



WRAP helps individuals, businesses and local authorities to reduce waste and recycle more, making better use of resources and helping to tackle climate change.

**Written by:** Birgit Balkenhoff, SLR Consulting Limited

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# Executive summary

As part of its key role to facilitate the delivery of additional capacity for composting and anaerobic digestion of source-segregated organic waste, the Waste & Resources Action Programme (WRAP) has identified the presence of food waste packaging in feedstocks as a potential barrier to efficient processing. SLR Consulting was commissioned to undertake a literature review of the available food waste depackaging equipment, suitable for the recovery of the organic fraction for treatment in anaerobic digestion or in-vessel composting plants.

The review concluded that suitable equipment is available to remove various types of packaging from food waste and technical information about this equipment has been collated. The information provided by the participating food waste depackaging suppliers is summarised in this report, and full details are available on WRAP's Organics web pages. This includes information on each technology in form of standardised equipment data sheets for each provider; these are also accessible as hot links to facilitate easy downloading.

In total 9 companies agreed to provide technical data for their equipment for inclusion on the website. These companies are:

- Atritor
- Baader
- Ha-Di-Tec
- Komptech
- Kufferath
- Puehler
- Rothenburg
- Sebright
- Sepamatic

The featuring of particular equipment and companies does not constitute an endorsement by WRAP and WRAP cannot guarantee the performance of the individual equipment. The equipment list is not exhaustive and does not claim to cover all relevant products and specifications available on the market, although every effort has been made to ensure completeness.

WRAP invites other companies offering similar equipment to include details on the webpages - see the WRAP website for further details on how to register information.

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## 1.0 Introduction

As part of its key role to facilitate the delivery of additional capacity for composting and anaerobic digestion of source-segregated organic waste, the Waste & Resources Action Programme (WRAP) has identified the presence of food waste packaging in feedstocks as a potential barrier to efficient processing. Consequently WRAP commissioned SLR Consulting Limited (SLR) to undertake a literature review of the available food waste depackaging equipment, to summarise the key information and to display this on WRAP's Organics webpage, with the aim to provide an aid to potential project developers.

The chief aim of this review was to identify suppliers of food waste depackaging equipment which is capable of separating solid and liquid organic wastes from packaging in order to recover the organic fraction for recycling in anaerobic digestion or in-vessel composting plants. The review mainly focussed on technology suppliers from the UK and mainland Europe, but also included some other overseas suppliers.

Technology data sheets have been prepared based on information provided by the technology suppliers. These will be made available in a standard stand-alone format for reference through links on WRAP's Organics web pages. A new web page will provide information about the project context and findings as well as hot links to facilitate easy downloading of the report and the associated equipment data sheets.

## 2.0 Project Brief & Objectives

### 2.1 Project Background

It has been noted in the Waste Strategies for England and the devolved administrations that food waste is the main component of biodegradable municipal waste (BMW) remaining in residual municipal waste and that it also forms a significant element of the commercial and industrial (C&I) waste stream. A key role for WRAP is to assist the UK to meet its 2010 and 2013 Landfill Directive targets for reduction in BMW landfilled, whilst also significantly reducing UK greenhouse gas emissions. Hence food waste is now being targeted by WRAP as a key BMW component for minimisation at source, separate collection, and diversion via composting or Anaerobic Digestion (AD). Specifically WRAP is seeking to make a significant contribution to these objectives by:

- increasing the capacity for composting and anaerobic digestion of source segregated food-included organic waste (this will include capacity for food waste only as well as combined garden & food waste streams);
- encouraging the demand for quality compost and AD outputs (to BSI PAS 100:2005 specification for compost and the proposed BSI PAS110 for the outputs of AD) in existing markets; and
- identifying and opening new markets for compost and AD outputs.

The expansion of the organics recycling industry to provide additional capacity for processing separately collected food waste is expected to play a significant role in achieving the landfill directive targets. However the presence of packaging materials in food waste feedstocks, particularly those collected from food manufacturers or retailers, contaminates the feedstocks mainly with plastics, but also with paper, card, cans and glass, which is also considered to be a particular problem for 'wet' AD systems, where the plastics materials will form a 'floating layer' on the surface of the wet digestate and result in process difficulties associated with trapped gases and flow blockages. Broken glass sinks to the bottom of the digesters and can cause blockages and abrasion in transfer systems. In addition to the impact on the digestion process and the process equipment, plastic residues contaminate the visual appearance of the product manufactured in IVC as well as AD systems. If the digestate product visually contains a significant amount of plastics it will fail to comply with PAS110 (PAS100 for the product from in-vessel composting facilities) and will have to be fine-screened to remove the plastics, adding the requirement of an additional process step.

WRAP estimates that there may be between 8.3 and 11.3 million tonnes of commercial and industrial food waste in the UK. This fraction of the waste stream will contain a higher proportion of packaging waste than the estimated 6.7 million tonnes of domestically generated food waste.

It is reported that currently there are only two anaerobic digestion plants in the UK with food waste depackaging units installed. Hence, the vast majority of AD plant operators in the UK do not currently have a high level of knowledge or capacity to remove the food packaging materials prior to processing.

The use of de-packaging technologies by in-vessel composting facilities (IVC) was not included in this review. Due to the different process, packaging is generally broken up at the front-end using a shredder; and any remaining packaging that has not bio-degraded, is then removed after the composting process when the material has dried and separation is more efficient. However, the equipment identified in this report can also be used at an IVC facility for depackaging of delivered food waste, if necessary.

## 2.2 Project Objectives

SLR's **main project objective** was to identify suppliers of food waste depackaging equipment and to gather technical information and performance data from the identified and participating suppliers. The study was to include a web based literature review of potential technology suppliers followed by direct communications (by e-mail & by phone) with the identified technology providers to supplement and update existing information.

The gathered information is summarised in this report, which will be accessible on WRAP's Organics web page. The information for each technology was to be summarised on a set of standardised equipment data sheets for each provider. These datasheets contain company contact details, technical specifications, commercial information, and locations of reference plants.

The final task for SLR was to make recommendations on the design of the new web page, for inclusion within the existing WRAP Organics web pages, to display the report and provide information and relevant links to the developed standard datasheets.

The **outcome of this study** is intended to provide AD and IVC plant operators with comprehensive information of food waste depackaging technology suppliers, which will be displayed on WRAP's newly designed Organics web pages.

## 3.0 Methodology

This section of the report sets out SLR's methodology and results from the process of identifying and evaluating suitable food waste depackaging technology providers. A description of the individual project tasks is provided in the following sections:

### 3.1 Literature Review

The starting point of the food waste depackaging equipment review was an in-depth web based literature review. A detailed search of data provided on the internet and on SLR's in-house technology database was carried out in order to identify a comprehensive list of potential food waste depackaging technology suppliers. Additional technology providers from the UK, Germany, Austria, Switzerland, Sweden, Denmark, the Netherlands and the USA were identified by:

1. Identifying international AD technology suppliers on the website of the German Biogas Association<sup>1</sup>
2. Contacting the identified AD technology suppliers, asking them whether
  - a) they have used food waste depackaging equipment in some installations; and
  - b) who the manufacturer of the equipment was; and
3. Identifying food waste depackaging equipment suppliers via exhibitor lists of the IFAT<sup>2</sup> 2008 (Munich) and the RWM<sup>3</sup> exhibition 2008 (Birmingham); two of the biggest exhibitions for waste treatment equipment in Europe.

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<sup>1</sup> <http://www.biogas.org/>

<sup>2</sup> [http://www.ifat.de/en/ExhibitorDatabase/~mmg\\_exvi-action/setModel/branchid/18960939/page/branch\\_list/searchtype/branch](http://www.ifat.de/en/ExhibitorDatabase/~mmg_exvi-action/setModel/branchid/18960939/page/branch_list/searchtype/branch)

In total 106 internationally active suppliers of turnkey AD technology were listed on the website of the German Biogas Association. The companies known to provide AD plants for biowaste were contacted and asked whether they included food waste depackaging equipment in their design, and if so who the manufacturer of these machines was. In total the contacted AD plant suppliers named 6 manufacturers of food waste depackaging equipment. These are included in Table 3-1. Additionally, 33 potential food waste depackaging technology suppliers were identified via the exhibitor lists. The complete list of the preliminary identified potential suppliers of food waste depackaging equipment is included as Appendix A.

The information provided on the various company websites was then used to filter out and subsequently exclude the AD technology providers that do not handle food waste. The remaining companies were included in a preliminary list of potential food waste depackaging equipment suppliers. They are listed in Table 3-1.

**Table 3-1**  
**Preliminary list of potential food waste depackaging technology equipment suppliers**

Suppliers		
Atritor (UK)	Komptech (AT)	Kuettner (D)
Baader (Germany)	Rothenburg (D)	Thoni (AT)
Sepamatic (UK/D)	Ha-Di-Tec (D)	Wackerbauer (D)
Sebright Products (USA)	Puehler (D)	Andritz (D)
Kufferath (D)	MT Energie (D)	ARP Scandinavia (SE)
Westfalia Separators (D)	Refood (D)	BOA Recycling Equipment (UK)
Envar Composting (UK)	Food to Energy (UK)	Herbold Meckesheim GmbH (D)
Bezner Anlagenbau (D)	TrennSo-Technik GmbH (D)	Redox Recycling Technology BV (NL)
AMB (D)	AU + T Anlagenbau (D)	Spaleck (D)
Jenz GmbH (D)	Siebtechnik GmbH (D)	Sweco (UK)
Eurec Technology sales & distribution (D)	Hein. Lehmann Trenn- und Foerdertechnik (D)	Okobit (AT)
AQS (UK)	Lohse (D)	

Companies that could not clearly be identified as food waste depackaging technology suppliers from the information provided on their website were contacted via e-mail and asked for further information, if applicable. Companies that were positively identified as food waste depackaging technology suppliers were contacted by phone and provided with the request for more detailed information required for the preparation of the equipment data sheets.

### 3.2 Data Sheets and Reporting

The information provided by each supplier was used to develop a standard datasheet for ease of comparison; these will be accessible via the WRAP Organics website. The standardised version was sent to each supplier for their approval prior to including it as available link. An example of the datasheet from participating suppliers (refer Table 4-1) is included in Appendix B. In summary, the data sheet includes following information:

- manufacturer details, including contact details;
- design application;
- operating principle / schematic;
- technical specification; including:

<sup>3</sup> <http://www.mrw.co.uk/page.cfm/Action=ExhibList/t=m/goSection=22>

- throughput capacity;
- separation efficiency;
- power requirements;
- physical dimensions;
- capital investment costs;
- operating/ maintenance costs;
- required service intervals
- delivery time;
- reference facilities / installations; and
- guarantees provided by supplier.

### 3.3 Web Page Design

A new web page has been designed for inclusion on WRAP's existing Organics web pages. It was designed to provide information about the project context and the findings. It also provides manufacturers and industries connected to food waste depackging with a portal for accessing technology information displayed in form of standard datasheets and contains links to the websites of the participating companies. See Appendix C.

## 4.0 Identified Suppliers of Food Waste Depackaging Equipment

### 4.1 Identified Suppliers

In total 9 companies provided technical data for their equipment for inclusion on WRAP's new website. These suppliers are shown in Table 4-1. An example datasheet is given in Appendix B.

**Table 4-1**  
**Identified suppliers of food waste depackaging equipment**

Supplier	Company HQ or UK Branch
Atritor	Coventry, UK
Baader	Aberdeen, UK
Ha-Di-Tec (Brand)	Schmerkendorf, Germany
Komptech	Kineton, UK
Kufferath	Dueren, Germany
Puehler	Bergneustadt, Germany
Rothenburg	Neumuenster, Germany
Sebright	Michigan, USA
Sepamatic	UK

Other suppliers of food waste depackaging equipment were identified, but declined to provide information for inclusion on the WRAP webpages.

However, WRAP encourages any other companies offering similar de-packaging equipment to provide details of their equipment for inclusion - see the WRAP website for details on how to register information.

### 4.2 Provided Information

All participating suppliers provided the information listed in Section 3.2.

References were only given in generic terms, i.e. the total number of reference plants without giving details on e.g. plant capacity, types of waste being treated or type of business. When provided however, details were included on the datasheets.

### 4.3 Additional Process Information

Additionally, details on the base package and the fabrication material were provided. Some companies provided generic layout drawings, which will be accessible on the website as a link.

## 5.0 Conclusions

This review has concluded that there is suitable technology available which is capable of removing various packaging types from packaged food waste, and technical details of the equipment is provided in data-sheet form on the WRAP Organics web pages.

Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid. The inclusion of particular equipment and companies does not constitute an endorsement by WRAP and WRAP cannot guarantee the performance of the individual equipment and strongly recommends that equipment manufacturers are consulted directly.

# APPENDIX A

## List of Initially Identified Potential Food Waste Depackaging Equipment Suppliers

Company	Contact	Email	Country
AAT Abwasser und Abfalltechnik GmbH	Christian Kloser	Christian Kloser [christian.kloser@aat-biogas.at]	Austria
Agdermaskin	Arild Knutsen	<a href="mailto:arild.knutsen@agdermaskin.no">arild.knutsen@agdermaskin.no</a>	Norway
	Oyvind Repstd	<a href="mailto:oyvind.repstad@agdermaskin.no">oyvind.repstad@agdermaskin.no</a>	Norway
AMB Group		<a href="mailto:info.oc@amb-group.de">info.oc@amb-group.de</a>	Germany
Baader			
Bezner		<a href="http://www.bezner.com">www.bezner.com</a>	Germany
AQS	Sam		Ireland
Atritor	Mark Hulme	<a href="mailto:MHulme@atritor.com">MHulme@atritor.com</a>	UK
Cimbria	Hans Henrik Hansen	<a href="mailto:hjh@niras.dk">hjh@niras.dk</a>	Denmark
Eurec technology		<a href="http://www.eurec.de">www.eurec.de</a>	
FARMATIC bio power plants			UK
Grinstedt Renseanlæg	John Primdahl	<a href="mailto:jpr@billund.dk">jpr@billund.dk</a>	Denmark
Ha-Di-Tec Brand	Hr Brand		Germany
Hein Lehmann		<a href="http://www.heinleumann.de">www.heinleumann.de</a>	Germany
Herbold	herbold@herbold.com		Germany
Jenz		<a href="http://www.jenz.de">www.jenz.de</a>	Germany
Komptech UK Ltd	Paul Carley	p.carley@komptech.com	UK
Kristianstad Sweden	Lennart Erfors		Sweden
Kufferath			Germany
Kuettner			Germany
Leopold Group	<a href="mailto:Manjit@leogroupltd.co.uk">Manjit@leogroupltd.co.uk</a>		UK
Lohse			Germany
MT-ENERGIE	Susanne Barth	<a href="mailto:Susanne.barth@mt-energie.com">Susanne.barth@mt-energie.com</a>	Germany
NSR	Åsa Winkler		
Okobit	Stroh		Germany
Puehler	Bianca Peters	<a href="mailto:sekretariat@puehler.de">sekretariat@puehler.de</a>	Germany
Redox		<a href="http://www.redox.nl">www.redox.nl</a>	Netherlands
Refood			Germany
Rothenburg GmbH	Meike Rath	<a href="mailto:meike.rath@rothenburg-gmbh.de">meike.rath@rothenburg-gmbh.de</a>	Germany
Schwarting Biosystem GmbH			Germany
Sebright Products	Dennis Sprick	<a href="mailto:dennis@brightbeltpress.com">dennis@brightbeltpress.com</a>	USA
Sepamatic		<a href="mailto:info@sepamatic.co.uk">info@sepamatic.co.uk</a>	UK
Siebtechnik		<a href="mailto:sales@siebtechnik.com">sales@siebtechnik.com</a>	Germany
Spaleck		<a href="mailto:f-s@spaleck.de">f-s@spaleck.de</a>	Germany
Sweco		<a href="mailto:europe@sweco.com">europe@sweco.com</a>	UK
TEMA Machinery Ltd	Bernie Wegerhoff		Germany
Trenso Technik		<a href="http://www.trenso-technik.de">www.trenso-technik.de</a>	Germany
U-T-Chemnitz		<a href="mailto:info@u-t-chemnitz.de">info@u-t-chemnitz.de</a>	Germany
Valpak	Duncan Simpson		UK

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Wackerbauer	Anneliese Wackerbauer	Germany
Westfalia separators		Germany

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# APPENDIX B

## Example Datasheet of Food Waste Depackaging Suppliers

This is an example, all other datasheets are available online at [www.wrap.org.uk/composting/production](http://www.wrap.org.uk/composting/production)

<b>Company Information</b>	
Contact details	<p>Atritor Limited. P.O. Box 101, Edgwick Park, Coventry CV6 5RD, UK.</p> <p><b>Telephone:</b> +44 (0)2476 662266</p> <p><b>Fax:</b> +44 (0)2476 665751</p> <p><b>web:</b> <a href="http://www.turboseparator.co.uk">www.turboseparator.co.uk</a></p>
Contact person	Mark A. Hulme <a href="mailto:mhulme@atritor.com">mhulme@atritor.com</a>
Country of origin	UK
<b>Technical Specification</b>	
Typical applications include	<ul style="list-style-type: none"> <li>▪ Beverages</li> <li>▪ Biscuits</li> <li>▪ Baby Foods</li> <li>▪ Cereals</li> <li>▪ Coleslaw</li> <li>▪ Coffee</li> <li>▪ Custard</li> <li>▪ Food Tins</li> <li>▪ Gravy Granules</li> <li>▪ Household Products</li> <li>▪ Pasta</li> <li>▪ Pet Foods</li> </ul>
Operating principle	<p>The materials to be separated are introduced into the unit via a flanged inlet and cycled through the Turbo Separator's bladed shaft. The variable speed, along with the design features of the beater blades and breaker bars, separate the product from its packaging. The materials are routed through a central discharge where the product is screened out. Various screens are available depending upon the product's size and consistency. The packaging material continues through the cylinder to the end discharge for disposal or recycling.</p>
Available models	Turbo Separator
Throughput capacity (m <sup>3</sup> /h)	1-20tph
Separation efficiency (%)	Up to 99%
Speed (rpm)	200 - 2500
Power requirements (kW)	11Kw up to 37Kw depending on Model
Dimensions (mm)	From 400x1800 to 760x2440
Base package includes	Machine, support and controls
Fabrication	Carbon steel or 304 stainless steel
Layout	
Anticipated delivery time	12 – 20 weeks depending on system
Guarantees provided by the supplier	12 months on none wear parts
Price range (£)	£50,000 upwards depending on Model
Annual operating costs for maintenance and consumables (%)	Less than 5%

## References

Not permitted due to restrictions placed on us by our clients  
There are 50 operating machines of which 95% are in the UK

Estimated Maintenance cost £/a or % of purchase price	Minimal as long as rogue objects are removed prior to the process
Required service Intervals (monthly or annually)	Check bearings regularly & keep them lubricated (every 2 months)

# APPENDIX C

## Web Page Design

### Composting

- News & Information
- Compost Specifications
- Events & Landmark Training
- Publications
- Brownfield
- Landscaping
- Horticulture
- Agriculture
- Production
  - Producing Quality Compost
  - Anaerobic Digestion In Vessel Composting
  - Open Windrow Thermophillic Aerobic Digestion
- Compost Suppliers
- Quality Protocol Consultation

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## Food Waste Depackaging Equipment

The purpose of de-packaging technology is so that food waste processors can accept packaged food onto their sites and process them through composting and Anaerobic Digestion after removing the outer packaging. Operators may find that using this technology could allow them to take packaged food waste as an input to their process.

WRAP has commissioned a report into to find the different technologies available for this purpose.

The full report can be downloaded [here](#).

Below is a list of companies which have provided general contact and technical information about their products. please click on the manufacturer to find out



products, please click on the manufacturer to find out more about their products.

All information about the technology has been taken directly from data provided by the technology manufacturer, please contact the manufacturer directly if you have any questions about the information or the technology described. WRAP cannot be held responsible for any of the information provided by these companies (please refer to full disclaimer).

- 
- [Atritor](#)
  - [Baader Food Processing Machinery](#)
  - [Brand Gmbh](#)
  - [Komptech](#)
  - [Kufferath](#)
  - [Puhler](#)
  - [Rothenburg](#)
  - [Sebright](#)
  - [Sepamatic](#)

#### DOCUMENTS

- [Review of de-packaging equipment 43 kb](#) 
- [Company information – Depackaging equipment 43 kb](#)   
Include your companys information by completing and submitting this form

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