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# Thermodynamic Study on the Release of Thiamine Disulfide (TDS) from TDS-Higher Fatty Acids Complexes. I. Effect of Even-Numbered Fatty Acids*

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The rates of release of thiamine disulfide (TDS) from even-numbered fatty acid-TDS complexes were determined in a JP XI dissolution test apparatus in JP XI disintegration test medium No. 1 (pH 1.2) at various temperatures, and the thermodynamic quantities for the release of TDS from the complexes were estimated. The concentration of TDS was determined spectrophotometrically.

The rate of release of TDS from the complexes decreased with increasing carbon number ($n$) in the fatty acid and increased at higher temperature. The values of activation Gibbs energy $\Delta G^{\neq}$ and activation enthalpy $\Delta H^{\neq}$ for the release of TDS from the complexes were positive, and the values increased with increasing $n$. The value of activation entropy $\Delta S^{\neq}$ was negative, and the value of $|-\Delta S^{\neq}|$ decreased with increasing $n$. The release of TDS from the complex was found to be an enthalpically controlled reaction. The release of TDS from octadecanoic acid-TDS complex, $(SA)_6(TDS)$, was found to be most disadvantageous from the enthalpic viewpoint and most advantageous from the entropic viewpoint as compared with the complexes formed with hexadecanoic acid and tetradecanoic acid. Furthermore, the largest value of activation energy for the release of TDS from $(SA)_6(TDS)$ was found to correspond to the largest positive value of $\Delta G^{\neq}$ for the release of TDS.

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