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A New Preparation of Peroxynitrite that Does Not Involve Nitrite

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ABSTRACT

Peroxynitrite ($ONOO^-$) and peroxynitrous acid (ONOOH) are strong biological oxidants that cause deleterious reactions such as lipid peroxidation, protein modification, and DNA damage and can ultimately lead to cell death. Peroxynitrite formation in vivo is primarily considered to occur from the nearly diffusion-controlled reaction of nitric oxide (NO) and superoxide (O_2^-). Due to the complications of preparing $ONOO^-$ from NO and O_2^-, studies on the biological and pathological effects of $ONOO^-$ in the laboratory is commonly conducted using synthetic ONOO– prepared by mixing acidic hydrogen peroxide (H_2O_2) and nitrite (NO_2^-). This widely used preparation of $ONOO^-$ inherently contains nitrite as contaminant, which has been shown to be bioactive. Here, we report a new preparation of $ONOO^-$ formed from the autoxidation of nitroxyl anion (NO^-), which does not involve nitrite. The reactivity of two preparations of $ONOO^-$ towards one- and two-electron oxidation and hydroxylation was compared. The results from this study will be presented.

KEYWORDS: peroxynitrite; peroxynitrous acid; synthetic peroxynitrite; nitric oxide; superoxide