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UK Shellfish are cleaner thanks to sewerage infrastructure improvements

Shellfish harvesting areas in the UK are cleaner, thanks to sewerage improvement schemes over the last decade which have lowered average levels of *Escherichia coli i*n oysters, mussels and other commercially-important species and boosted the shellfish industry's economic value. Addressing the additional pollution risks from agriculture could further reduce contamination and human health risks.

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European legislation states that shellfish beds must be monitored for microbiological pollution, under Regulation (EC) No 854/2004[1]. Each harvesting area is classified between A and C, with classifications based on the levels of the bacterium *E. coli* in shellfish flesh and the amount of treatment needed before shellfish are considered suitable for human consumption.

In 1999, the UK government set out its aim for all shellfisheries in England and Wales to achieve at least class B status. Over the following five years an estimated £43 million (€57 million) was invested in sewerage infrastructure to improve the quality of shellfish waters. Changes implemented included UV disinfection of continuous discharges and increased storage of intermittent discharges.

The study focused on *E. coli* levels in oysters (native and Pacific), mussels, cockles, scallops and surf clams around the coast of England and Wales. Between January 1999 and December 2008, these shellfish were tested for *E. coli* by local authorities at 203 monitoring points within 57 production areas.

Over the 10-year period, the average *E. coli* concentrations in shellfish fell in 12% of the sampling areas. Most of these sites had undergone major sewerage improvements in the period 2000-2005 that had affected shellfish waters. At 79% of the monitoring points there was no significant change in *E.coli* concentrations.

The percentage of production areas in England and Wales that achieved class B increased from 69% to 86%. It is estimated that this may have boosted the shellfish industry's economic value by £1-2.5 million (€1.17-2.9 million) per year, partly because supermarkets and other large purchasers prefer to source shellfish from class A or class B areas, but also because health costs of food-borne infections are reduced.

At 9% of the monitoring points, *E. coli* concentrations actually increased over the decade, while in two production areas, both upward and downward trends in *E. coli* concentrations were observed. One of these sampling points (Fal, Cornwall) was subject to major sewerage treatment improvements in the period 2000-2005, reducing shellfish water contamination by an estimated 60%. However, this site is also at risk of microbial pollution from livestock farming. Although sewage discharges have improved, contamination from land run-off now poses more of a risk and may contribute more than 40% of shellfish water contamination in the north- and south-west of England and Wales.

Contamination from agriculture is likely to fall under the UK's Catchment Sensitive Farming Delivery Initiative, although the authors of the study suggest more work is needed to understand the different sources and risks of microbiological contaminants.

Importantly, while cases of bacterial gastroenteritis from shellfish consumption have steadily fallen, thanks to monitoring of *E. coli* levels, the number of human infection outbreaks linked to shellfish contaminated with viruses, such as human norovirus, has increased over recent years. There is evidence to suggest that the current hygiene classifications for shellfisheries may not necessarily be an accurate indicator of the risk of viral contamination.

1. Regulation (EC) No 854/2004 of the European Parliament and of the Council of 29 April 2004 laying down specific rules for the organisation of official controls on products of animal origin intended for human consumption. See: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32004R0854:EN:NOT