



# Knärzje Product CO<sub>2</sub> eq. Factsheet

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## EXECUTIVE SUMMARY

CarbonTag has conducted a comprehensive analysis of the CO<sub>2</sub> eq. emissions associated with the production of Knärzje’s Original and Knärzje's Alkoholfrei beer. The results indicate a significant reduction in emissions, with Knärzje's pioneering sustainable practices in ingredient sourcing and brewing leading to a decrease in CO<sub>2</sub> eq. product emissions by over **40%**. This report provides a detailed outline of the substantiated green claims, affirming Knärzje’s dedication to environmental conservation and their proactive measures towards reducing their carbon footprint. The findings highlight the effectiveness of Knärzje’s environmental strategies and their continued pursuit of sustainable excellence in the brewing industry.





# SUSTAINABILITY PRACTICES

Knärzje has integrated several key sustainability practices into its beer production process, including:

- The **integration of recycled bread**, sourced from Biokaiser's organic bakery surplus and non-marketable items, into their brewing process. By substituting 25% of the traditional barley malt with these bread remnants, the brewery not only curtails food waste but also reduces the CO<sub>2</sub> eq. emissions by reducing the virgin ingredient emissions associated with their beer. This sustainable approach is exemplified in their production of both their original and alcohol-free beer, demonstrating a practical application of recycling within the brewing industry.
- The **use of ingredients certified organic** by Bioland in their beer production. These ingredients meet the standards set by the Regulation 2018/848 of the European Parliament and the Council of 30 May 2018 on organic production and the labelling of organic products, along with subsequent related legal acts, collectively known as the "EU Organic Regulation." Farms certified by Bioland are required to adhere to the stipulations of the EU Organic Regulation in its current iteration. A notable example is the application of manure instead of synthetic fertilisers, a practice under these organic standards that significantly contributes to the reduction of CO<sub>2</sub> equivalent emissions from the production of these ingredients.
- The **use of renewable electricity** for the brewing process. Knärzje sources its beer from a brewery that utilises a renewable electricity mix supplied by Eon for their operations, which directly impacts the CO<sub>2</sub> eq. emissions associated with the electricity used during production. This shift to green electricity is reflected in the product-level CO<sub>2</sub> eq. emissions, resulting in a reduction of the overall emissions of Knärzje's products and decreasing its dependence on fossil fuels.





- The **use of non-branded, reusable glass bottle** as packaging. Knärzje adopts eco-friendly packaging by utilizing non-branded, reusable glass bottles made from recycled glass. These non-branded bottles are chosen to effectively shorten the refill journey, consequently lowering the transportation CO<sub>2</sub> eq. emissions associated with Knärzje's products.

## METHODOLOGY & ASSUMPTIONS

The carbon footprint analysis conducted by CarbonTag encompasses the entire lifecycle of Knärzje's beer production, from ingredient sourcing to packaging and distribution to the end consumer. For more information see our detailed methodology report. The following assumptions were crucial to our calculations and the subsequent green claims that resulted from them:

- **Recycled Bread Usage:** The CO<sub>2</sub> eq. emissions associated with the production of the virgin bread materials were excluded, given that the bread was not initially produced for the purpose of being recycled by Knärzje and is thus accounted for in the waste emissions part of the carbon footprint of the bread itself, for which the Biokaiser's bakery is responsible. Additionally, we did not take non-materialized emissions into account. This means that we did not subtract the ingredient emissions that were avoided by using the recycled bread from the total emissions of Knärzje's products, as we cannot be certain about the counterfactual scenario, i.e. we cannot be sure that Knärzje would even produce beer if it weren't for the fact that they substitute 25% with recycled bread. Similarly, we also disregarded the possibility that the bread would otherwise have been used as animal feed, as yet again we cannot be sure about the counterfactual scenario and assume that there is still enough bread to recycle in the area that the animals did not have to change their diet due to Knärzje's intervention.



- **Organic Farming Practices:** In assessing the CO<sub>2</sub> eq. emissions impact of organic ingredients, we considered that organic farming typically results in lower yields per hectare, potentially increasing emissions factors such as fuel use for farming operations, as more land must be cultivated to achieve the same output. Furthermore, we acknowledged that organic practices in compliance with Bioland standards avoid the use of synthetic fertilizers and pesticides. These emissions were, therefore, not included in the calculation for Knärzje's organic ingredients. The manure used in place of synthetic fertilizers was also not included in Knärzje's emissions profile, as it is categorized under manure management emissions for animal-based products. This is because the manure was not produced explicitly for Knärzje's ingredients, hence the responsibility lies with the livestock owners who use it to produce animal-based products. Additionally, we did not account for non-materialized emissions, meaning we did not deduct the emissions that would have been produced by synthetic fertilizers if manure had not been used. This approach was due to uncertainties surrounding the counterfactual scenario; for instance, it is not definitively known whether Knärzje would produce beer without the use of organic ingredients.
- **Renewable Electricity Consumption:** To evaluate the CO<sub>2</sub> eq. emissions reduction resulting from the use of green electricity, our analysis compared the greener electricity mix employed in Knärzje's brewery operations with the average German electricity mix at the product level. Since Knärzje's cannot ascertain the specific electricity mix used at the ingredient level, we utilised the average German electricity mix as a proxy.





- **Non-Branded Reusable Glass Bottles:** To assess the CO<sub>2</sub> eq. emissions reduction from utilising non-branded reusable glass bottles, we considered the extended transportation distance required for branded bottles to return to their original production facility. The notion that branded bottles may have a lower rotation frequency per lifecycle than non-branded bottles was disregarded owing to the absence of credible data substantiating this claim.

## GREEN CLAIMS

CarbonTag's comprehensive product carbon footprint analysis reveals that Knärzje has achieved a significant reduction in CO<sub>2</sub> eq. emissions through the implementation of various sustainable practices as outlined in the respective section above. The specific outcomes of our analysis are presented in Tables 1 and 2 below. From this data, the following percentage reductions in CO<sub>2</sub> eq. emissions due to Knärzje's various sustainability measures can be deduced when compared to the conventional methods where these measures are not implemented.

The incorporation of 25% recycled bread as a brewing malt has resulted in a **6.7%** decrease in CO<sub>2</sub> eq. emissions for Knärzje's Original and a **7.2%** reduction for Knärzje's Alkoholfrei. The commitment to exclusively organic ingredients has further decreased the CO<sub>2</sub> eq. emissions by **2.4%** for Knärzje's Original and by **2.1%** for Knärzje's Alkoholfrei. One of the most substantial environmental benefits stems from using green electricity in the brewing process, slashing CO<sub>2</sub> eq. emissions by **23.5%** for Knärzje's Original and by **22.8%** for Knärzje's Alkoholfrei. Additionally, the choice of non-branded glass bottles has contributed to a **12%** and **11.6%** CO<sub>2</sub> eq. emissions reduction for Knärzje's Original and Knärzje's Alkoholfrei, respectively.

When these measures are combined, they result in a cumulative decrease in the CO<sub>2</sub> eq. emissions by **44%** for Knärzje's Original and by **43.3%** for Knärzje's Alkoholfrei, compared to a baseline scenario where none of these sustainable strategies were implemented. This data



underscores Knärzje's commitment to environmental sustainability and showcases the effectiveness of their targeted initiatives in reducing the overall carbon footprint of their products.

	No green action	25% recycled bread	Organic ingredients	Green electricity	Non-branded bottle	All green action
Ingredient emissions	216.48	162.36	197.47	216.48	216.48	148.1
Package emissions	122.93	122.93	122.93	122.93	122.93	122.93
Electricity emissions	205.4	205.4	205.4	16.4	205.4	16.4
Transportation emissions	258.23	258.23	258.23	258.23	162.06	162.06
Storage emissions	1.21	1.21	1.21	1.21	1.21	1.21
<b>Total emissions</b>	<b>804.25</b>	<b>750.13</b>	<b>785.24</b>	<b>615.25</b>	<b>708.08</b>	<b>450.70</b>

**Table 1:** Emissions of **Knärzje Original** in grams of CO<sub>2</sub> eq. per kg of product

	No green action	25% recycled bread	Organic ingredients	Green electricity	Non-branded bottle	All green action
Ingredient emissions	239.88	179.91	222.13	239.88	239.88	166.60
Package emissions	122.93	122.93	122.93	122.93	122.93	122.93
Electricity emissions	205.4	205.4	205.4	16.4	205.4	16.4
Transportation emissions	258.23	258.23	258.23	258.23	162.06	162.06
Storage emissions	1.21	1.21	1.21	1.21	1.21	1.21
<b>Total emissions</b>	<b>827.65</b>	<b>767.68</b>	<b>809.91</b>	<b>638.65</b>	<b>731.48</b>	<b>469.20</b>

**Table 2:** Emissions of **Knärzje Alkoholfrei** in grams of CO<sub>2</sub> eq. per kg of product



## CONCLUSION AND DISCLAIMER

The analysis conducted by CarbonTag substantiates Knärzje's green claims, demonstrating their substantial efforts to reduce CO2 eq. emissions through a variety of sustainability measures. It is important to note that while this report provides a comprehensive overview of the potential environmental benefits of Knärzje's practices, the results are based on assumptions that reflect the most accurate data available at the time of the analysis. Variations in data or changes in the underlying assumptions could affect the outcome of the reported emission reductions. The findings should therefore be interpreted as indicative rather than definitive, and they serve as a benchmark for Knärzje's ongoing commitment to sustainability.

For any queries regarding the details of this analysis or to seek further clarification on the methodology and results presented, please feel free to reach out to Jasper Döninghaus at CarbonTag. Jasper's expertise in environmental assessment ensures that all inquiries will be addressed with precision and due diligence. His contact information can be found in the 'Contact' section of this report.

## CONTACT

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