

THE ACCUMULATION OF MERCURY ON BAUNG FISH (*Mytus nemurus*) IN THE KAHAYAN RIVER OF CENTRAL KALIMANTAN

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ABSTRACT

The Kahayan River of Central Kalimantan had environmental stress due to mercury waste. This waste came from the traditional gold mining activities. There were 1014 gold mining sites along the river from upstream to downstream. Mercury in river sediment was subsequently methylated by sulfate reduction bacteria. This research were study the accumulation of mercury (Hg) on *Mytus nemurus*, sediment and water, from upstream to downstream in the Kahayan River, and also to study the fish distribution and abundance along the river. Total distance from up to downstream site was approximately 296 km. Data was collected from 3 location along the river. Within each location, sampling sites were at floodplain. Reseach was carried out during wet season. Fish were caught using *rengge* (gillnet). The determination of mercury was using SS-AAS (*solid sampling -atomic absorption spectrophotometric*) and CV-AAS (*cold vapor atomic absorption spectrophotometry*) methods. There were 7 fish species, Baung (*Mytus nemurus*), Lais Litang (*Hemisirilus heterorhynchus*), Tapasak (*Amblyrhynchichthys truncatus*), Tampahas (*Wallago leerii*), Rumet (*Polystonemus multifilis*), and Belida (*Notopterus borneensis*). The total of individual of all species was 38 fish. *M. nemurus* was found along the stream from headwater to large river. Therefore, we used *M. nemurus* for mercury measurement in the fish. This poor abundance was due to wet season sampling. The results showed that among samples being measured, the accumulation was highest in river sediment ($0,336 \mu\text{g.g}^{-1}$), followed by the meat of *M. nemurus* ($0,303 \mu\text{g.g}^{-1} \pm 0.342$), and the water (0.058 mg.l^{-1}) respectively. Mercury had tendency higher toward downstream site. This was due to sediment texture which was dominated by silt. Such condition was potential for methylation. Turbidity, water current and pH contributed to the increasing level of mercury in the downstream. WHO permittable-tolerable weekly intake for mercury was $171,42 \mu\text{g}$ was equal to $24,4 \mu\text{g}$ daily. If one person consume 100 g *M. nemurus* meat daily, it is possible that will be $30,3 \mu\text{g.g}^{-1}$ enter the body. This means that mercury along the Kahayan River threaten the people who eat fish up from this river.

Keywords :

Kahayan River, sediment, mercury (Hg) waste, Baung (*Mytus nemurus*) fish, traditional gold mine.

INTISARI

Sungai Kahayan di Kalimantan Tengah, pada saat ini mengalami tekanan lingkungan yang tinggi berupa masukan limbah merkuri (Hg). Limbah merkuri tersebut berasal dari penambangan emas tradisional. Ada 1014 *lanting* tambang emas tradisional, mulai dari hulu sampai ke hilir sungai Kahayan. Penelitian ini bertujuan untuk mempelajari akumulasi merkuri pada ikan Baung (*Mytus nemurus*), sedimen dan air mulai dari hulu sampai ke hilir Sungai Kahayan Kalimantan Tengah. Di samping itu juga dipelajari distribusi dan kemelimpahan ikan di sepanjang sungai ini. Data dikoleksi pada 3 lokasi mulai dari hulu sampai hilir, di dataran banjir. Jarak antara lokasi hulu dan hilir sungai yang dikaji mencapai 296 km. Penelitian ini dilaksanakan selama musim hujan. Sampel ikan ditangkap menggunakan jala insang (*rengge*). Kandungan merkuri diukur menggunakan metode SS-AAS (*solid sampling-atomic absorption spectrophotometric*) dan CV-AAS (*cold vapor atomic absorption spectrophotometry*). Ada 7 species ikan, yakni Baung (*Mytus nemurus*), Lais Litang (*Hemisirilus heterorhynchus*), Tapasak (*Amblyrhynchichthys truncatus*), Tampahas (*Wallago leerii*), Rumet (*Polystonemus multifilis*), dan Belida (*Notopterus borneensis*). Total cacah individu dari seluruh species adalah 38 ekor. Ikan Baung ditemukan di semua lokasi kajian, dari lokasi hulu sampai lokasi hilir. Dengan demikian, ikan Baung digunakan sebagai bahan uji pengukuran merkuri pada ikan. Kemelimpahan ini sangat sedikit, terutama diakibatkan penangkapan dilakukan pada saat musim hujan. Hasil analisis merkuri menunjukkan bahwa di antara seluruh cuplikan yang diukur, kandungan paling tinggi terdapat di sedimen sungai ($0,336 \mu\text{g} \cdot \text{g}^{-1}$), diikuti dalam daging ikan Baung ($0,303 \mu\text{g} \cdot \text{g}^{-1} \pm 0.342$), dan air ($0.058 \text{mg} \cdot \text{l}^{-1}$). Kandungan merkuri cenderung naik ke hilir sungai. Tingginya kandungan debu di daerah hilir sungai sebagai tekstur sedimen, menyebabkan proses metilasi lebih intensif daripada di hulu sungai. Selain itu, turbiditas, pH dan kecepatan arus juga memberikan kontribusi besar terhadap tingginya kandungan merkuri di hilir. Menurut WHO, konsumsi yang dapat ditolerir untuk setiap minggunya adalah sebesar $171,42 \mu\text{g}$ sama dengan $24,4 \mu\text{g}$ tiap hari. Andai kata satu orang mengkonsumsi sebanyak 100 g daging ikan Baung tiap hari, maka sekitar $30,3 \mu\text{g} \cdot \text{g}^{-1}$ masuk ke dalam tubuh. Tingkat kontaminasi ini sudah membahayakan masyarakat yang memakan ikan di sepanjang aliran Sungai Kahayan.

Keywords :

Sedimen sungai Kahayan, limbah merkuri (Hg), ikan Baung (*Mytus nemurus*), tambang emas tradisional.