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Acidity and Complexing Properties of Several Phosphonic and Phosphinic Analogs of Valine and Homoproline

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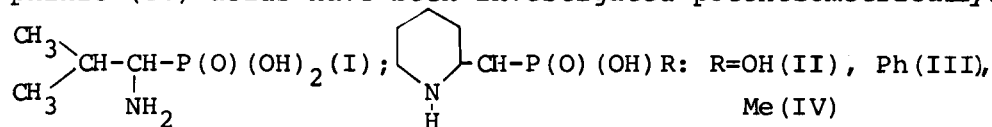
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ACIDITY AND COMPLEXING PROPERTIES OF SEVERAL PHOS- PHONIC AND PHOSPHINIC ANALOGS OF VALINE AND HOMOPROLINE

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The acidity and complexing properties of 1-amino-2-methyl-
 propylphosphonic (I), piperidine-2-phosphonic (II), piper-
 idine-2-phenylphosphinic (III) and piperidine-2-methylphos-
 phinic (IV) acids have been investigated potentiometrically.



The dissociation constants of acids I-IV and the ability
 constants of MHA^+ and MA complexes with metal ions (M),
 Ca^{2+} , Mg^{2+} , Co^{2+} , Ni^{2+} , Cu^{2+} , Zn^{2+} have been determined at
 25°C and $I=0,1$.

Acid	pK_1	pK_2	$\lg\beta_{\text{CoA}}$	$\lg\beta_{\text{NiA}}$	$\lg\beta_{\text{CuA}}$	$\lg\beta_{\text{ZnA}}$
I (H_2A)	6.02	10.33	5.60	6.19	9.47	6.31
II (H_2A)	5.74	11.31	5.10	5.89	8.76	5.86
III (HA)	9.15	-	2.74	3.17	5.26	3.43
IV (HA)	9.53	-	3.64	3.92	5.73	3.70

Acid I formed highly stable complexes with calcium ($\lg\beta_{\text{CaA}} = 3.42$) and magnesium ($\lg\beta_{\text{MgA}} = 3.68$) ions. Aminophosphonic
 acids I and II were more efficient complexing agents than
 the corresponding amino acids, valine and homoproline.

Unlike to amino acid complexes the stability of zinc com-
 pounds with the anions of acids I-IV is approximately equal
 to, or exceed, that of the corresponding nickel complexes.
 The structure of the complex compounds in solution has been
 discussed.