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**Analisis Residu Kadmium (Cd) dan Timbal (Pb) di Sungai Siak, Kecamatan Tualang, Provinsi Riau: Studi
Kasus pada Air, Sedimen, Hepar dan Daging Ikan Juaro (Pangasius polyuranodon)**
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INTISARI

Analisis Residu Kadmium (Cd) dan Timbal (Pb) di Sungai Siak, Kecamatan Tualang, Provinsi Riau: Studi Kasus pada Air, Sedimen, Hepar dan Daging Ikan Juaro (*Pangasius polyuranodon*)

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Juaro merupakan ikan konsumsi endemik Sungai Siak yang berisiko mengandung residu logam berat dari aktivitas industri, perkebunan dan pelabuhan di sepanjang aliran sungai yang dapat membahayakan kesehatan manusia melalui konsumsi ikan. Penelitian ini bertujuan menilai keamanan pangan ikan juaro segar asal Sungai Siak bagian Kecamatan Tualang berdasarkan konsentrasi residu kadmium (Cd) dan timbal (Pb) daging serta nilai *Target Hazard Quotient* (THQ), mengkaji pola akumulasi Cd dan Pb pada hepar dan daging, membandingkan konsentrasi residu antar kelompok area penangkapan, serta menganalisis hubungan konsentrasi Cd dan Pb dengan panjang dan berat ikan. Dua puluh satu ekor ikan juaro segar, enam sampel air sungai dan 3 sampel sedimen dari 3 kelompok area penangkapan ikan di Sungai Siak bagian Kecamatan Tualang dikoleksi. Ikan diambil daging dan heparnya. Spektrofotometer Serapan Atom digunakan sebagai instrumen analisis residu Cd dan Pb. Nilai *Estimated Daily Intake* (EDI) dan *Target Hazard Quotient* (THQ) dihitung dalam rangka *risk assessment*. Hasil penelitian ini adalah konsentrasi residu Cd daging dan rerata Pb daging berada pada rentang <0,0039-0,01 mg/kg dan 0,064±0,057 mg/kg. Nilai THQ Cd, THQ Pb anak, THQ Pb dewasa adalah 0,004; 0,97; 0,57. Konsentrasi Cd dan Pb pada daging ikan juaro masih berada di bawah batas maksimal residu menurut SNI 2729:2021, dengan nilai THQ <1,0 yang menunjukkan tidak adanya risiko kesehatan non-karsinogenik. Pola akumulasi residu Cd dan Pb adalah konsentrasi hepar signifikan lebih tinggi dari daging. Tidak terdapat perbedaan signifikan konsentrasi residu Cd dan Pb antar kelompok area penangkapan. Konsentrasi Cd hepar berbanding lurus dengan panjang ikan (r=0,443), sebaliknya konsentrasi Pb daging berbanding terbalik dengan panjang (r=-0,607) dan berat (r=-0,504) ikan secara signifikan. Ikan juaro segar asal Sungai Siak bagian Kecamatan Tualang saat ini masih aman dikonsumsi berdasarkan parameter residu Cd dan Pb, namun *monitoring* kualitas lingkungan dan residu logam berat secara berkala tetap diperlukan.

Kata kunci: ikan juaro, keamanan pangan, residu Cd, residu Pb, Sungai Siak

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ABSTRACT

Analysis of Cadmium (Cd) and Lead (Pb) Residues in the Siak River, Tualang Sub-district, Riau Province: A Case Study of Water, Sediment, Liver and Flesh of Juaro Fish (*Pangasius polyuranodon*)

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The juaro fish (*Pangasius polyuranodon*) is an endemic food fish of the Siak River. It is at risk of accumulating heavy metal residues from industrial, agricultural, and port activities along the river, posing a potential health hazard to human consumers. This study aims to assess the food safety of fresh juaro fish from the Tualang Sub-district section of the Siak River based on cadmium (Cd) and lead (Pb) residue concentrations in the flesh tissue and the Target Hazard Quotient (THQ). Additionally, it examines the accumulation patterns of Cd and Pb in the liver and flesh, compares residue concentrations across different fishing zones, and analyzes the correlation between fish length/weight and heavy metal concentrations. Twenty-one fresh juaro fish, six river water samples, and three sediment samples were collected from three fishing zones in the Tualang Sub-district section of the Siak River. Flesh and liver tissues were extracted from the fish, and an Atomic Absorption Spectrophotometer (AAS) was used for the metal analysis. The Estimated Daily Intake (EDI) and Target Hazard Quotient (THQ) values were subsequently calculated for risk asssessment. The concentration range of Cd and the mean concentration of Pb in the flesh tissue were <0,0039–0,0100 mg/kg and 0,064 ± 0,057 mg/kg, respectively. The THQ for Cd, along with the THQ for Pb in children and adults, were 0,004, 0,970, and 0,570, respectively. The Cd and Pb concentrations in juaro fish remained below the maximum residue limits established by SNI 2729:2021, and the THQ values were <1,0, indicating no non-carcinogenic health risks. The accumulation of Cd and Pb was significantly higher in the liver than in the flesh. No significant differences in Cd and Pb concentrations were observed among the different fishing zones. Liver Cd concentration exhibited a significant positive correlation with fish length (r = 0,443). Conversely, flesh Pb concentration was significantly and negatively correlated with both fish length (r = -0,607) and weight (r = -0,504). Currently, fresh juaro fish from the Tualang Sub-district section of the Siak River remain safe for human consumption regarding Cd and Pb levels; however, regular monitoring of environmental quality and heavy metal residues is strongly recommended.

Keywords: Cd residue, food safety, juaro fish, Pb residue, Siak River