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Microdosimetric response of proportional counters filled with different tissue-equivalent gases.

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In pulse mode operation each detector at the output gives pulse height spectra. These pulse height spectra from tissue-equivalent proportional counters are recalculated to microdosimetric quantity like $y_f(y)$, $y_d(y)$ or $y^*h_0(y)$ or others, for expressing the radiation quality.

The pulse height spectra from different in geometry, proportional counters have been measured for three different TEG mixtures (C₃H₈/CO₂/N₂, CH₄/CO₂/N₂ and Ne/C₂H₄/C₂H₆/N₂). The measurements have been made for the same counters, in the same geometry and radiation fields, only mixtures were different. All obtained spectra were normalised to permit their direct comparison. The mixtures pressures were varied in the range from 12 hPa to 300 hPa to have simulated tissue target diameter of the order of a few μm , from 0,4 μm to 8 μm . It was found out that the microdosimetric distributions are similar but some differences are observed up to 10%. The dose –mean energy for all spectra was determined and employed for expressing the average radiation quality. Details will be presented.

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