Table 2: Proton ligand formation constants of TA and stability constant of ternary complexes formed in this study at 0.1M $NaClO_4$ and 25±0.1 °C.

Metal ions	M (TA) $logk_1^H$	M (TA) $logk_2^H$	M (Gly) $logk_1$	$logK_{M(TA)(Gly)}^{M(TA)}$	$\Delta logk$
H^+	5.4	– – –	10.3	– – –	– – –
Fe (III)	9.79	8.204	6.34	8.83	+ 2.49
Al (III)	9.23	6.34	4.94	7.23	+ 2.29
Sr (II)	9.42	– – –	8.34	3.42	4.92
Th (IV)	9.02	6.78	5.94	7.63	+ 1.69
Pb (II)	8.83	6.58	9.14	6.83	– 2.31
La (III)	11.5	8.65	6.94	4.48	– 2.46
Ti (II)	8.73	6.15	9.54	6.76	– 2.78
Zr (IV)	9.03	6.99	8.53	3.37	– 5.16
Co (II)	8.63	– – –	7.14	4.96	– 2.18
Cr (III)	8.82	6.38	7.54	5.64	– 1.9

4. Conclusion:

From this study it can concluded that potentiometric and conductometric methods are excellent methods for calculation of stability constant of metal ligand complexes. It was found that TA has only one site and the proton may be dissociated from this site in proportion, which vary with the degree of neutralization. The stability constant of metal ligand complex (1:1) decreased as the concentration of medium increased.

However, Al (III) ion form (1:1), (1:2) and (1:3) metal to ligand complexes. Also, Zr (IV), Fe (III), Ti (II), Cr (III) and Pb (II) ions forms (1:1) and (1:2) metal to ligand complexes, but in the case of Co (II), Sr (II) and La (III) only one complex (1:1) metal to ligand was formed . The stiochiometric ratio that obtained from potentiometric method is will agreement with the results of conductometric method. For all metal ions investigated with TA, the ML species (1: 1) are the major species and the species ML_2 (1:2) is the minor one in the entire pH ranges.

Ternary complexes formed between TA, Gly and the studied metal ions prove that all studied metal ions form a single mixed complex (1:1:1) with TA.

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