

The binding of ^{14}C formaldehyde to tissues is shown in Figure 2. At room temperature (25°C), formaldehyde bound to tissue sections increased with time until an equilibrium was reached. Since the tissue sections were extremely thin ($16\text{ }\mu\text{m}$), penetration was not considered a factor in the kinetics of the reaction. At 37°C , the reaction of formaldehyde is considerably faster and equilibrium is reached after 18 hr or less. The thickness of tissue that will be penetrated by formaldehyde under these conditions is far greater than that which bonded to the tissue according to the Medawar constant for aqueous formaldehyde where penetration of tissue-like substances is a function of the square root of the time of exposure. In the case of 4% formaldehyde the constant is about 5.5, which means that in 24 hr immersion, formaldehyde may penetrate 20 or more mm. The rate of binding of ^{14}C formaldehyde to tissues that were thick was not measured. In a practical sense, this experiment shows that since covalent binding of formaldehyde into cross links is a fundamental event in fixation, fixation with formaldehyde depends on 24 hr exposure at room temperature or 18 hr at 37°C .