

## Kinetic investigation of hydroxide ion and DNA attack on some high spin iron (II) chelates Bearing ONO Donors amino acid Schiff bases

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**Abstract:** The reactivity of few novel high spin Fe(II) complexes of Schiff base ligands derived from 2-hydroxynaphthaldehyde and some variety of amino acids with OH<sup>-</sup> ion has been examined in aqueous mixture at temperature in the range 10–40 C°. Based on the kinetic investigations, the rate law and a plausible mechanism were proposed and discussed. The general rate equation was suggested as follows: rate =  $k_{obs}$  [Complex], where  $k_{obs} = k_1 + k_2$  [OH<sup>-</sup>]. Base catalyzed hydrolysis kinetics measurements imply pseudo-first-order doubly stage rates due the presence of mer- and fac-isomers. The observed rate constants  $k_{obs}$  are correlated the effect of substituent R in the structure of the ligands. From the effect of temperature on the rate; various thermodynamic parameters have been evaluated. The evaluated rate constants and activation parameters are in a good agreement with the stability constants of the investigated complexes.

**Keywords:** Base catalyzed hydrolysis, Isomer, Reaction mechanism, Thermodynamic parameters

### Introduction

Schiff base complexes have extensive importance as radiotracers [1], biologically active reagents [2–5], catalysts for oxidation [6, 7], epoxidation [8], polymerization [9] and decomposition reactions [10, 11]. On the other hand, considerable attention has been paid over the last few decades in establishing substitution reactions, dissociation, hydroxide attack, and reaction with cyanide of low-spin tris-ligand Fe(II) complexes. Some studies have been carried out on 1,10-phenanthroline complexes [12–14], complexes of substituted 2,2'-bipyridyl [15], complexes of Schiff base ligands derived from pyridine 2-carboxaldehyde [16] or 2-benzoylpyridine [17], and other derivatives [18]. Moreover, substituents effects on reactivity have been considered for base hydrolysis of tris-ligand-Fe(II) complexes of Schiff base ligands derived from 2-acetylpyridine and substituted benzylamines and their aniline analogues [19]. From a bioinorganic point of view, iron Schiff base complexes provide useful structural and electronic models for the similarly coordinated sites found in the heme iron enzymes. Moreover, these complexes are also important for the asymmetric oxidation of organic substrates, since their structure and catalytic activity are analogous with those of iron porphyrins [20]. This contribution deals with the of hydroxide attack on some newly prepared and characterized Schiff base amino acid Fe(II) complexes [21]. The particular importance of the ligands used in this study (Scheme 1) is their sufficiently strong interaction with Fe(II) central metal. Kinetic data concerning the base hydrolysis reaction of the important Fe(II) Schiff base amino acid complexes will help to complete the scan of pH effects on the reactivity of these vital complexes and subsequently will be very helpful in extending their applications. Substituent, temperature and pH effects on the reactivity of these important chelates of wide applications have long been ignored and chemists worldwide would be greatly interested in these kinetic data.