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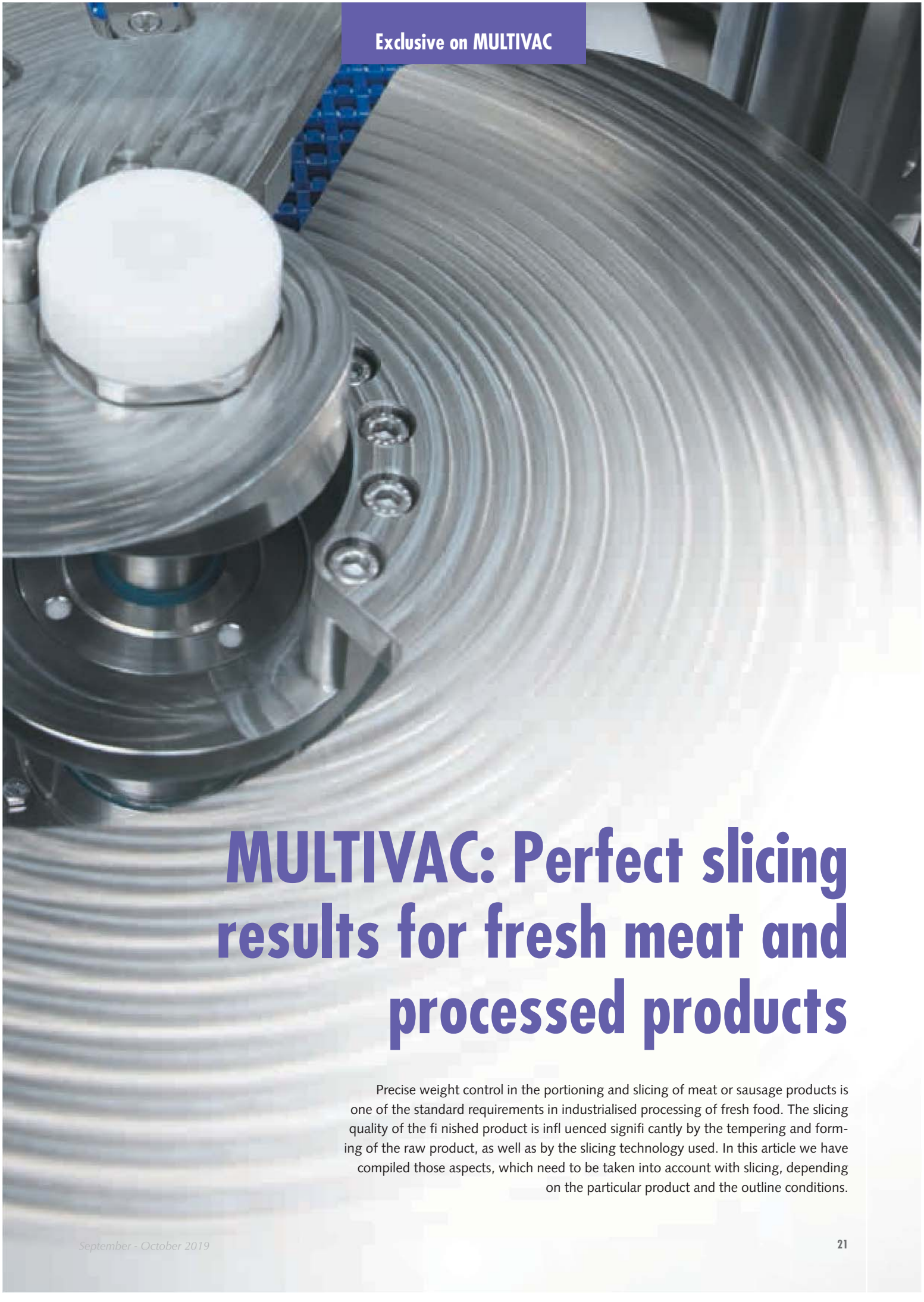

MULTIVAC: Perfect slicing results for fresh meat and processed products

Precise weight control in the portioning and slicing of meat or sausage products is one of the standard requirements in industrialised processing of fresh food. The slicing quality of the fi nished product is infl uenced signifi cantly by the tempering and forming of the raw product, as well as by the slicing technology used. In this article we have compiled those aspects, which need to be taken into account with slicing, depending on the particular product and the outline conditions.

Viewed worldwide, meat production has quadrupled in the last five decades to around 330 million tons. Experts predict this will rise by 2050 to some 450 million tons. However, in view of lower margins, tough competition, rising energy, wage and structural costs, as well as the diversity of products demanded by consumers and retailers, it is more necessary than ever for meat processing companies to optimise their working procedures and the quality of their products. But how can perfect slicing results for fresh meat and processed products be achieved in an efficient and cost-effective way?

An overview of the requirements and challenges

The market requirements relate essentially to improving yield and increasing slicing quality, while reducing give-away and achieving a high level of weight accuracy and very even portioning. In addition to maintaining the highest hygiene levels, slicing solutions should also offer high performance, user-friendly handling and maximum flexibility - they must be capable of being used universally and performing the widest possible range of tasks, as well as providing rapid change of product and format. Meeting all these requirements is however a great challenge.

Portioning of fresh meat

Meat is a natural product. Aspects such as husbandry, feeding, and type of animal, as well as the climate and many other factors, have an effect on the meat primal and infl uence its quality, texture and taste. Added to this is the fact that every region and country is subject to different legislation on processing and portioning requirements, as well as usually having different consumer attitudes. Standardisation is therefore practically impossible. When portioning fresh meat, the optimum result is therefore based on fi rst clarifying the individual conditions for the particular product: What type of raw product is to be processed? How are the products prepared for the portioning process? Which portions are required, and what throughput? What objectives are to be achieved?

If the portioning process stage is an integral part of a complete line, the downstream packaging procedure must also be included in the overall consideration, so that the maximum efficiency and best possible packaging result can be achieved.

Improving the quality of portioning or slicing through optimum product tempering

The quality of slicing or portioning is determined primarily by the slicing technology used, and in particular the fl exible adjustment of the blade speed to the particular product. As regards the product itself, the main factors include the even forming and the temperature of the product. With the rising demands of quality, output, yield, cutting accuracy, and visual appearance, the controlled tempering of the fresh product

becomes even more important. This applies to every meat portioning machine.

Depending on the product, the basic recommendation today is that the raw product should have a low core temperature of approx. 0 to 4 degrees Celsius and a small freezer crust of up to 5 millimetres. If there is no blast freezer crust, the temperature of the meat should be consistently under 0 degrees Celsius. The product quality can however suffer under some circumstances at these temperatures, since the increased formation of ice crystals promotes damage to the fibres of the meat, which in turn leads to increased loss of juice from the meat in the packaging tray, as well as changes to colour. The freezer crust does however significantly improve the forming and cutting of the portions, and therefore also the visual appearance and placement, since the blade exits crisply with a clean cutting edge and without the meat fibres being frayed or torn. Thanks to the dry surface freezing, the shelf life can also be extended significantly.

Trim-reduced or trim-free portioning

The even forming of the pieces of meat is the most important element in trim-free portioning. Forming the raw product enables an evenly formed cross section to be presented along the entire product length. This means evenly large and evenly thick slices can be cut over the whole piece of meat.

Trim with the first and last cut should generally tend towards zero. It may be necessary in some cases, however, to have a first or last cut due to quality requirements. With the portioning solutions from TVI, the leading company in this market sector, this can be kept as minimal as possible at two to three millimetres. The operator-friendly user interface enables the customer to choose, whether in fixed-weight mode he would like to cut the slice weights as exactly as possible, and therefore also accept a piece of trim, or whether this theoretical trim should be distributed evenly in trim-free mode to all the slices. The resulting small fluctuation in the slice weight can easily be compensated for via the loading lines and their checkweighing stations, so that the highest possible product yield can still be achieved with the smallest give-away.

As the market leader, which has been part of the MULTIVAC Group for two years, TVI can offer the GMS 1200 and GMS 1600 twincut high-performance models with 3D forming system for maximum portioning quality of product with and without bone. Thanks to the incorporation of the forming and cutting procedures into one process, the minimal freezer crust described above is actually sufficient. The three to five millimetre thickness is significantly smaller than with similar products on the market or with processes using external presses. In addition to this, considerable energy savings can be achieved.

Precise weight control and very even portioning

As well as correct product tempering and forming, the proper design of the forming set tooling plays the most important role in precise weight portioning. Precise specifi cation of the raw product and fi nished portion in advance also contributes significantly to the optimum result.

The 3D forming system from TVI offers signifi cant benefits in this respect over other similar systems on the market. Thanks to three-dimensional forming in conjunction with trim-free cutting, not only is the highest possible yield achieved for all products, but the maximum number of slices can also be produced from a piece of meat in visually very attractive and even portions. The weight accuracy of each individual pack is checked by means of checkweighers.

Minimising give-away

The highest possible weight accuracy is crucial, particularly for fixed-weight packs with single slice portions, since there is subsequently no possibility of having any effect on the weight of the pack. In such cases the meat portioning machine is therefore absolutely critical for the level of give-away achievable. In the case of portions with several slices, this can also be achieved by means of suitable checkweigh and make-up systems in the loading line.

The TVI solutions are also market leaders in this area as well, since they achieve the best possible values in compliance with the legislation on fi nished pack weights. Thanks to a high level of weight accuracy for the portions, as well as effi cient monitoring and correction of the loaded trays, it is possible to achieve a giveaway of under 1 percent for products without bone, where there are at least four slices per tray, and under 1.5 percent for bone-in products.

Maximum flexibility and simple handling

When portioning, a high level of fl exibility is required above all else. Multifunctional portioning machines should be able to process all types of red meat and poultry - in any consistency and to any portion size, and always optimised for weight and product trim, as well as at a low level of processing cost. The two most successful TVI models, the GMS 520 singlecut and GMS 1600 twincut, can for example cut fi llets, cutlets, and steaks from small and medium-sized meat primals at high output, as well as pork collar or salmon steaks from frozen product (down to -3° C), or roulades and thin grill strips from large meat primals, as well as diced products such as goulash and many other cuts. Even meat with bone, for example pork chops or neck cutlets of calf and lamb, can be cut into very even slices.

It is also MULTIVAC's primary objective to design these solutions to be as user-friendly as possible, but at the same time with the maximum process reliability. In addition therefore to the ease and reliability of cleaning, some of the most important features include simple machine control via a clear and intuitively operated display, as well as quick and easy conversion of the machine to different products.

The technical challenges of slicing

Many factors, which have been described in the portioning process, also apply to the slicing of sausage, ham, or cheese. These products must also be tempered to give excellent slicing results, and the slicer has to be perfectly designed for the requirements. Thanks to the innovative slicing technology, which MULTIVAC has developed for its slicers, it is possible for example to have sliced products at a measurably warmer temperature, while still slicing them extremely precisely and being very gentle on the product. Blast freezing is not required. The special asymmetric shape of the slicing blade, together with lane-centered product guiding, means there is always an identical and perfect ratio of pressure to traction at every point of contact with the product. This ensures the slicing result is consistently good. Even delicate food products retain their appearance, taste and consistency. Preparing the product for slicing is also easier, and the passage of the product through the slicer is much simpler.

The energy costs are also low. Due to the high temperature tolerance of the MULTIVAC slicing system, the product can generally be prepared fresher and warmer. This enables the storage time between manufacturing and slicing to be reduced, and less chilling capacity (volume, duration) is required for the product in the production and slicing areas. Since the product has to be chilled less, there is also less cooling output required for the chilling process after manufacture. In addition to this, energy-effi cient servo drives are used on MULTIVAC slicers, enabling compressed air to be saved.

The core elements of a slicer are essentially the loading unit, the cutting system and the product guide. The geometry and characteristics of the slicing blade are the defi ning elements of the slicing technology. Fully automatic central loading ensures product change times are very short, which gives a high level of slicing effi ciency. Lane-centered loading ensures the product is aligned exactly when slicing - and this in turn enables the sliced product to be loaded consistently accurately at the packaging machine. Servo-driven product guidance units above and below the product ensure it is fed continuously and gently to the slicing blade without any pressure. It is essential for optimum slicing quality and accuracy, and therefore for the yield as well, that the product is fed to the blade without any pressure.

The slicer range from MULTIVAC

The S 800 offers a high slicing speed with up to 800 cuts per minute. The slicing system on the machine can create virtually any form of portion - from precise placement of slices in shingled portions and straight or staggered stacks, through to the shingling of wafer-thin cut product, and right up to the folding of individual slices. The servo-driven portioning system, which can be raised and lowered, enables stacks up to 80 mm high to be produced, as well as tall shingled portions and large bulk packs of product. In contrast to other systems in the market, no pneumatic connections are required when fitting the specifically designed product grippers. At IFFA 2019 MULTIVAC will be presenting its latest model, the S 1600, which has the same features as the S 800. Thanks to its innovative slicing technology, it offers a very high slicing speed of up to 1,600 highly precise cuts per minute.

The slicers are also very impressive in their innovative blade design. Sausage, ham, and cheese can be sliced extremely precisely, and the slicing action is very gentle on the product. This “soft cut” ensures the special blades slice smoothly through sausage and cheese in a controlled way and without any pressure. The longer service life of the blade due to its longer cutting edge, as well as an

extended lifespan thanks to a regrinding scope of up to double-digit mm range, contribute to increasing the slicer's productivity and reducing costs.

Converting a slicer to different products and formats also has to be user-friendly with relatively few hand movements. Quick-change systems for the grippers significantly accelerate and facilitate conversion to different products and formats, since the grippers no longer require time-consuming adjustment or screw attachment. The whole process is completed in just a few minutes. Since the belts and cutting frame can also be exchanged quickly without tools, this further increases machine availability and efficiency. The use of 2-3-4 combined weighers has a similarly positive effect since the checkweighers do not have to be converted with different multi-track applications, and the portion weights in each individual track are still captured very accurately. This is one of the basic requirements for accurate portion weights in compliance with the legislation on pack weight limits, as well as ensuring give-away is minimised in the production batches.

Precise weight portioning of naturally formed products

When slicing naturally formed products such as raw ham, bacon, and cheese, additional measuring systems are used to determine the distribution of the product volume prior to slicing, so that the necessary slice thickness for achieving the target weight can be calculated. MULTIVAC uses the VS 600 product volume measuring system. A multi-track measuring system with laser scanners, which delivers measured results for each product independently of the track. Thanks to the use of the VS 600, even naturally formed products can be portioned with precise weights, while the give-away is also minimised.◆