

PENYIAPAN CUPLIKAN DAN ANALISIS PENGAKTIFAN NEUTRON UNSUR RUNUTAN DALAM JARINGAN TUMOR DAN KANKER

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ABSTRAK

PENYIAPAN CUPLIKAN DAN ANALISIS PENGAKTIFAN NEUTRON UNSUR RUNUTAN DALAM JARINGAN TUMOR DAN KANKER. Telah banyak dikemukakan peran unsur runutan di dalam tubuh manusia. Diantaranya ada yang berperan sebagai kofaktor, aktivator atau inhibitor untuk suatu proses biokimia. Sampai batas tertentu, perubahan kandungan unsur tersebut dapat mengakibatkan proses biokimia pada jaringan tumor/kanker dan berbeda dengan jaringan normal. Dengan mempelajari macam dan kandungan unsur runutan pada kedua macam jaringan tersebut (tumor dan kanker) diharapkan dapat mengungkap salah satu aspek karsinogenesis. Di dalam penelitian ini dipelajari berbagai penyiapan cuplikan jaringan tumor dan kanker serta penentuan kandungan unsur runutannya dengan teknik analisis pengaktifan neutron. Jaringan tumor dan kanker diperoleh dari RSHS-Bandung. Penyiapan cuplikan dilakukan dengan beberapa metode khusus untuk mencegah kontaminasi unsur logam pengotor. Iradiasi dilakukan pada fluks neutron sekitar 10^{12} n cm⁻² detik⁻¹ selama 15 menit, pendinginan 2 - 6 hari (untuk unsur yang berwaktu paruh panjang). Pencacahan dilakukan dengan MCA dilengkapi detektor Ge. Hasil analisis secara kualitatif, diperoleh kesamaan antara macam unsur yang terkandung dalam jaringan tumor dan kanker. Hal ini ditunjukkan pada spektrum sinar γ hasil cacahan dari jaringan tersebut. Macam unsur runutan yang ditemukan ialah Se, As, Co, K, Mn, Fe, Zn, Sb, Cr dan Cu. Tinjauan secara kuantitatif terhadap keseluruhan hasil yang diperoleh, menunjukkan bahwa kadar rata-rata Zn dan Fe (27 μ g dan 228 μ g) di dalam jaringan tumor lebih kecil dari pada yang ditemukan di dalam jaringan kanker (45 μ g dan 292 μ g).

ABSTRACT

SAMPLE PREPARATION AND NEUTRON ACTIVATION ANALYSIS OF TRACE ELEMENTS IN TUMOR AND CANCER TISSUE. The role of trace elements in the human body has been reported many times, e.g. as cofactor, activator or inhibitor in biochemical process. To a certain extent, changes in elemental composition may bring about differing biochemical processes in tumor/cancer tissue compared with normal tissue. Qualitative and quantitative analysis of trace elements in tumor and cancer tissue can be expected to shed some light on one of the aspects of carcinogenesis. In the present study several methods were developed for sample preparation and neutron activation analysis of trace elements in tumor and cancer tissue. The tumor and cancer tissues were obtained from Hasan Sadikin General Hospital in Bandung. Special methods for sample preparation were employed to avoid elemental contamination. For short-lived elements, irradiation was carried out at a neutron flux of approximately 10^{12} n cm⁻² sec⁻¹ for 15 minutes with a cooling time of 2 - 6 days, while for long-lived elements the samples were irradiated for approximately 60 hours and cooled for 1 - 2 weeks. Counting was performed using a multichannel analyzer equipped with a germanium detector. Qualitative analysis results showed similarity in trace elements composition of tumor and cancer tissues as shown by the γ spectra. The trace elements found were Se, As, Co, K, Mn, Fe, Zn, and Cu average levels of Zn and Fe (27 μ g and 228 μ g) found in tumor tissue were lower than those in cancer tissue (45 μ g and 292 μ g).

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