1522

ELECTRON DISTRIBUTION OF BONE-SEEKING AGENT.
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The electron distribution of methylene-diphosphonate molecule (MDP), hydroxyethylene-diphosphonate (HEDP), hydroxymethylene-diphosphonate (HMEDP), and dixhydroxymethylene-diphosphonate (DHMDP) was calculated approximatively by the molecular orbital (MO) method in order to examine the physicochemical property of bone-seeking agents. The basic concept of the MO method is to find an approximate electronic wave functions for a molecule by assigning to each electron a one-electron wave function which in general extends over the whole molecule. The one-electron wave function was constructed from a linear combination of atomic orbital (AO) of the atoms in the molecule. The electron density on each atom in above molecules was given in Table 1.

\[
\begin{array}{ccc}
P & 0 & O \\
\text{MDP} & -0.6102 & \\
\text{HEDP} & -0.5935 & -0.3006 \\
\text{HMEDP} & -0.5927 & -0.2986 \\
\text{DHMDP} & -0.5910 & -0.3034 \\
\end{array}
\]

(values indicate the electron density on oxygen atoms for P=0 bond or C=0 bond)

It can be seen that the electron density on oxygen atom of MDP is larger than tridentate molecules. As the difference of electron density between HEDP and HMEDP is little, low adsorption of the former may be related to steric hindrance in the chemisorption.

1523

RADIODEGRADATION OF Tc-99m-(Sn) COMPOUNDS.
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The presence of free pertechnetate in solutions of Tc-99m-radiopharmaceuticals is one of the most serious problems among the radiochemical impurities. The appearance of pertechnetate results from the low labeling efficiency at the preparation or the instability of Tc-99m-radiopharmaceuticals. In either case, this phenomenon relates to the deterioration of the reducing reagents. As the factors deteriorating the reducing reagents, oxidants in the solution of radiopharmaceuticals and radiolysis are most crucial.

In this paper, we report the effect of radiation on the stability of bone scanning agents (Tc-99m). When the bone scanning agents were prepared with Tc-99m of high activity, the labeling efficiency was lowered significantly. We confirmed this effect to be the result of the oxidative radiolytic reaction. Furthermore, we quantitatively evaluated the effect of stabilizers such as L-ascorbate which inhibited the radiodecomposition of Tc-99m-radiopharmaceuticals. We report, also, influences of some organic impurities which are contained in the final labeled products.