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## Dose-Enhancing Agent for Radiotherapy at 6 and 10 MV Medical Linac

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Radiation therapy is an important and effective technique of malignant tumors treatment [1]. Actual problem of radiotherapy is increasing effectiveness and reducing side effects of the treatment. Binary technologies of radiation therapy can be used to improve treatment results. One of the most promising technology is contrast-enhanced or "photon-capture" radiotherapy (PCT) [2]. The PCT is effective at low X-ray energies where the photoelectric effect dominates (up to about 200 keV). Accordingly, the energy escalation of photon beams leads to a gradual decrease the effect of the PCT. However, low-energy photons for medium- and deep-seated tumors are limited due to their low penetrating power. For irradiation of deep-seated tumours, the megavoltage photon beams from linear accelerators are widely used, where the Compton effect is maximal and the photoelectric effect is minimal.

Although the effect of PCT should be low, different studies shows the escalation of energy in the target volume due to the introduction of dose-enhancing agent (DEA) at megavolt photon beams [4-6]. Some authors suggest that the observed effect is caused by the wide energy spectrum of photon beams, which including the low-energy kilovolt energy range.

In this research we simulated the dependence of dose increase on the DEA concentration at 6 and 10 MV medical Linac using Monte-Carlo simulation by the means of Geant4.

### References:

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