

Making the cut

Labour shortages, tight margins and rising compliance demands are putting meat processors under pressure to deliver more with fewer resources. *FoodBev* explores how automation and AI are transforming conventional processing, while cultivated meat developers work to turn laboratory advances into reliable commercial production.



The meat processing sector is operating against a backdrop of sustained demand and growing production pressures. UK meat production remained broadly stable in 2025, increasing by 0.1% to a total of 4.1 million tonnes. Its value, however, rose by 9.8% to £12.1 billion, largely owing to higher beef prices, according to Defra.

Meanwhile, the OECD-FAO Agricultural Outlook 2025-2034 projects that global meat consumption will increase by 47.9 million tonnes by 2034.

Supplying that demand is becoming more complicated. Kevin van Dijk, marketing manager for meat at JBT Marel, identified "margin pressure, optimising value of raw materials, food safety demands, traceability requirements and changing consumer needs" among the sector's biggest challenges.

Together, these pressures are encouraging investment in automation, yield optimisation and digital systems that provide greater visibility across operations.

Technology, however, cannot resolve every challenge facing British processors. The British Meat Processors Association's (BMPA) CEO, John Powell, pointed to structural labour shortages, declining livestock numbers, market access barriers including post-Brexit trade friction and the duplication of "compliance audits".

BMPA's 2024 Meat Industry Manifesto charted a fall in UK abattoir numbers from around 2,500 in 1979 to 203 in 2023. Processors could use imported meat, but British livestock farms cannot operate without domestic abattoirs.

This explains why long-term confidence matters. "Processors still want to invest, but major automation and technology projects need a stable economic, regulatory and political environment," Powell told *FoodBev*. "Uncertainty makes long-term commitments harder."

From automation to intelligence

Automation is already in repetitive, labour-intensive processes "such as carcass splitting, leaf lard removal, primal cutting, grading, weighing, packing and internal logistics," said JBT Marel's Van Dijk. What is changing is the intelligence surrounding the machinery.

Around 542,000 industrial robots were installed worldwide in 2024, more than double the number a decade earlier, according to the International Federation of Robotics. Yet, Van Dijk cautioned that more equipment does not automatically create a better operation.

"The greatest gains come when processors first optimise product flow, labour allocation and process design, and

then apply automation where it delivers the most value," he said. Advanced facilities will connect employees, machinery and data rather than simply accumulate robots.

JBT Marel's latest technologies illustrate how this shift is reaching different stages of the line. Van Dijk also highlighted JBT Marel's new M-Line Splitting Saw (MSS-TT), which he said delivers "high-capacity automated splitting" with a focus on hygiene, consistency and throughput, while DeboFlex supports vertical cutting and deboning.

Advancements in JBT Marel's AuraVision grading and classification systems are "enabling processors to make more accurate, data-driven decisions through enhanced product measurement, quality assessment and classification capabilities," stated Van Dijk. AI applications including "pelvic bone detection, shoulder-blade detection, fat class determination, back-fat measurement and automatic product classification and grading," can also help processors make more accurate cuts.

Cargill is taking a similar approach with CarVe, an AI-powered computer vision system developed to improve beef yield. Leon Fletcher, vice president of operations at Cargill Beef, said: "With CarVe, cameras and AI models analyse bones and trim during production, helping identify where red meat may remain and where technique can be refined".

"Supervisors can see performance through dashboards and visual tools on plant floor kiosks, helping them coach teams using specific examples. It also supports more consistent execution because teams can review performance at the table level and identify where adjustments may be needed."

He added that early results have shown yield improvements of up to 0.5%, depending on the cut and facility. Although that percentage sounds small, at an industrial scale it can translate into a significant volume of additional saleable meat. "Recovering more usable meat helps us reduce waste, improve efficiency and keep more protein in the food supply," Fletcher said.

Developing CarVe required Cargill to build and label an image dataset, then translate its findings into accessible feedback. It does not store individual worker data and is positioned as a coaching tool.

"CarVe does not replace skilled work," Fletcher added. "It gives our teams better information to strengthen skills, consistency and recover more usable meat."

That distinction is particularly relevant in deboning. BMPA's Powell noted that robotic deboning remains "slow, costly and difficult," while Cargill's



Fletcher emphasised that every animal is different and that technology should support, rather than replace, skilled work.

Safety, sustainability and scrutiny

Automation can reduce manual handling and create more consistent hygienic product flows, while digital monitoring and traceability systems help identify deviations earlier and maintain detailed records.

JBT Marel's SensorX Accuro, for example, "uses advanced X-ray technology to automatically inspect trim for hard contaminants such as bone, metal and glass at full production speed," said Van Dijk. He added that better cutting and grading can reduce giveaway, rework and waste while improving raw material utilisation.

Yet implementing these technologies requires investment, which becomes harder to justify when processors also face overlapping audits from regulators, assurance schemes and retailers. BMPA's Powell stressed that the industry is not seeking weaker standards, but a more proportionate way of demonstrating compliance.

"The main challenge...is not weaker standards, but the growing burden of proving compliance through duplicated audits and bureaucracy," he said.

Technology can therefore strengthen control, but it cannot resolve the regulatory and commercial conditions surrounding investment on its own.

That same divide between technical capability and manufacturing reality is becoming increasingly important in cultivated meat. Although production begins with cells rather than a carcass, developers face familiar demands around safety, consistency, scale and cost. ►



Cultivated meat meets manufacturing reality

The commercial backdrop has become less forgiving. According to the Good Food Institute, investment in cultivated meat and seafood fell from \$144 million in 2024 to \$73.9 million in 2025, intensifying pressure on companies to demonstrate a viable route to commercial production.

The UK regulatory pathway is also taking shape. In June 2026, the Food Standards Agency said two cell cultivated product applications had passed validation and were progressing through formal risk assessment, which it aims to complete by February 2027. No cell cultivated food for human consumption has yet been authorised for sale in the UK.

Against this, Czech cell cultivated meat company, BeneMeat, is concentrating on the engineering required to make production reliable and economical. "The hardest part is no longer biology, it's engineering wrapped around it," said Jan Krahulík, the company's future protein strategy lead.

BeneMeat has replaced fetal bovine serum with a proprietary cultivation medium and adapted its cells to grow without antibiotics. It has also co-developed a sterilisation system designed to improve corrosion resistance and worked with "a leading global systems provider on a control system built for the specific demands of cultivated meat," highlighted Krahulík. These developments aim to ensure that processes demonstrated in the laboratory can operate consistently in industrial bioreactors.

Israeli cultivated meat business, SuperMeat, meanwhile, is reconsidering how scale should be measured. Its avian embryonic stem cells are "designed to grow in suspension, remain stable [and] tolerate the physical conditions expected at scale," mentioned Osnat Shostak, the company's VP of business development.

Rather than relying solely on larger reactors, SuperMeat uses continuous perfusion and separates cell expansion from the shorter processes used to differentiate cells into fat or muscle.

A portion of the culture can therefore be harvested while the remaining cells rebuild density. This allows each biological stage to use appropriate equipment and shifts the focus from peak cell density to sustained output over time. As Shostak put it: "An impressive bioreactor run is not yet a manufacturing process".

Both companies believe cultivated meat can benefit from established processors' expertise. BeneMeat's Krahulík pointed to their experience in "standardisation, logistics, throughput, quality management systems that hold up across thousands of tonnes," while SuperMeat's Shostak noted that conventional manufacturers begin with the finished product and work backwards. "A hybrid burger, sausage or prepared-food ingredient may not require every cell to undergo complete tissue maturation," Shostak highlighted. "It requires the right balance of flavour, fat, protein, binding, colour and cooking behaviour."

Shostak also expects the sector to adopt the principle of "carcase balance, although without the carcase," directing different cellular fractions towards their most valuable applications.

Whether production starts with a carcase or a cell culture, the objective is ultimately similar: turning biological material into safe, consistent and commercially viable food.

Conventional processors will use automation and AI to address labour and yield pressures, while cultivated meat companies will depend on disciplined engineering to transform promising science into dependable production. Across both sectors, the priorities remain improved safety, controlled costs and less waste. ●



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