

Reduced-sodium seafood products: smoked salmon



SUMMARY

Table salt is approximately 40% sodium and 60% chloride. The human body requires sodium to conduct vital functions, but too much sodium in diets is known to increase blood pressure, which can lead to heart attack, strokes, dementias and kidney diseases. In most European countries, sodium intake is approximately double the level recommended by the World Health Organisation. Reducing consumption of sodium is one of the most effective ways to improve public health. This knowledge output consists of a consumer-validated formula for producing smoked salmon with 25–50% reduced sodium levels, without compromising sensory quality or food safety. The new naturally derived formula also has the potential to reduce sodium levels in additional seafood products beyond smoked salmon, as well as in many other types of food, and so could significantly contribute to improving public health.



KNOWLEDGE NEED

Seafood is a rich source of important nutrients, and while unprocessed seafood is generally low in sodium, processed smoked, cured, salted or dried seafood products typically contain high quantities. There is a need for processed seafood with lower sodium content, without compromising product quality or safety.



RESULTS

This Knowledge Output consists of a new economically viable and validated formula for producing smoked salmon with reduced sodium content. Sodium chloride, typically used for smoked salmon elaboration, was replaced with potassium chloride (KCl) at 25% and 50%. Two smoking procedures (natural wood and liquid smoke) were studied, as well as two smoking temperatures (18 – 19 °C and 56 °C). Smoked salmon samples were characterized by physicochemical, sensory and microbiological analyses. No major differences were observed regarding physicochemical properties in the studied treatments. Smoked samples with 50% of NaCl replaced by KCl were slightly more bitter than those with 25%, whereas samples with 25% replacement did not show differences to those with non-reduced Na content (5 g of added NaCl per 100 g of salmon). Microbiological assessment indicates that 2-week shelf-life would be appropriate and safe in terms of complying with EU regulation, taking into account foreseeable storage temperatures (up to 8 °C). The results confirm that it is possible to reduce sodium content in smoked salmon products without compromising quality and safety. In addition, an economic feasibility and valuation study of this product has also shown that this product has high market potential, with large target consumer groups and limited additional costs in comparison to traditional production methods.



IMPACTS

This knowledge has the potential to improve consumer health and reduce the risk of cardiovascular disease, by providing an alternative to sodium needed for processed products. This is expected to contribute to an improved health profile of the European population overall, as well as an increase in seafood sector growth, sustainability and profitability.

Contributes to the UN Sustainable Development Goal 12: Responsible consumption and production

END-USERS & APPLICATIONS

- ➔ **Salmon processors / smoked salmon producers:** could use this knowledge to improve the health benefits and nutritional quality of their products, by replacing sodium chloride with potassium chloride.
- ➔ **Food processing companies:** could apply the formula to other processed seafood and food products
- ➔ **Food scientists and research community:** working in the area of nutrition and food safety could use the knowledge to support further research and developments in this area.
- ➔ **Consumers and cardiovascular disease patients:** If brought to market, this knowledge could help to improve consumer health and increase consumption leading to economic growth in the sector.

DISSEMINATION AND EXPLOITATION

Scientific publications:

- Muñoz I *et al.* (2020). Effect of the sodium reduction and smoking system on quality and safety of smoked salmon (*Salmo salar*), *Food and Chemical Toxicology*, 139, 111554. DOI: 10.1016/j.fct.2020.111554.
- Open access version: zenodo.org/record/4267783#.YFjJ3a_7TIV
- Open access validated data sets: zenodo.org/record/4312939#.YFji5K_7TIV

Exploitation activities for policy makers:

- Managers, regulators and policy makers will be reached through the final **SEAFOOD^{TOMORROW}** event, EC info session, and a dedicated EU policy event.

Dissemination activities for society / all users:

- Project newsletter and news articles
- Promotion on Twitter and LinkedIn

Exploitation activities for seafood industry:

- IRTA has reached out to seafood processing companies participating in the project to support uptake of this knowledge
- This product was presented and available for tasting at the **SEAFOOD^{TOMORROW}** demonstration workshop in Spain, of which the proceedings can be found on the project website.
- The method was shared with the Irish Seafood Development Agency and Irish Aquaculture technology and Innovative Platform (April 2020).
- Horizon Results Platform: seafoodtomorrow.eu/horizon-results-platform



INNOVATION STATUS

Technology Readiness Level 5 – technology validated and ready for uptake. Results have been published and data is available in open access.

Patents and IPR: Not applicable



FUTURE RESEARCH

A potential area for further development would be applying this formula to other seafood and food products. Further studies would be needed to verify these additional applications, including analysis of safety and sensory properties. To complete and qualify the system, the potential impacts must be showcased to end-users.

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