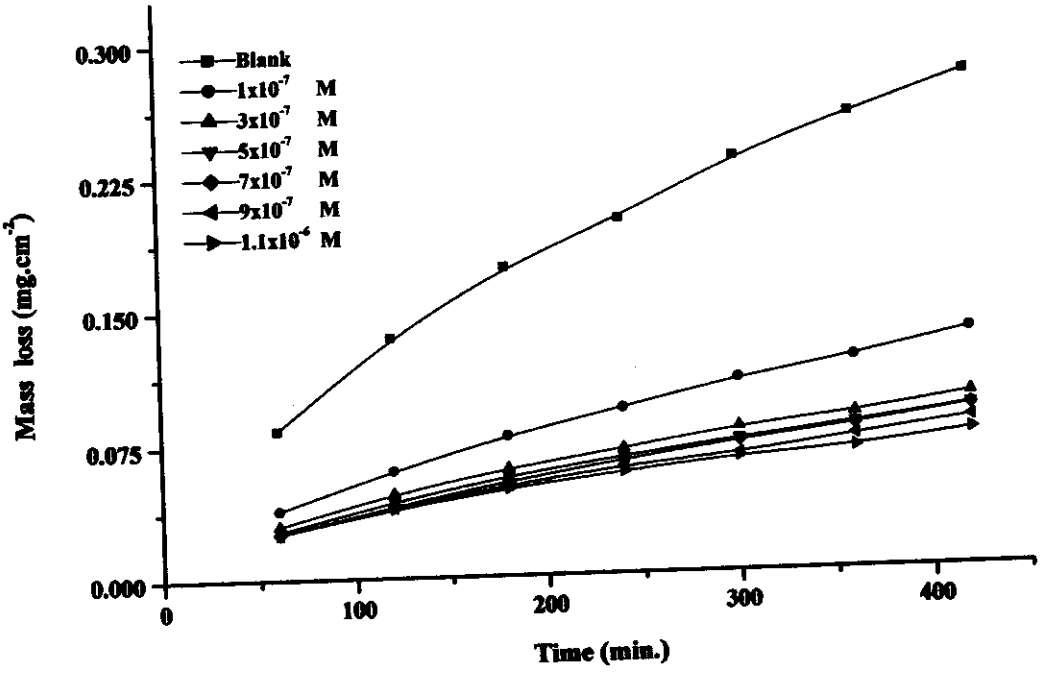

Fig. (3.8): Mass loss-time curves of 304SS in 2M HCl in absence and presence of different concentrations of DB24C8 at 303K.

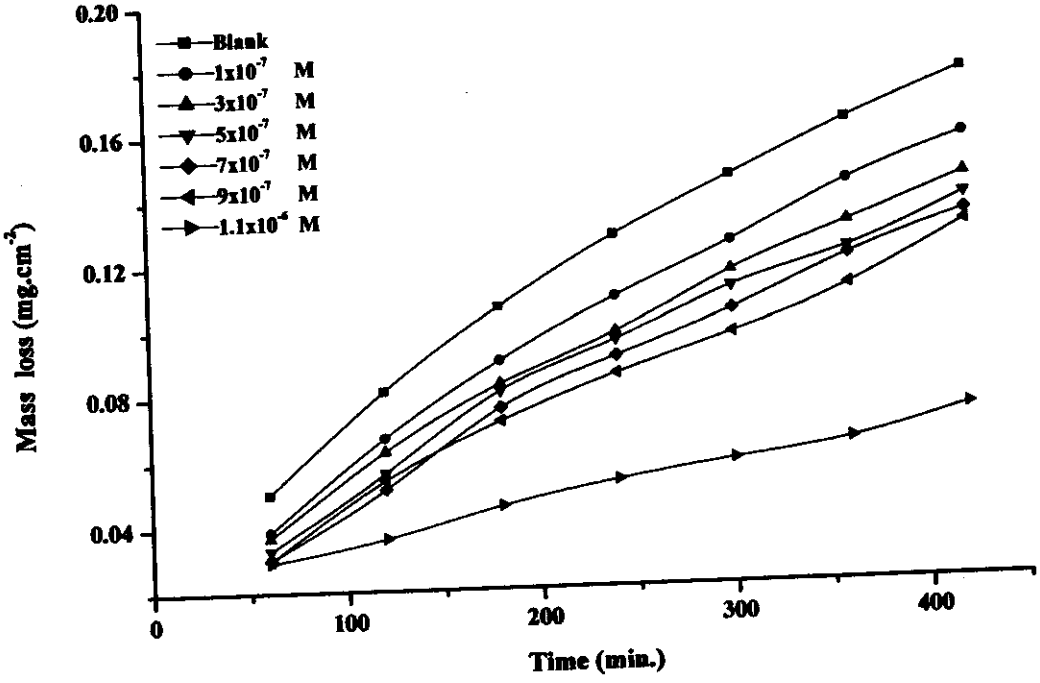

Fig. (3.9): Mass loss-time curves of 316SS in 2M HCl in absence and presence of different concentrations of DB18C6 at 303K.

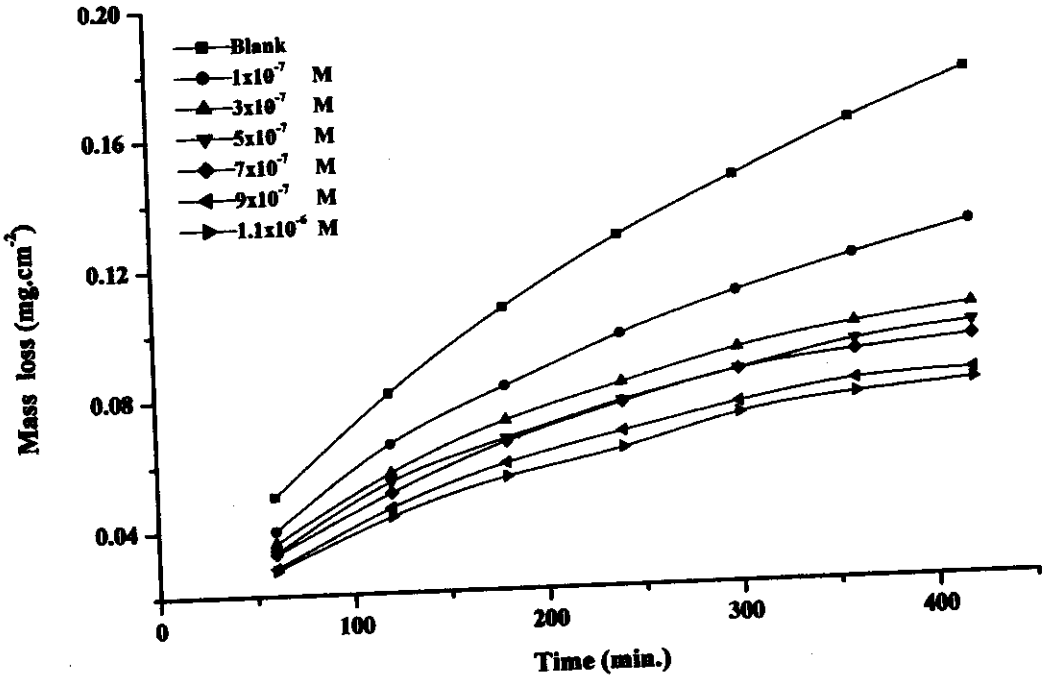

Fig. (3.10): Mass loss-time curves of 316SS in 2M HCl in absence and presence of different concentrations of Kry-22DD at 303K.