

Supplementary Material

I. Short-term dry storage results for NBT in cellulose

Cellulose strips were sized to hold 60 μL . The strips were filled to capacity with 220- μM Bis-Tris Propane buffer, pH 6.3, and dried overnight. The strips then received 2.5 μL of NBT (2400 μM). To add the reagents in a reproducible manner, the pipette tip was gently touched to the strip surface allowing the cellulose to imbibe the fluid through capillary action. The strips were then assayed after 1, 3, and 7 days of dry storage. NADH was prepared in 50-mM Bis-Tris Propane buffer, pH 9.3, to simulate the high pH of the enzymatic reaction. The dried strips received 20 μL of solution containing 0.3-mM NADH and PMS. After 3 minutes the strips were imaged and the average grayscale intensity was analyzed. The intensity of 6 cellulose strips wetted with buffer was averaged and subtracted from all test values. A negative control of zero-NADH was performed for each dry storage condition. Additionally, a positive control of fresh reagent was performed on each day. A total of 3 replicates were run for each dry storage condition on each day.

The colorimetric signal intensity when using dried NBT was similar to that of fresh reagents as seen in **Figure S1**. However, this was influenced by autoproduction at the location of dry storage. When the cellulose pads were removed from the light-protected petri dish, there was already a faint purple signal at the center of the pad. This contributed to a greater final colorimetric signal. This is also reflected in the elevated signal intensity of the dried NBT negative control of zero-NADH. The dried NBT group showed a slight increase in signal at day 7, likely due to increased autoproduction during storage.

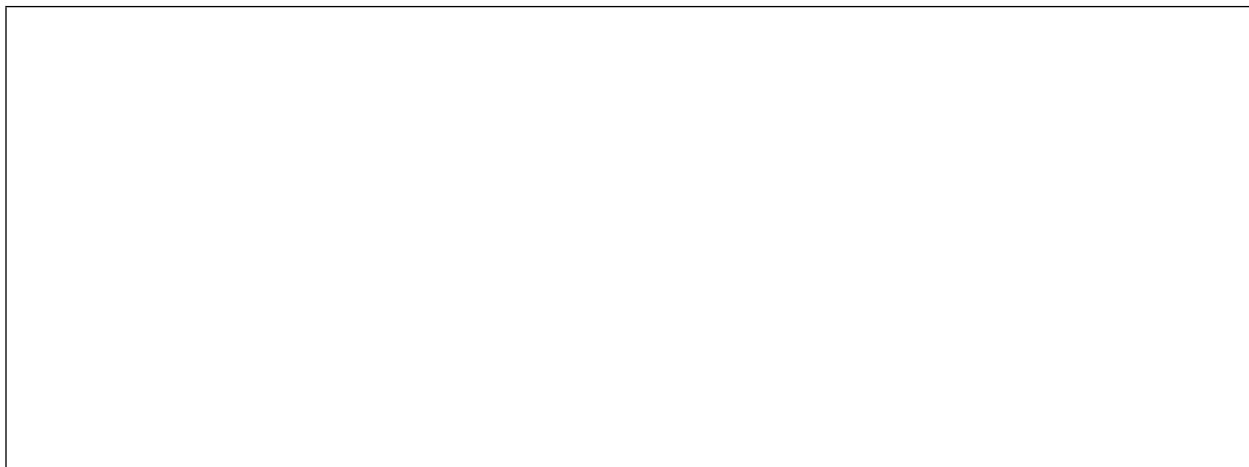


Figure S1

II. Short-term dry storage results for PheDH in glass fiber

Glass fiber pads were sized to a 60- μ L capacity. The pads received 3 μ L of PheDH solution at 20 U/mL. The pads, prior to receiving the PheDH solution, were impregnated and dried with 50-mM Bis-Tris Propane buffer, pH 9.3. The pads were then assayed after 1 and 3 days of dry storage. The pads received 60 μ L of 50-mM Bis-Tris Propane buffer, pH 9.3, to rehydrate the contents. The pads were centrifuged to extract the contents. A 50- μ L volume was then transferred into a well plate. A 50- μ L volume of Phe (1.2 mM) and NAD⁺ (7.5 mM) solution was added to the well, for a 100- μ L reaction volume. For comparison, fresh PheDH and buffer were added to glass fiber pads at volumes matching the original volumes for the dried case, and the pads centrifuged to extract the contents. The absorbance at 340 nm after 10 minutes was measured for all samples. The absorbance of a solution containing only 7.5-mM NAD⁺ was measured to normalize all other values. A total of 3 replicates were performed for each control and drying protocol on each day.

When PheDH was dried using the approach of a small, concentrated volume, it retained approximately 95% of the signal as compared to fresh reagent, after 1 day (see **Figure S2**) and

approximately 96% of the signal after day 3. In contrast, the large volume, low concentration protocol retained approximately 30% of the signal after 1 day. After 3 days, it retained approximately 16% of the signal.

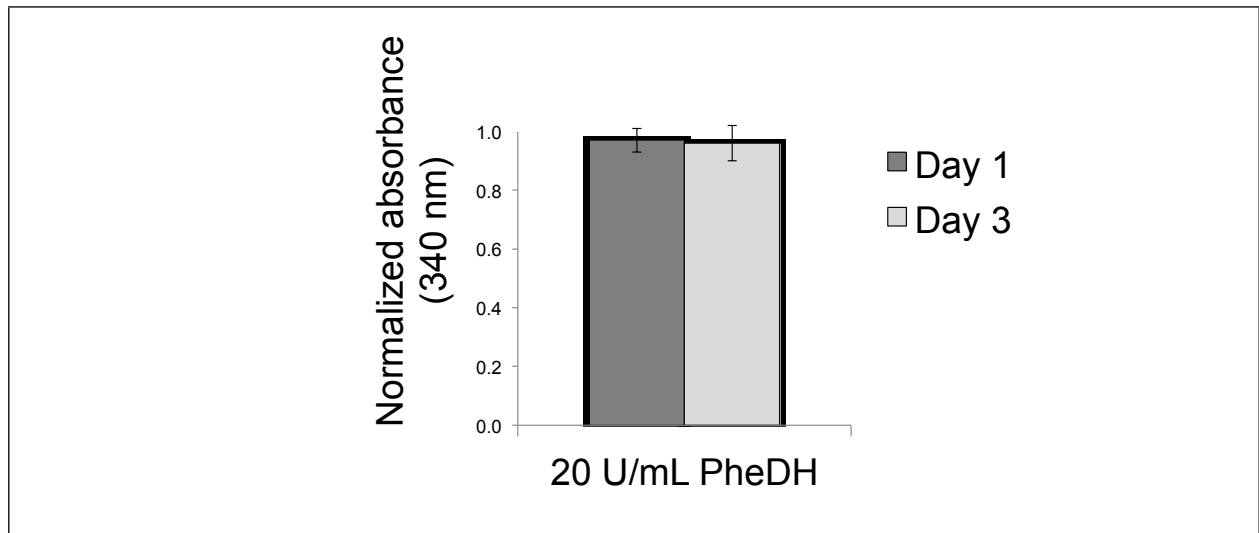


Figure S2