

#### Abstract:

Internal disorders of fruit that occur during storage are often caused by unfavourable composition of the atmosphere inside the fruit, which is different from the storage atmosphere. The skin represents the major barrier to gas transport. In this contribution the accuracy and applicability of different methods for estimating resistance to gas diffusion ( $R$ ) through the analysis of the efflux of preloaded inert gas out of a fruit was critically assessed. The inert gas neon was introduced as a good replacement for the non-inert gas ethane. An alternative method to determine the surface area of the fruit proved to increase the accuracy considerably. Experiments with two apple and two pear cultivars confirmed that the results obtained through non-linear regression analysis were more accurate. The largest resistance to gas diffusion was found in Doyenné du Comice pears, followed by Conference pears and Braeburn apples, and the lowest value was found for Jonica apples. Storage duration did not affect the resistance to gas diffusion unless for Doyenné du Comice where a significant increase in resistance to gas diffusion during storage could be noted. The harvest date had no influence on the resistance to gas diffusion.