respectively, indicating excellent agreement between the intercepts and μ_s' ratios for 545/390 and 452/390 nm. For 529/390 nm, when the lowest two scattering levels were omitted, the average intercept was 0.80 ± 0.06, which indicates this ratio is more sensitive to scattering than the other two ratios. This dependence on scattering can be seen from the average percent errors shown in Fig. 3, where the error for 529/390 was higher than the errors for 545/390 and 529/390 nm.

Previous work has been focused on empirical determination of one or two ratios that could be used to estimate Hb concentration or Hb saturation. Here we provide three ratios that show feasibility for predicting Hb concentration in laboratory phantom and clinical *in vivo* measurements using regression equations generated from simulated data. Any one of the three ratios can be used to predict Hb concentration, which is useful in any application where rapid quantitative measurements are needed, such as in the operating room. In addition, this provides Hb concentrations that are concordant with those extracted using a more sophisticated inverse Monte Carlo model. The ratiometric approach significantly reduces the time for data processing by almost a factor of 2000 when compared to more sophisticated methods for extracting Hb concentration, such as the inverse Monte Carlo model developed by our group [8].

5. Conclusions

Diffuse reflectance measurements from Monte Carlo simulations were used to develop linear regression equations for a set of isosbestic ratios that could quantify Hb concentration from tissue mimicking phantoms and cervical precancer data. These ratios were generally independent of scattering and Hb saturation for a large range of Hb concentrations. A simple ratiometric algorithm for diffuse reflectance measurements has applicability in settings where Hb concentration needs to be measured rapidly.

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