## P-007: Measuring absorption and reduced scattering coefficients of fresh fruit by means of laser-induced backscattering imaging

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Decoupling optical properties of fruit and vegetables appears challenging, but necessary to get better insight of the relationship between light and produce attributes. In this study, nine solid phantoms were applied capturing the ranges of absorption ($\mu_a$) from 0.1 to 1.5 $cm^{-1}$ and reduced scattering ($\mu_s'$) from 2.1 to 22.1 $cm^{-1}$ found earlier in fresh fruit. Phantoms were analysed non-destructively using laser-induced backscattering imaging (LLBI) at 660 nm. Data analysis of LLBI was carried out on the diffuse reflectance, attenuation profiles obtained by means of Farrell's diffusion theory either calculating $\mu_a$ [$cm^{-1}$] and $\mu_s'$ [$cm^{-1}$] in one fitting step or fitting only one optical variable and providing the other one from a destructive analysis. The nondestructive approach was approved when calculating one unknown coefficient non-destructively, while no ability of the method was found to analysis both, $\mu_a$ and $\mu_s'$, non-destructively. Measuring uncertainty decreased when $\mu_s'$ was fixed, while $\mu_a$ was non-destructively calculated. The approach was tested on fresh fruit. Results indicated that the optical properties of fruit changed in correspondence to chlorophyll and water contents. A batch-wise calibration step of $\mu_s'$ and online analysis of $\mu_a$ may be considered in future developments for more robust fruit sorting results, when considering real fruit developed from carpels showing high variability of $\mu_s'$ such as stone fruit and berries.