

Utilisation and disposal of mollusc shell waste

The utilisation and disposal of waste is highly regulated and processors need to ensure their waste is responsibly dealt with. Changes in legal requirements have resulted in outlets for the disposal of waste becoming increasingly restricted and expensive. And it is not necessarily straightforward to utilise shell for other products.

Legal requirements

All waste is subject to a Duty of Care. This means that a producer of waste is responsible for that waste up to its final use or disposal.

Generally, shellfish waste is classed as a Category 3 animal by-product and must be handled and treated to the same standards as other animal by-products. This means that it should only be treated or disposed of through facilities that are licensed specifically to take that category of product. Shell that is destined to go back into the food or feed chain must be treated according to the full requirements of the Animal By-products Regulation (ABPR).

However, there are exceptions for shellfish waste that is deemed 'free of flesh' shell that will be used in certain technical 'low risk' products. Technical plants may process mollusc or crustacea shells from which the flesh has been removed when it is going to be used in the production of aggregates for a variety of uses, such as in gardens, construction, maintenance, repair of footpaths, draining the land and ornamental purposes.

If a seafood processor wishes to remove the flesh in order to supply clean shell for these specific purposes, they must ensure it is 'free of flesh'. Currently this means there should be no visible signs of flesh remaining. However this may change as the development of criteria for defining 'free of flesh' is currently underway.

A processor must ensure that whoever receives the shell (whether it is waste or to be used as a by-product) has the necessary permission for its use or disposal e.g. waste management licensing if it is used for land based purposes.

Disposal at sea is not permitted for any seafood waste produced by facilities on-shore, unless a licence has been obtained.

Uses for shell

The end use of the shell dictates the extent to which it can be supplied as 'free of flesh' or whether it has to be treated to the full requirements of the ABPR.

There are a number of potential options for the direct use of free of flesh mollusc shell;

- Aggregates
- Decorative mulches
- Ornamental uses
- Product presentation i.e. clean scallop shell for export
- Cultch (spat collection in shellfish harvesting areas).

In addition, there are a number of other products that can be produced from fully treated shell including;

- poultry feed additives
- liming agents
- fertilisers etc.
- Using it as a filtration media

Mixed flesh and shell waste can be used as bait, without any need for treatment. However it must only be used on hooks or in pots and not distributed over the seabed.

Producing free of flesh shell

Seafood processors generally produce shell with flesh attached as part of normal production. The remaining flesh can be removed through an appropriate process which could include;

- further manual or mechanical processing
- heat treatment
- high pressure washing
- use of enzymes or bacterial action
- autoclaving
- acid/alkali washing etc.

The process used should be tailored to suit the type of shell and the site. Currently, processors producing 'free of flesh' shell will largely use manual processing, whilst others use a washing process. These processes have proven relatively simple and cost-effective.

Depending on the end use, the treated shell may be broken down by milling, crushing or grinding into a range of sizes.

If the shell is used in one of the low-risk options listed, there is no requirement to sterilise or pasteurise the shell providing all the flesh has been removed.

Economics and scale

If clean shell is obtained through normal processing, no further costs will be incurred. However if a secondary flesh removal stage is required the costs will vary depending on the method used. For example, if high pressure water is used this would require the necessary equipment plus manpower, water supply, trade

effluent disposal costs and storage. Although these costs could be comparatively low, it will still require investment.

If a more complex process, such as heat treatment, is used this would vastly increase the capital and operating costs. But these costs would vary depending on the process. Therefore it is difficult to put an exact figure on costs apart from indicating this option as potentially low to medium cost.

Some of these costs could be recouped if the clean shell is sold for other uses, but in most cases it is expected that the seafood processor would pay to cover haulage to the site where the shell is used.

It is possible for a processor to develop an in-house facility to treat their own shell. This would tie in with small-scale, localised uses such as improving land drainage or for footpaths. This is already happening on a small scale in some parts of the UK.

Conversely a regional or co-operative development could be undertaken to clean up shell from a number of companies which would require a much larger facility. This would be suitable for something that requires a much larger volume of material, such as aggregates. There are currently a small number of companies taking shell, cleaning it and breaking it down into a powdered product for other uses, including land application, export etc. These have been approved as technical plants with the necessary licences issued. Similarly there are also companies who source clean shell for use in their own processes generally on a more localised level. At the moment these companies are charging up to £40/t for shell removal.

SWOT analysis for producing free of flesh shell

Strengths	Weaknesses
<ul style="list-style-type: none"> • Basic cleaning can be done in-house by a seafood processor • Can handle a large volume of shell • Can be a low technology, cost effective option • Established precedents in the UK 	<ul style="list-style-type: none"> • Can be difficult to remove all the flesh from some species • Local markets are not always available or immediately obvious • Legal restrictions may prevent use on land • Processors need space or resources to process shell in-house
Opportunities	Threats
<ul style="list-style-type: none"> • Specialist producers already use (imported) shell in a variety of products • Cleaning shell may open up markets for a wider range of products that are not currently accessible • The technical products list can be extended provided it is backed up by evidence of 'no or low risk' 	<ul style="list-style-type: none"> • Residual flesh, if not properly removed, could lead to environmental problems • Oversupply of material to local sources/outlets • Undersupply for some potential large scale options such as aggregates • Perceptions from environmental health if done in-house

Conclusion

Producing free of flesh shell and finding alternative uses for the shell is not necessarily straightforward. However if a company has the space and resources to do it and has a local outlet for the shell it is a practical solution.

The main benefit of treating shell and finding alternative uses for the shell, is that it can reduce overall disposal costs. If the shell is sold, this can generate additional income but at present income generating streams have very limited availability in the UK.

Further information

Seafish has undertaken a number of projects on the treatment and utilisation of shell. This includes;

- Shell in aggregates project
- Use of shellfish waste as bait
- Disposal at sea of seafood waste
- Land application of shellfish by-products
- Autoclaving shellfish waste

These are available to download from the publications page of our website – <http://www.seafish.org/resources/publications.asp> (search for 'waste')

We have also produced a summary of the 'Legal requirements for animal by-products' <http://www.seafish.org/upload/file/legislation/ABPQAV2.pdf>

For a list of companies approved to treat or dispose of animal by-products - <http://www.defra.gov.uk/animalhealth/inspecting-and-licensing/abp/premises/index.htm>

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