

Better bedding, improved health and higher yields

Green bedding has been widely used in continental Europe for many years, but has only recently been regarded an option in the UK. There are financial benefits to using the undigested fibres recovered from slurry but, according to leading green bedding separator manufacturer Bauer, the main reason most farmers choose it is the improved hygiene, cow health and comfort it provides. **David Williams** reports.

Bedding choice for cows is usually influenced by availability and cost; options often readily available including straw and sawdust. Sand is considered a benchmark but, with approximately 20kg of sand required per cow per day, a 1,000-cow herd needs 20t daily and the cost of the sand as well as transport can be expensive. Disposing of the slurry can also be pricey, with accelerated wear often an issue on pumps and spreading machinery. With each cow producing an average 25m³ of slurry per year, a constant challenge is providing efficient storage and transport of the liquid, but by making use of it to provide effective bedding, which also reduces reliance on other sources of material, the slurry can become a valuable asset.

Green bedding is produced by extracting undigested organic fibres from slurry, using a separation device. The most common method of separation is to pump the slurry at high pressure through a mesh tube using a tight-fitting auger, the liquids drain off through the mesh filter, leaving the solids to pass through for extraction at the end. Operating pressure, and the amount of liquid extracted, is controlled by a pair of weighted output flaps which restrict

the flow. The principle is the same as for a standard slurry separator except that for green bedding considerably higher dry matter content is required, so much tighter tolerances and higher pressures are needed.

Standard separators achieve approximately 26 per cent dry matter content while for green bedding the solids must be at least 30 per cent and preferably closer to 35 as the higher the dry matter, the healthier and more comfortable the bedding is for the cows. After separation the bedding material is applied in shallow layers of just 2–5cm depth and it must be used within five hours.

Approximately 60 herds within the UK currently use green bedding, almost all of which have been using the system for under two years. Users report immediate benefits including obviously improved cow comfort, cleaner cows and cubicles, increased cow resting time and improved health. Milk yields increase as a result, and the bacterial cell counts are reduced.

While green bedding has been readily accepted on the continent, there has been extra caution regarding the concept in the UK, and a review of international scientific evidence, together with a survey of



The new mobile separator from Bauer is designed to be easily moved between sites. It is available as a standard separator or as a green bedding separator producing green bedding material at a dry matter content up to 36 per cent and with a work-rate of 25m³/hr.

UK users, by industry body DairyCo, concluded in April this year that green bedding saves money and does not adversely affect cow health. Good disease control practice dictates that green bedding should be used only on the farm where it is produced and that only slurry from adult cattle should be used. In addition it states that dry matter content should be at least 30 per cent and ideally 35 or more.

As a result of this study, Defra permits the use of green bedding on the farm of origin subject to further monitoring of the technique over the coming years and compliance with a set of requirements and best practice guidelines being formulated by an industry stakeholders' group co-ordinated by DairyCo.

Is there enough available?

According to Bauer availability is not a problem on a typical farm as only 70 per cent of what could be produced is actually required so a herd should be self-sufficient and, because the green bedding is produced daily, there is no requirement for long-term storage.

A further benefit is that because green bedding breaks down naturally with use, there is no need to change it as there would be in a sawdust or straw-based system.

Bauer UK & Ireland sales manager Adrian Tindall says most adopters of the system so far in the UK have

been aware of the financial benefits, but the main reasons for investing in a green bedding separator have been the convenience of having

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FAN Separator green bedding separators are available with additional features over Bauer-branded units. Constant feed can be maintained with a built-in agitator at the slurry entry point and automatic adjustment of the plug pressure can be achieved by the optional automatic weight adjustment which alters the position of the resistor weights during operation.



The BRU Compact bedding recovery unit installed on a farm near Voitsberg, Austria. The new Compact version is designed for smaller herds of approximately 600 cows and produces dry green bedding up to 46 per cent dry matter. In one end of the container is the green bedding separator (pictured), and from this the green bedding enters the 6m drying drum in which it achieves a temperature of 65°C during the aerobic reaction.



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bedding produced daily on the farm with no complications of storage, and the improved animal health. "Most systems have been purchased by family farms with medium-sized herds, to provide the best living conditions for their stock," he says. "The bedding is spread easily and it dries out further as it is used by the cows and is warm, dry, and very clean. Because it is produced on the farm, it has only the farm stock's bugs in it; none are brought in from outside as can happen with sawdust. It offers all the benefits of sand but with none of the hassle."

Bauer manufactures green bedding separators under two brand names; Bauer – which supplies basic separators, and FAN Separator – which includes higher specification models with extra features available.

Versions capable of processing different amounts of slurry are available, but the working principle is the same for all of them. "Our green bedding separators have been manufactured for approximately two years and currently account for some 70 per cent of the machines sold within Europe," says Adrian. "They are premium-priced machines, but made specifically for green bedding to stand the extra stresses over those encountered by a standard separator. The quality of build and components means our units experience similar wear-rates to standard machines despite extracting 10 per cent more moisture, and their running costs are significantly less than for any



The larger BRU1000 and 2000 bedding recovery units are suitable for herds up to 2,000 cows and consist of a green bedding separator installed in a 20ft container mounted above, and feeding into, the revolving drum which is in a second 40ft container. The two containers make up one BRU system, awaiting dispatch from Bauer's factory. (pictured left), the inside of the drum.

other make. They are compact, have higher throughput so run for less time and have lower wear rates than other similar separators, and so save money."

Adrian gave the example of a typical Bauer green bedding separator with a 7.5kW motor capable of processing up to 20m³ of slurry per hour and producing bedding at 36 per cent dry matter which, with a 4kW pump, and 5.5kW mixer motor will typically cost £1.70 per hour to run.

Little maintenance is needed;

without sand in the system the screen requires cleaning once per week; a 20-minute operation, and will typically last some 2,000 hours, after which it will need replacing at a cost of approximately £2,200. The auger usually lasts 6,000–7,000 hours after which it can be refurbished. Two years' warranty is provided on bedding separators.

Ideal for contractors

A new 'plug and play' mobile separator was demonstrated at the Bauer factory in Voitsberg, Austria for the first time. Designed to be moved by a forklift or trailer, the portable unit includes the separator and pumps mounted on a galvanised steel frame with all the necessary pipework, so it requires just a three-phase electrical supply and it is ready to use. Several versions are available; capable of processing from 30–40m³/hr, and capable of achieving up to 32 per cent dry matter.

A green bedding version is also available which, with its 7.5kW motor, can achieve outputs up to 25m³/hr producing bedding at up to 36 per cent dry matter.

"It could be an ideal solution for the growing number of farms

Adrian Tindall is delighted with the new products and their success on farms. He says the advantages of the BRU dried bedding systems mean they will appeal to both mid-sized and larger livestock units offering improved cattle health and hygiene, higher milk yields and reduced demands on labour for operations such as bedding down. Like the green bedding separators they also make it easier to store and apply the liquid slurry, as it is easier to pump, and penetrates the ground better.

with more than one dairy unit and slurry storage and handling facilities," explains Adrian. "For contractors, it offers a new service opportunity that will bring the benefits of separation to farms that cannot justify investment in their own systems."

Separator for smaller farms

A new smaller separator with an output up to 5m³/hr for cattle slurry and 7–10m³/hr for pig slurry was also shown at the press event. "This is a new lower cost option for smaller dairy herds up to 150 cows or so," comments Adrian. "It eases storage demands and makes better use of slurry as a resource making separation a viable proposition for smaller farms."

The Compact separators are priced at approximately £10,000 depending on specification while a control panel, pipes and fittings adds a further £3,500.

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After leaving the drying drum the bedding material is dry and clean, and will store for up to a week under cover. Liquid is pumped away to a slurry lagoon before being applied to the land.



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Cleaner, reclaimed bedding

Taking the green bedding concept a stage further, by further drying of the green fibres making them cleaner, healthier for the cows and suitable for longer term storage, is made possible by the Fan Separator Bedding Recovery Unit (BRU).

The BRU1000 and BRU2000, suitable for up to 1,000 and 2,000 cows respectively, both use Fan Separator green bedding separators, installed in 20ft shipping containers and mounted above 40ft containers containing huge 10m-long revolving drums into which they discharge the green bedding. The drum slowly rotates, tumbling the green bedding, while air is drawn through. No additional heat is needed, as the natural breakdown of bacteria in the green bedding generates its own heat during the drying process, the temperature reaching 65–70°C, enough to kill off any harmful pathogens. After passing through the drum, which takes 10–12 hours, the resulting material is up to 46 per cent dry matter. Looking like fine compost, it makes ideal bedding material and can be stored under cover for up to one week.

Because the BRU depends on a precise chemical reaction to achieve the required temperature and to work successfully, it has to run 24 hours/day and accurate setting-up and monitoring is essential. Adjustments include the feed rate of green bedding into the drum, the rotation speed and the airflow. Initial set-up includes filling the drum with green bedding and then waiting 24 hours for the temperature to increase as the aerobic reaction starts up. Once the necessary temperature is achieved, the drum is rotated and bedding material is fed in while the operating temperature and dry matter content are monitored. Adrian Tindall says that when the necessary parameters have been identified performance remains almost constant as long as major changes to the herd feed regime don't occur. However, the key is to maintain a suitable working temperature; too low and the harmful pathogens will not be killed and, if it becomes too high, then inconsistent performance results as the bacteria which maintain the reaction are killed, causing the reaction to slow down and the temperature to drop.

Maintaining a steady through-flow and monitoring motor torque and drum operating temperature are essential to maintain consistent quality, and the operator can access the control panel remotely to ensure

the correct performance is being achieved.

Bauer makes BRU systems for livestock units up to 2,000-head, and has supplied 70 so far, to countries including the USA, Russia, Hungary, China, the UK and Canada, all for herds of 1,000 or more cows.

"It is the next step up from green bedding," explains Adrian. "It is drier, more consistent in its quality and the material is always usable whereas sometimes green bedding can vary depending on whether anything has blocked pipes or contaminated the slurry. The higher dry matter content, thorough pathogen kill and ability to store the material for longer makes it more convenient to use, and anything that will handle sawdust can be used for spreading dried bedding material."

Adrian says that as well as the additional health benefits, the system provides an easy bedding regime

for staff. "Often, on larger units, the availability of labour for routine yard tasks is limited, and the dried green bedding offers significant advantages. Being very dry it can be applied in much thicker layers than the standard green bedding so doesn't need applying daily and, because it doesn't need removing, there is less cubicle maintenance needed. Also, handling and storing the liquid slurry after the solids are removed is easier than with untreated slurry as it flows better, can be pumped longer distances for application and requires less agitation in the lagoon.

"The cleanliness of the bedding material means that in the USA, provided the material has attained a temperature of 65°C, farmers can trade it from farm to farm but in the UK at present, it can be used only on the unit where it is produced," explains Adrian.

BRU for smaller units

Making the dried bedding technology available for smaller farms, FAN Separator has launched a new BRU Compact; the whole process from solid separation to discharge of the bedding contained within a single 40ft shipping container. The same system is used as in larger versions but the revolving drum is 6m long rather than 10m. Suitable for units up to 600 cows the BRU Compact produces approximately 12m³/day of dried bedding material.

The costs of the BRU1000 and 2000, suitable for units of up to 1,000 and 2,000 cows respectively, are £168,000 and £180,000 while the new BRU Compact is priced at £151,000.

Running costs for a BRU1000 which is operating in the UK are approximately £11,000 per year, to power pumps, the separator, air supply fans and the drum revolving motors.

Poly-tankers re-launched



Bauer's Poly-Tank slurry tankers are to be sold direct to customers in the UK and Ireland, making them more competitively priced.

Bauer's range of high-specification slurry tankers is being re-launched in the UK and will be sold direct by Bauer to end-users, with parts and service back-up remaining available through local dealers. The range includes models from 10.5-24m³ and is unique in having a hand-made polyester tank mounted on a galvanised steel chassis. The polyester tank is claimed to save considerable weight, (up to 3t), compared with a traditional steel tanker and its unusual heart-shaped profile means the wheels can be set in to the lower section of the tank allowing wider tyres to be fitted while minimising width for transport and keeping the centre of gravity low.

Bauer spiral or high-capacity centrifugal pumps can be specified for fast filling and high spread rates. Options include a front filling arm for quick turn-around at the slurry store.

Spread options include a double nozzle spray boom for spreading up

to 27m, or dribble bars in working widths from 9–30m, the wider versions manufactured for Bauer by Vogelsang, and fitted with the company's macerating distributors. Further options include drag-shoe applicators up to 21m or disc injectors to place the slurry below the surface up to 8m working

width.

The new sales and supply arrangement means the farm price is more competitive, explains Adrian, and a typical 18.5m³ tandem axle version with a 15m dribble bar is available now for approximately £70,000 while an automatic loading system adds £6,000.



Activities at Bauer's test facility, visited by Farmers Guide, included demonstrations of its latest irrigation products.