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TECHNICAL FACULTY IN BOR

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WHY SHOULD USED CREOSOT IMPREGNATED WOOD WASTE BE CHARACTERIZED AS HAZARDOUS?

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Abstract

- **Introduction and objective**

Creosote is used as wood preservative all over the world. Over 1500 different chemical compounds are present in creosote [1]. Most of these molecules have render toxic, carcinogenic and mutagenic effects. Impregnated wood, as construction material for bridges, railroad ties, utility poles, have an environmental impact through the polycyclic aromatic hydrocarbons (PAHs), phenolic compounds, N-, O- and S- heterocycles emissions [2]. The aim of this review is to draw attention on waste management of creosote impregnated wood.

- **Review and results**

PAHs constitutes approximately 85 % of creosote content. U.S. Environmental Protection Agency (EPA) in 1976. made up a list of 16 PAHs to estimate risks to human health from drinking water [3]. Those 16 "priority PAHs" represent only 15 % from all of those present in creosote [4]. EU directives 75/442/EEC, 91/156/EEC, and 94/67/EEC, order that any waste that exceeds the critical creosote limit should be regarded as hazardous [4]. PAHs content over 100 mg/kgdm in solid waste classified that waste as hazardous, according to Law on Waste Management in Serbia (Regulation on categories, examination and classification of waste, Official Gazette of RS, No. 56/2010) [5].

- **Conclusion**

Can we and should we underestimate phenolic compounds and N-, O- and S- heterocycles which are also present in creosote impregnated wood among PAHs? Toxicological effects and environmental impact of every single compound in creosote composition are not known. Into addition to over 1500 chemicals following PAHs in creosote, each ones waste creosote impregnated wood should be regarded as hazardous.

***Keywords**: Creosote, Legal regulation, Waste management, Impregnated wood*

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REFERENCES

[1] C. Gallacher, R. Thomas, C. Taylor, R. Lord, R. M. Kalin, Comprehensive composition of Creosote using comprehensive two-dimensional gas chromatography time-of-flight mass spectrometry (GCxGC-TOFMS), Chemosphere, 178 (2017) 34-41.

[2] S. Lebow, K. Brooks, J. Simonsen, Environmental Impact of Treated Wood in Service, Enhancing the Durability of Lumber and Engineered Wood Products, Kissimme (Orlando), Florida, February 11-13, 2002, 205-215.
[3] J.T. Andersson, C. Achten, Time to Say Goodbye to the 16 EPA PAHs? Toward an Up-to-Date Use of PACs for Environmental Purposes, Polycyclic Aromatic Compounds, 35:2-4 (2015) 330-354.
[4] T. Thierfeldera, E. Sandströmb, The creosote content of used railway crossties as compared with European stipulations for hazardous waste, Science of Total Environment 402 (2008) 106-112.
[5] Law on Waste Management ("Official Gazette of the Republic of Serbia" No. 36/2009, 88/2010, 14/2016, 95/2018 and 35/2023) (Serbian).

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