

NUTRIENT CONTENT AND PHYSICAL PROPERTIES OF SCOTTISH HEMP OIL AND OIL BY-PRODUCTS

~Data to support the revalorisation of hemp by-products and promote a circular nutrition~

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Background: Scotland's ambitious target of net-zero GHG emissions by 2045 and to reduce emissions by 75% by 2030 calls for a holistic approach across industry, research, education and government, as well as changing individual behaviour. Increasing agricultural diversity by inclusion of crops such as hemp could be a key component in the sectors response towards the mitigation of GHG emissions. Hemp has an excellent nutritional profile and can contribute to dietary protein diversification and boost daily fibre recommendations. Hemp also brings environmental advantages due to its capacity for carbon sequestration, and contribution to greater biodiversity, land recovery and remediation. These aspects align with the government's ambitions for protecting Scotland's future, including the current programme for early action to accelerate Scotland's journey towards net zero.

Key Points

In Scotland, agriculture is part of the strategic solution to meet the ambitious target of net-zero GHG emissions by 2045.

Agricultural hemp could become a new 'cash-crop' for Scottish agriculture and play a key role in the development and expansion of a low carbon environmentally responsible industry, bringing and creating new opportunities across the supply chain.

The very first commercial cold-pressed Scottish hemp oil was produced in Scotland in 2022 from hempseed harvested in 2021 by several Scottish farmers in NE Scotland.

Scottish hemp oil is a rich source of healthy fats (omega-3 fatty acids), superior to rapeseed and olive oil.

By-products resulting from the production of hemp oil such as hemp cake can deliver dietary recommendations for various microelements and macronutrients.

This report describes the nutritional composition and physical properties of the very first commercial cold pressed Scottish hemp oil and oil by-products and their suitability to contribute to nutritional daily recommendations.

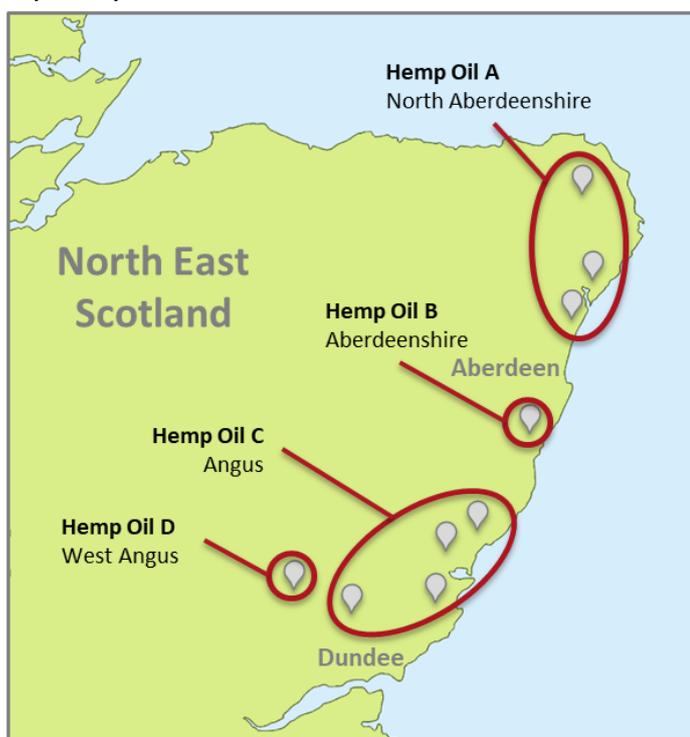


Figure 1: Locations of hemp farms and segregation of hempseed harvests used for hemp oil production.

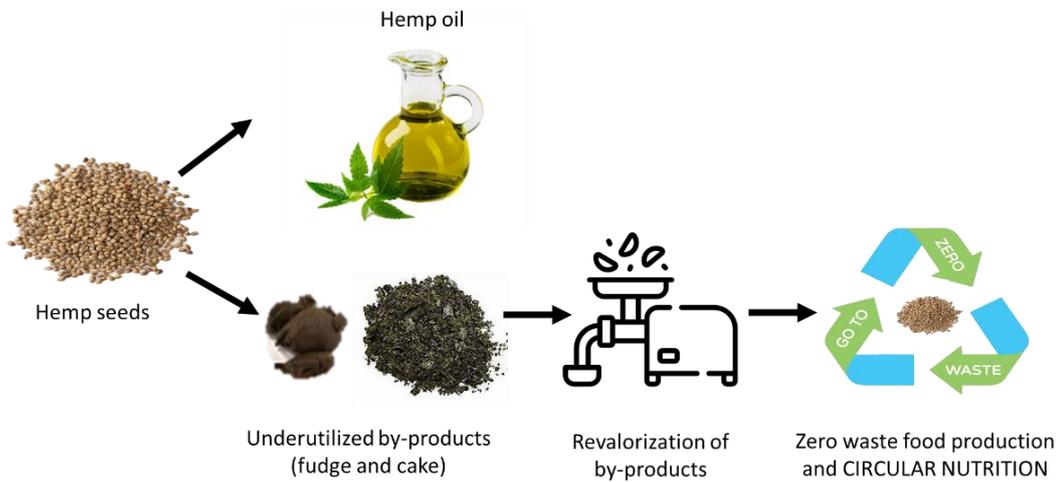


Figure 2: Primary product and by-products generated during hempseed cold press for oil production.

Main findings:

- Commercial cold-pressed Scottish hemp oil is a source of healthy fat; being rich in omega (9, 6 and 3) fatty acids, making up 80-84% of the total fat content. The oil is particularly high in omega-3 fatty acids, which makes up 19-20% of the fat content.

- Ten grams of Scottish hemp oil deliver 2 g of omega-3 fatty acid; this is the quantity required to be consumed daily for maintenance of normal blood cholesterol concentrations.

- Hemp oil is a rich source of vitamin E and could contribute to daily recommended intakes.

- Both hemp cake and oil fudge are rich sources of dietary protein (26-35%); the oil fudge is rich in fat (40%) and the hemp cake rich in dietary fibre (20-23%).

- One hundred grams of both hemp cake and oil fudge could contribute 50-70% of the "Reference Nutrient Intake (RNI)" of protein for adults and 100 g of hemp cake, could deliver approximately 67% of the daily recommendation for fibre and 80% of recommendations for non-starch polysaccharides.

- Scottish oil fudge is a rich source of omega-3 fatty acid and approximately 22 g can deliver 2 g of omega-3 fatty acids.

- Scottish hemp by-products are rich in various microelements and 100 g of product could deliver all the daily dietary recommendations for magnesium, phosphorus, potassium, manganese, iron and zinc and would contribute towards the recommendations for molybdenum, potassium, calcium and selenium.

- The thermal stability of commercial cold-pressed Scottish hemp oil is comparable to other commercial hemp oils and the results indicate that it is unlikely to be suitable for deep fat frying applications. The oil by-products have a much greater thermal stability than the oil.

Recommendations:

- Scottish hemp oil could be used as a table oil, and for light frying food preparations. similar in use to that of extra virgin olive oil.

- Scottish hemp oil and hemp fudge could be used as a healthy dietary source of fat and regular (daily) consumption could contribute to the maintenance of normal blood cholesterol concentrations.

- Scottish hemp oil and by-products could contribute to meet the daily recommendations for vitamin E

- Both hemp cake and fudge could be used to diversify the source of dietary protein and contribute to meeting dietary recommendations of several microelements.

- Scottish hemp cake could be used to meet the dietary fibre recommendations as well as to diversify the source of dietary fibre.