

Studi pengaruh spesiasi terhadap bioakumulasi  $^{242}\text{Pu}$  dan  $^{243}\text{Am}$  melalui jalur air laut oleh siput macan (*Babylonia spirata* di perairan Teluk Jakarta) = Study of the effect of chemical speciation on the bioaccumulation of  $^{242}\text{Pu}$  and  $^{243}\text{Am}$  through seawater pathway by *Babylonia spirata* from Jakarta Bay

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Abstrak

Telah dilakukan penelitian bioakumulasi plutonium dan americium oleh *Babylonia spirata* dari Teluk Jakarta menggunakan perunut  $^{242}\text{Pu}$  dan  $^{243}\text{Am}$ . Eksperimen akuaria menggunakan dua jenis tingkat oksidasi 3 dan 4 dengan tiga kali pengulangan. Percobaan dilakukan melalui 2 tahapan, yaitu akumulasi dan depurasi. Bioavailabilitas  $^{242}\text{Pu}$   $\text{Pu}^3$  dan  $\text{Pu}^4$  dan  $^{243}\text{Am}$   $\text{Am}^3$  dan  $\text{Am}^4$  di air laut pada *Babylonia spirata* telah dipelajari. Parameter biokinetika yang diteliti meliputi faktor konsentrasi CF, konstanta laju pengambilan  $k_u$ , konstanta laju pelepasan  $k_e$ , faktor biokonsentrasi BCF, dan waktu paruh biologis  $t_{1/2}$ . Spesiasi  $^{242}\text{Pu}$   $\text{Pu}^3$  dan  $\text{Pu}^4$  dan  $^{243}\text{Am}$   $\text{Am}^3$  dan  $\text{Am}^4$  menunjukkan pengaruh yang berbeda terhadap kemampuan *B. spirata* mengakumulasi Pu dan Am. Bentuk  $\text{Pu}^4$  dan  $\text{Am}^3$  terakumulasi lebih tinggi dan tertahan lebih lama di kompartemen tubuh *B. spirata*. Radionuklida  $^{242}\text{Pu}$  dan  $^{243}\text{Am}$  terdistribusi paling tinggi pada cangkang dan sisa organ, dan terdistribusi paling rendah pada insang dan ginjal *B. spirata*.

The research of bioaccumulation Plutonium and Americium of *Babylonia spirata* from Jakarta Bay using  $^{242}\text{Pu}$  and  $^{243}\text{Am}$  radiotracers has been conducted. The aquaria experiments were applied by two oxidation states of Pu and Am speciation with three replications. The experiment was carried out by 2 steps, such as uptake and depuration. The bioavailability of  $^{242}\text{Pu}$  and  $^{243}\text{Am}$  in the III and IV oxidation states through sea water pathway has been studied for *Babylonia spirata*. Biokinetics parameters, such as concentration factors  $\text{CF}_{ss}$ , uptake rate constants  $k_u$ , elimination rate constants  $k_e$ , bioconcentration factors BCF, and biological half life  $t_{1/2}$ , were investigated. Speciation of  $^{242}\text{Pu}$   $\text{Pu}^3$  dan  $\text{Pu}^4$  dan  $^{243}\text{Am}$   $\text{Am}^3$  dan  $\text{Am}^4$  affected the ability of *B. spirata* to accumulates plutonium and americium. The research shows that  $\text{Pu}^4$  and  $\text{Am}^3$  are potentially accumulated in greater value than  $\text{Pu}^3$  and  $\text{Am}^4$  by *B. spirata*, in which Pu and Am are more rapidly distributed and retained longer in shells and remainders, and shorter in gills and kidneys.