P3-2

APPLICATION OF BENFOR'S EQUATIONS TO THE PROBLEM OF "SEEING THROUGH LAYERS"

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This work is a further development of the method created by G. Krivoshiev in 1996 for elimination of peel interference and prediction of fruit flesh optical density. In this investigation, as it was earlier, the objects are observed as being structured by three successive layer "A→O→B" denoting "peel-flesh-peel". In the first version of the method the transmittances of the surface layers A and B were measured according to Kubelka-Munk theory by means of their diffuse reflectance. At that the overall transmittance T was approximated in the form of a multiplication approximation being valid for plane-parallel layers of a non-scattering material.

In this work this approximation was done away with applying the theory of discontinuum, respectively Benfor's equations. As a result two mathematical models were created for non-destructive prediction of fruit flesh optical density.

These models are different from the ones based solely on Kubelka-Munk theory, the destruction being marked by the terms ln $(1 - R_A R_0)$ and ln $(1 - R_A R_B)$, where: R_A and R_B are reflectance values for the surface layers A and B; R_0 is the average reflectance of the internal layer that could be obtained empirically by means of a preliminary measurement of sufficiently large number of physically peeled fruits of a given species and variety.