

INTISARI

PERHITUNGAN DOSIS PADA TERAPI KANKER SERVIKS DENGAN METODE *BORON NEUTRON CAPTURE THERAPY* (BNCT) MELALUI PEMANFAATAN PHITS 3.26

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Telah dilakukan penelitian mengenai perhitungan dosis, waktu iradiasi, dan konsentrasi boron optimal untuk terapi kanker serviks dengan BNCT (*Boron Neutron Capture Therapy*). Penelitian dilakukan dengan mensimulasikan geometri jaringan kanker dan organ sehat di sekitarnya yang diiradiasi dengan neutron sekunder yang berasal dari berkas proton berenergi 30 MeV keluaran akselerator siklotron yang ditembakkan pada target Berilium. Simulasi dilakukan menggunakan program simulasi PHITS 3.26. Hasil penelitian menunjukkan : (1) Dosis yang diterima pada jaringan kanker semakin besar seiring bertambahnya konsentrasi boron. (2) Waktu iradiasi yang paling efektif untuk kasus kanker serviks stadium IIIA sebesar 29 menit 29 sekon dengan arah iradiasi *left lateral*. (3) Konsentrasi yang optimal dicapai pada konsentrasi boron sebesar 150 $\mu\text{g/g}$ jaringan dengan efek samping yang lebih minimum pada jaringan sehat dan merupakan waktu terapi paling singkat.

Kata Kunci: BNCT, kanker serviks, siklotron, PHITS

ABSTRACT

DOSAGE CALCULATIONS IN THE THERAPY OF CERVICAL CANCER WITH BORON NEUTRON CAPTURE THERAPY (BNCT) METHOD THROUGH THE UTILIZATION OF PHITS 3.26

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Research has been conducted on the calculation of dosage, irradiation time, and optimal boron concentration for cervical cancer therapy with BNCT (*Boron Neutron Capture Therapy*). The study was conducted by simulating the geometry of cancer tissue and surrounding healthy organs irradiated with secondary neutrons derived from a 30 MeV energy proton beam output of a cyclotron accelerator fired at a Beryllium target. The simulation was carried out using the PHITS 3.26 simulation program. The results showed: (1) The dose received in cancer tissue is getting bigger as boron concentrations increase. (2) The most effective irradiation time for stage IIIA cervical cancer cases is 29 minutes 29 seconds with the direction of *left lateral* irradiation. (3) Optimal concentration was achieved at boron concentration of 150 $\mu\text{g/g}$ of tissue with more minimum side effects in healthy tissue and was the shortest therapeutic time.

Keywords: BNCT, cervical cancer, cyclotron, PHITS