The goal of this study was to demonstrate a proof-of-concept that would reduce liquid handling by creating a stable, dry, and ready-to-use PCR reagent mixture by incorporating the sugar trehalose into the mixture. This study was conducted to determine whether: 1) the addition of trehalose affected amplification of forensically relevant STR loci, 2) freeze-drying and adverse storage conditions affected the reagent mixture, and 3) long term storage of the PCR reagent mixture affected the quality of forensic DNA profiles. The addition of trehalose to the ABI Identifiler™ kit PCR master mix did not adversely affect the PCR reaction. ABI Identifiler™ PCR master mix preserved with trehalose was found to produce full profiles when stored frozen and between 22-25°C for 37 hours. The trehalose preserved ABI Identifiler™ PCR master mix was viable for up to 6 weeks at 18-23°C.