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# QUALITY OF WOOD RESIDUE AND USED WOOD IN THE FUNCTION OF SUSTAINABLE WOOD FUEL PRODUCTION

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**Abstract**: This study presents the results of an analysis of relevant EU standards and regulations related to the quality of wood residue from the wood processing industry and used wood. The use of these categories of woody biomass for the production of wood fuels is in line with the requirements of the EN ISO 17225-1:2021 standard. In this specific case, the analysis is limited to the use of these categories of woody biomass for the production of wood pellets, wood briquettes and wood chips. In addition to the quality assessment required by the standard, the systems used in the UK and Germany to grade wood residue and used wood were also analyzed. The analysis also included the main EU regulations for waste management, including wood waste, to understand how they address the quality of wood residue and used wood. The study found that the quality of wood residue from the wood processing industry and of used wood used for the production of wood fuel is only determined by the content of heavy metals and organohalogen compounds. The subject of this study is therefore the EU standards and regulations relevant to the quality and management of wood residue from the wood processing industry and used wood. In addition, the grading systems of wood residue and used wood in selected European countries and the corresponding EU regulations were also the subject of the study. The research was carried out with the aim of determining the quality that wood residue from the wood processing industry and used wood should have in order to be used for the production of wood fuels. Future studies will extend the analysis to the EU regulations for wood packaging and the trade volume of these products on the EU market.

***Keywords:*** *woody biomass, grade, wood fuels, regulations, EU*

## INTRODUCTION

According to the classification in the EN ISO 17225-1:2021 standard, wood pellets, wood briquettes and wood chips are produced from various types of woody biomass, including by-products and wood residue from the wood processing industry and used wood. Given the objectives of the circular economy and the principles of sustainable resource use, maximizing the use of wood residue and used wood in the production of wood fuels would reduce the pressure on forests, plantations and other sources of virgin wood. Of course, each country's government decides whether to promote the production

of wood fuels from certain types of biomass or their direct combustion. This decision is not easy and depends on many factors. It should also be noted that these types of biomass are not only used for the production of wood fuels. If you decide to use wood residue from the wood processing industry and used wood for the production of wood fuels, you have to develop a whole system for the training and functioning of this decision. It is undeniable that the quality of the types of woody biomass studied must be clearly defined, as well as the management rules that apply to them. The aim of the study was therefore to determine the quality of wood residues from the wood processing industry and of used wood used for the production of wood fuels. The subject of the study was the relevant EU standards and regulations for the quality and management of wood residue from the wood processing industry and used wood. The grading systems used in the UK and Germany were analyzed to understand how the markets define the quality of the types of woody biomass under investigation. The relevant national regulations were also examined to determine whether they are in line with the key EU regulations for the management of wood residue from the wood processing industry and used wood.

## RESULTS AND DISCUSSION

In this research chapter, the quality of wood residue from the wood processing industry and of used wood was analyzed in accordance with the relevant European standards. The analysis was then extended to practical examples from the UK and German markets to determine the quality grades of the selected woody biomass types. The final part of the study focused on the main EU and national regulations dealing with waste management, including wood waste.

### Relevant EU standards for wood fuels, wood residue from wood processing industry and used wood

The following standards, which are relevant for wood fuels, wood residue from the wood processing industry and used wood, are analyzed in the paper:

1. EN ISO 17225-1:2021: *"Solid biofuels – Fuel specifications and classes";*
2. ISO/DIS[1] 17300-1:2021: *"Wood residue and post-consumer wood – Classification – Part 1: Vocabulary";*

The EN ISO 17225 standard is a multi-part standard in which the second, third and fourth parts are important for research in addition to the first part [1]. The first part of the standard specifies general requirements, the second part quality requirements for wood pellets, the third part quality requirements for wood briquettes and the fourth part quality requirements for wood chips [2-4]. The new standard ISO/DIS 17300-1 will contribute to the harmonization of terminology in the field of woody biomass, as it prescribes the definition of terms used in this field [5]. In addition to the two aforementioned standards, the standard ISO 38200:2018: *"Chain of custody of wood and wood-based products"* will also be of particular importance for the area of wood products and their quality [6]. It also specifies the requirements for the chain of custody of wood and wood-based products, bark and lignified materials other than wood, such

[1] DIS is the designation for the Draft International Standard, which means that more than 95 % of the standard is technically correct (https://www.iest.org/Standards-RPs/ISO-Standards/ISO-Document-Stages).

as bamboo and their products [6]. In this way, the quality of the product is monitored and the points at which it has changed are identified.

**Quality of wood residue from the wood processing industry and used wood according to standard EN ISO 17225:1-4**

According to the classification in the EN ISO 17225-1:2021 standard, by-products and wood residue from the wood processing industry represent the second category of woody biomass (1.2.) that can be used for the production of wood fuels, and used wood the third category (1.3.) [1]. The definitions for by-products, wood residue from the wood processing industry and used wood are contained in the ISO/DIS 17300:2021 standard [5].

The EN ISO 17225-1:2021 standard defines two classes of by-products and wood residue from the wood processing industry. This means that they can be chemically untreated and chemically treated. Chemically untreated wood residue comes from the processes of debarking, cutting, trimming, sawing, profiling and pressing of wood. Chemically treated wood residue is derived from the processes of wood processing, panel and furniture production and as such it has undergone certain chemical treatments. In the wood processing industry, chemical treatments include gluing, painting, lamination, wood protection and similar processes. Chemical treatments must not increase the content of heavy metals and organohalogen compounds in the treated wood above the limit specified in the EN ISO 17225 standard [1].

The EN ISO 17225-1:2021 standard also defines two classes of used wood. Used wood can be chemically untreated and chemically treated. Chemically untreated used wood is only mechanically processed and is only contaminated to a small extent during use. Wooden pallets, wooden packaging, cable drums and construction timber are classified in this group of secondary raw materials. In 2022, the EU imported 5.6 million tons of wood in the form of pallets, and future studies will analyze EU imports of other wood products mentioned [7]. Used wood with a content of heavy metals and organohalogen compounds above the limits specified in the EN ISO 17225-1:2021 standard is considered wood waste. Wood waste, i.e. wood that can no longer be used, is treated in accordance with the provisions of the Basel Convention on the Control of Transboundary Movement of Hazardous Waste and its Disposal.

The analysis of the requirements of the EN ISO 17225 standard shows that the quality of by-products and wood residue from the wood processing industry and of used wood used for the production of wood pellets, wood briquettes and wood chips, is determined only by the content of heavy metals and organohalogen compounds. The quality of the investigated types of woody biomass is not determined by wood species, moisture content, and size of wood pieces or similar parameters. Chemically untreated by-products and wood residue from the wood processing industry are used for the production of wood pellets, wood briquettes and wood chips of higher quality grades [8]. Chemically treated by-products and wood residue from the wood processing industry as well as used wood are used for the production of selected wood fuels of lower quality grades [8]. In the standards examined, the term wood residue is used, while the term wood waste is used for wood that is more contaminated with heavy metals and organohalogen compounds than permitted by the EN ISO 17225 standard and can no longer be used.

## Grading of wood residue from the wood processing industry and used wood in the UK and Germany

There is no common system for grading wood residue from the wood processing industry and used wood in Europe. Accordingly, the article analyzed the grading used in the UK and in Germany. A comparative analysis shows that in both markets the term "waste wood" is used instead of "wood waste" or "wood residue" [9,10]. In both countries, waste wood is graded into four grades (Table 1). The first grade (A and AI) is clean, uncontaminated wood, the second grade is treated non-hazardous wood (B and A II), the third grade is treated, non-hazardous waste and the fourth grade is treated, hazardous wood waste (D and A IV) [9,10]. From the point of view of wood fuel production, only grades A and AI are relevant, as wood waste of these grades can be used for the production of wood fuels. The quality of all types of woody biomass, which is graded into four grades in both countries, is defined in the same way as in the EN ISO 17225 standard. In this case, too, only the content of heavy metals and organohalogen compounds is relevant. Waste wood is graded as non-hazardous and hazardous waste, and the term wood residue is not used anywhere in the grading system. Accordingly, the use of the term "waste wood" is highly questionable, especially for grades A and AI, which are certainly not that.

**Table 1. Grades of waste wood on the markets in the UK and Germany**

| Country | Grades | | | |
|---|---|---|---|---|
| UK | A | B | C | D |
| | Clean untreated „waste wood" from solid softwood and hardwood: offcuts and trimmings from virgin/sawn timber and untreated boards products, packaging waste, scrap pallets, packaging cases, cable drums. | Business "waste wood" (treated non-hazardous): as grade A, plus wood from construction and demolition operations, skip operators, transfer stations. | Municipal "waste wood" (treated non-hazardous): as grade A and B, plus flat pack furniture made from board products and do-it-yourself materials. | Hazardous "waste wood" (treated hazardous): railway sleepers, telegraph poles and agriculture fencing. |
| Germany | A I | A II | A III | A IV |
| | Natural or mechanically processed „waste wood": pallets and solid wood furnitur. | Glued, coated and painted waste wood without organohalogen compounds in the coating and without wood preservatives: furniture made of particleboard, such as kitchens and wardrobes. | „Waste wood" without wood preservatives with organohalogen compounds in the coatings is only permitted after prior cleaning. | „Waste wood" treated with wood preservatives: railway sleepers, hop poles, vine poles and other waste wood. |

Source: [9, 10]

## EU regulations for the management of wood waste

The analysis of the relevant EU regulations on waste wood management included the following:

- The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal)[2] with amendments[3];
- Commission Decision of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste)[4] with Annex (Annex, List of wastes pursuant to Article 1(a) of Directive 75/442/EEC on waste and Article 1(4) of Directive 91/689/EEC on hazardous waste);[5]
- Directive 2008/98/EC of the European Parliament and of the Council of November 19, 2008 on waste and repealing certain Directives[6], with amendments[7];
- Directive (EU) 2018/851 of the European Parliament and of the Council of May 30, 2018 amending Directive 2008/98/EC on waste[8];
- Regulation (EC) No 1013/2006 of the European Parliament and of the Council of June 14, 2006 on shipments of waste,[9] with amendments[10].

[2] https://www.basel.int/TheConvention/Overview/TextoftheConvention/tabid/1275/Default.aspx

[3] Amendment of the Basel Convention (Article 17 (5)), BC-10/3: Indonesian-Swiss country-led initiative to improve the effectiveness of the Basel Convention; Amendment to the annexes to the Basel Convention (Article 18), VIII/15: Revisions to the procedure for the review or adjustment of the lists of wastes contained in Annexes VIII and IX and the status of decision VII/21; Basel Convention E-waste Amendments, BC-15/18: Amendments to Annexes II, VIII and IX to the Basel Convention (https://www.basel.int/Implementation/Ewaste/EwasteAmendments/Overview/tabid/9266/Default.aspx), Amendment to Annex IV, BC-17/15, (https://www.basel.int/TheConvention/Amendments/Overview/ tabid/2759/Default.aspx).

[4] https://eur-lex.europa.eu/eli/dec/2000/532/oj/eng

[5] **2001/118/EC**: Commission Decision of 16 January 2001 amending Decision 2000/532/EC as regards the list of wastes (Text with EEA relevance) (notified under document number C(2001) 108). Document 32001D0118. *OJ L 47, 16.2.2001, p. 1–31*. URL: https://eur-lex.europa.eu/eli/dec/2001/118(1)/oj; **2001/119/EC**: Commission Decision of 22 January 2001 amending Decision 2000/532/EC replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste (Text with EEA relevance) (notified under document number C(2001) 106), *OJ L 226, 6.9.2000, p. 3–24*, URL: https://eur-lex.europa.eu/eli/dec/2000/532/oj/eng; **2001/119/EC**: Commission Decision of 22 January 2001 amending Decision 2000/532/EC replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste (Text with EEA relevance) (notified under document number C(2001) 106), Document 32001D0119. *OJ L 47, 16.2.2001, p. 32–32* URL: https://eur-lex.europa.eu/eli/dec/2001/119(1)/oj; **2001/573/EC**: Council Decision of 23 July 2001 amending Commission Decision 2000/532/EC as regards the list of wastes. Document 32001D0573. *OJ L 203, 28.7.2001, p. 18–19.* URL: http://data.europa.eu/eli/dec/2001/573/oj; **2014/955/EU**: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council Text with EEA relevance. Document 32014D0955. *OJ L 370, 30.12.2014, p. 44–86. URL:* http://data.europa.eu/eli/dec/2014/955/oj; **2023/2581/EU**: Commission Delegated Decision (EU) of 12 September 2023 correcting certain language versions of Decision 2000/532/EC C/2023/6037. Document 32023D2581. *OJ L, 2023/2581, 16.11.2023. URL: https://eur-lex.europa.eu/eli/dec_del/2023/2581/oj.*

[6] https://eur-lex.europa.eu/eli/dir/2008/98/oj/eng.

[7] COMMISSION REGULATION (EU) No 1357/2014 of 18 December 2014 replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives; COMMISSION DIRECTIVE (EU) 2015/1127 of 10 July 2015 amending Annex II to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives; COUNCIL REGULATION (EU) 2017/997 of 8 June 2017 amending Annex III to Directive 2008/98/EC of the European Parliament and of the Council as regards the hazardous property HP 14 'Ecotoxic'.

[8] https://eur-lex.europa.eu/eli/dir/2018/851/oj/eng.

[9] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02006R1013-20250101.

[10] REGULATION (EC) No 219/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 March 2009 adapting a number of instruments subject to the procedure referred to in Article 251 of the Treaty to Council Decision 1999/468/EC with regard to the regulatory procedure with scrutiny, Adaptation to the regulatory procedure with scrutiny — Part Two; DIRECTIVE 2009/31/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006; REGULATION (EU) No 1257/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 November 2013 on ship recycling and amending Regulation (EC)

"**The Basel Convention** is an international multilateral agreement that prescribes rules of conduct, i.e. criteria for the management of hazardous waste and procedures for its transboundary movement" [11]. The Basel Convention, which was adopted in 1989 and entered into force in 1992, is currently applied in 175 countries[11]. According to the Basel Convention, waste is divided into hazardous and non-hazardous waste. According to Article 1, paragraph 1 of the Basel Convention, hazardous wastes are [12]:

"(a) wastes belonging to any of the categories listed in Annex I, unless they do not exhibit any of the properties listed in Annex III; and

(b) wastes that do not fall under paragraph (a) but are defined or considered as hazardous wastes in the national legislation of the Party of export, import or transit."

Hazardous wastes are included in List A and listed in Annex VIII of the Basel Convention, while non-hazardous wastes are included in List B and listed in Annex IX of the Convention. List B of non-hazardous wastes, in the part marked B3 lists: "Wastes containing principally organic constituents, which may contain metals and inorganic materials" [12]. Category B3050 is: "untreated cork and wood waste: wood waste and scrap, whether or not agglomerated in logs, briquettes, pellets or similar forms" [12].

**The European List of Waste** or **Waste Catalog** is a list of non-hazardous and hazardous waste, according to which waste is divided into twenty groups, depending on its source, production and origin [13]. According to the Waste Catalog, wood waste is divided into five groups, namely the third, fifteenth, seventeenth, nineteenth and twentieth. The third group includes waste from wood processing and the manufacture of panels and furniture, pulp, paper and cardboard. The fifteenth group comprises wood packaging, the seventeenth group wood waste from construction and demolition, the nineteenth group wood waste from mechanical waste treatment and the twentieth group municipal wood waste.

**The Waste Directive 2008/98/EC** "prescribes measures to protect the environment and human health by preventing or reducing the generation of waste" [14]. Article 4 of the Directive prescribes the hierarchy in waste management, which consists of the following elements: "prevention, preparation for re-use, recycling, other recovery (e.g. energy recovery) and disposal" [14]. Article 11, Paragraph 2, prescribes the percentage of the weight of municipal waste by 2025, i.e. 2030 and 2035 a certain percentage of the weight of municipal waste should be prepared for re-use and recycling [14]. The directive consists of five annexes, the first of which contains the disposal methods, the second the recovery methods, the third the properties which make the waste hazardous, the fourth examples of waste prevention measures and the fifth a correlation table.

Article 1 of **Directive 2018/851** states that "Waste management in the Union should be improved and transformed into sustainable material management", which has an impact on the understanding and management of waste [15]. This is further supported by Article 2, which states that: "Improving the efficiency of resource use and ensuring that waste is valued as a resource can contribute to reducing the Union's dependence on the import of raw materials and facilitate the transition to more sustainable material management and to a circular economy model". Article 10 of the Directive explicitly clarifies the term "municipal waste". It is good to know that municipal waste includes waste from the maintenance of parks and gardens, i.e. leaves and woody material. The same Article of the Directive states that municipal waste is waste that is classified in

No 1013/2006 and Directive 2009/16/EC; COMMISSION DELEGATED REGULATION (EU) 2024/3229 of 18 October 2024 amending Regulation (EC) No 1013/2006 of the European Parliament and of the Council as regards changes on shipments of electrical and electronic waste agreed under the Basel Convention.

[11] https://www.basel.int/TheConvention/Overview/tabid/1271/Default.aspx

subgroup 1501 and group 20 of waste according to the classification in the Waste Catalogue. Waste from production, forestry, construction and demolition is not considered municipal waste. Directive 2018/851 also contains amendments to Directive 2008/98/EC.

**Regulation (EC) No 1013/2006 on waste shipment**[12] "establishes procedures and control regimes for the shipment of waste, depending on the origin, destination and route of the shipment, the type of waste shipped and the type of treatment to be applied to the waste at its destination" [16]. The annexes to the Regulation contain examples of documents accompanying the shipments of waste in the case of transboundary movements, such as Notification document for transboundary movements/shipments of waste and Movement document for transboundary movements/shipments of waste, as well as instructions for completing these documents. It also specifies the method of waste classification so that the regulation contains lists of wastes in accordance with the Basel Convention and the Waste Catalog.

Analysis of the relevant EU regulations has shown that they treat the quality of wood waste from the wood processing industry and used wood in a similar way to the EN ISO 17225 standard, i.e. the quality is defined only by the content of substances that cause certain properties that make the waste hazardous. In this sense, wood waste is defined as hazardous and non-hazardous, which is why the term wood waste and not wood residue is used.

## National regulations for the management of wood waste in the Republic of Serbia

Although the Republic of Serbia is not a member of the EU, national regulations on wood waste management are harmonized with EU regulations. "In the group of international documents used for waste management, the Republic of Serbia has ratified the Basel Convention through the Law on Confirmation of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal[13]" [11]. The provisions of the European Waste List and relevant regulations and directives have been incorporated into national laws and regulations in the field of waste management [11]. The management of wood waste in the Republic of Serbia is regulated by the Law on Waste Management[14] and the Regulation on the Method and Procedure for the Management of Construction and Demolition Wood[15], as well as by certain regulations, some of which are listed below[16]:

- Rulebook on categories, testing and classification of waste[17];
- Rulebook on the conditions and methods of collection, transport, storage and treatment of waste used as secondary raw material or for producing energy[18];
- Rulebook on the content of requests for registration in the Register of by-products and the Register of waste that has ceased to be waste[19];

[12] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02006R1013-20250101
[13] https://www.ekologija.gov.rs/sites/default/files/old-documents/Otpad/Zakoni/Zakon%20o%20potvr%C4%91ivanju%20bazelske%20konvencije%20o%20kontroli%20prekograni%C4%8Dnog%20kretanja%20opasnih%20otpada%20i%20njihovom%20odlaganju.pdf
[14] "Official Gazette of the RS" No. 36/2009, 88/2010, 14/2016, 95/2018 – other Laws and 35/2023.
[15] "Official Gazette of the RS" No. 93/2023.
[16] Rulebooks used in the RS for waste management can be found on the website of the Ministry of Environmental Protection: https://www.ekologija.gov.rs/dokumenta/upravljanje-otpadom/pravilnici.
[17] "Official Gazette of the RS" No. 56/2010, 93/2019, 39/2021 and 65/2024.
[18] "Official Gazette of the RS" No. 98/2010.
[19] "Official Gazette of the RS" No. 76/2019, 95/2022.

- Rulebook on the content of the documentation to be submitted with the request for a permit for the import, export and transit of waste[20].

**The Law on Waste Management**[21] of the Republic of Serbia regulates: "types and classification of waste; planning of waste management; waste management entities; responsibilities and duties in waste management; organization of waste management; management of hazardous waste streams; conditions and procedures for issuing permits; transboundary movements of waste; waste reporting and database; financing of waste management; monitoring and other issues of importance for waste management" [17]. Article 7 of the Law on Waste Management defines that it applies to municipal (household) waste, commercial waste and industrial waste. In Article 8a of the same Law the term by-product is defined as "material or object that has arisen as a result of the production process and whose main objective is not the production of this material or object" [17]. According to Article 4, paragraph 7, the provisions of this law do not apply to "natural, harmless agricultural or forestry materials used in agriculture and forestry or for the production of energy from such biomass by processes or methods that do not harm the environment or human health" [17].

**Regulation on the manner and procedures of construction and demolition waste management**[22] deals with wood waste which is classified in Group 17 according to the Waste Catalog: Construction and Demolition Waste, Subgroup 17020: wood [18].

The Rulebook on categories, testing and classification of waste[23] prescribes the Waste Catalog used in the RS [19]. The Serbian waste catalog is identical to the European waste catalog. In the other regulations mentioned above, the activities and documents used for the management of wood waste in the RS are more clearly and precisely defined [20-22].

**Comparative analysis of EU and national regulations for wood waste management**

Although the analyzed regulations adopted in the RS are identical to the EU regulations, some irregularities were found in the comparison. These irregularities are the result of inadequate translation of the wood industry terms from English into Serbian. The explanations are given below:

- wood waste is included in List B in category B3050 in the Law on Confirmation of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, and the word pellet is translated into Serbian as "ball" [12,23]; In the meantime the term pellet has been adopted in Serbian, and the word "ball" is no longer a suitable translation;
- the name of the third waste group in the Serbian Waste Catalogue is not in accordance with the original name of the third waste group in the European Waste Catalogue [13,19,24]. The name of the third waste group in the European Waste Catalog is: "Waste from wood processing and the production of panels and furniture, pulp, paper and cardboard". The name of the third waste group in the Serbian Waste Catalogue is: "Wastes from wood processing and the production of paper, cardboard, pulp, panels and furniture";
-the English words *panel* and *pulp* are retained in the Serbian Waste Catalogue, although there are Serbian words for both terms [13,19,24];

[20] "Official Gazette of the RS" No. 60/2009, 101/2010, 48/2017, 98/2017, 38/2018 and 6/2021.
[21] "Official Gazette of the RS" No. 36/2009, 88/2010, 14/2016, 95/2018 – other Laws and 35/2023.
[22] Official Gazette of the RS No. 93/2023.
[23] Official Gazette of the RS No. 56/2010, 93/2019, 39/2021 and 65/2024.

-the names of waste subgroups 030104 (sawdust, shavings, cuttings, wood, particle board and veneer containing hazardous substances) and 030105 are inadequately translated into Serbian. The translation of the names of the subgroups into Serbian contains the word wood chips, while wood chips do not appear in the name of the subgroups in the original version of the Waste Catalogue in English. At the same time, the word *cuttings* which exists in the original name of the group has not been translated into Serbian [13,19,24];
- according to the latest version of the Serbian Waste Catalogue [24], the wood waste subgroups 030104 and 030105 were declared waste category waste V6. Waste subgroup 030104 (sawdust, shavings, cuttings, wood, chipboard and veneer containing hazardous substances) is marked with an asterisk and represents hazardous waste. The V symbol means that the waste may have hazardous properties under certain conditions. Accordingly, waste subgroup 030104 is correctly labeled, but not subgroup 030105. According to the Serbian translation, waste subgroup 030105 includes sawdust, shavings, cuttings, wood, particle board and veneer that are not listed under 030104. This means that this waste subgroup does not contain any hazardous substances, and that contradicts the designation V6 and its meaning [13,24];
- the name of waste subgroups 19 12 in the original version of the Waste Catalogue (Commission Decision 2000/532/EC) contains the word *pelletising*, which is incorrectly translated as "palletizing" instead of "pelleting" in the Serbian catalog [13,19,24].

## CONCLUSION

According to the requirements of the EN ISO 17225-1-4 standard, the quality of by-products and wood residue from the wood processing industry and of used wood used for the production of wood fuels is assessed only on the basis of the content of heavy metals and organohalogen compounds. The standards define two grades of by-products and wood residue from the wood processing industry and used wood, depending on whether they have been chemically treated or not. Grading of waste wood in the UK and German markets is achieved according to the same quality requirements as in the EN ISO 17225 standards. Grading into four grades is used in both countries, while only grades A and AI are relevant for wood fuel production. At the same time, the use of the term “waste wood” in the grading is questionable, especially for grades A and AI.

EU standards and regulations clearly define the quality of by-products and wood residue from the wood processing industry and of used wood used for the production of wood fuels. However, the term wood residue used in EN ISO 17225 standards will be difficult to introduce into current EU regulation as it stands for non-hazardous wood waste. As part of future research, the analysis will be extended to other EU regulations in this area. Particular attention will be paid to the regulations on wood packaging and the volume of trade in these products on the EU market.

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