

PRESS RELEASE

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KRONEN IS GRANTED A PATENT FOR ITS EQUIPMENT AND METHOD FOR PITTING AND PEELING AVOCADOS

Automated avocado processing using robotics and patented processing technology

KRONEN delivered its first robotic solution for avocado processing in April. The tools and methods that the robot uses to pit and peel avocados were developed by KRONEN and have now been granted a patent. They enable the sensitive fruit to be processed gently in an automated procedure and they play a key role in the unique Robot Avocado Line, which was showcased for the first time at this year's Fruit Logistica and Anuga FoodTec exhibitions. KRONEN developed the innovative solution in a research project in cooperation with the German Institute of Food Technology (DIL), and it is the only system of its kind on the market.

Ripe and ready-to-eat avocados are sensitive and pose difficult challenges when it comes to processing, which is why they have mostly been processed manually, even in industrial facilities, until now. Automated avocado processing using a robotic solution requires specially adapted tools that gently pit and peel the fruit while still enabling a high yield and an efficient process. KRONEN ticked these boxes by developing a method for pitting and peeling avocados with the help of specialized tools, and the company has now successfully received a patent for its unique idea.

Use of the method in the Robot Avocado Line

The tools and the method are incorporated into the Robot Avocado Line, which uses one to three robots to halve, pit and peel large amounts of avocados efficiently and hygienically, thus reliably ensuring a consistently high processing quality. Another reason for developing a machine-based solution is the fact that manual processing requires a constant turning movement, which puts a great deal of strain on employees' wrists. Furthermore, the increasing lack of suitable staff in the food processing industry means that more and more automation is required.

A patent as a result of expertise, research and development

KRONEN worked together with the industry to develop the innovative line from the first demand to the industry-ready solution. "When developing the solution, we were able to make the most of our team's many years of experience when it comes to processing, especially cutting and peeling, sensitive food products. We also acquired comprehensive expertise on the properties and processing of avocados," explains Benjamin Keske, Project Manager at KRONEN, who accompanied the topic right from the word go.

"We then incorporated this expert knowledge into the robotic tools and processing steps, which we further developed by running tests and optimizing the solution based on the results. The combination of our developments with the robots from

Stäubli offers companies that process large quantities of avocados a gentle processing solution with a high degree of automation. Both the strong interest attracted among industry players worldwide after showcasing the solution at exhibitions and the fact that we have been granted a patent for our method demonstrate that we identified the industry requirements at an early stage.

Specially adapted tools for an automated processing method

Alongside its pitting and peeling unit, another component of the Avocado Robot Line is its grabber, which is specially adapted to handle the shape and texture of avocados and was developed by the DIL in its joint research project with KRONEN. These grabbers are mounted on Stäubli robots, which perform the fully automated processing steps consecutively (with one robot) or in parallel (with two or three robots) once the avocados have been placed in an inlay tray by an employee.

- A conveyor belt transports the fruit to the measuring station, which measures the fruit and transmits the data to the robot, which in turn adjusts the grabbing and peeling processes to suit each individual fruit.
- The robot uses the grabber specially adjusted to hold the fruit to pick up the avocado and transport it to the pitting unit.
- The knives cut the flesh in half and clamp the stone.
- The grabber pits the first half of the avocado by rotating around the pitting unit.
- The robot then peels the avocado by moving it over the peeling knife, which separates the peel from the flesh.

Depending on the capacity and customer requirements, the good product can be collected in crates or discharged via a belt. As the product leaves the system, an employee visually checks the processing result.

Videos of the Robot Avocado Line: www.kronen.eu/video-avocado-robot

More information on the research project:

<https://www.kronen.eu/en/company/research/robotics-solution-avocados>

About KRONEN GmbH

KRONEN is a family-managed globally operating producer and supplier of stand-alone machines, special-purpose machines and high-tech processing facilities for the fresh-cut industry. The product portfolio of KRONEN and its partners covers fruit, vegetable and lettuce processing: from preparing, cutting, washing, drying, dewatering, peeling and sterilizing right through to packaging.

KRONEN additionally offers machines for the processing of meat and fish, special vegan products, baked goods and pet food.

The company, which is based in the German town of Kehl am Rhein and has a second production site in the nearby town of Achern, currently employs more than 130 members of staff, has representatives in over 80 countries worldwide and supplies its products to more than 120 nations all over the globe.

With more than 45 years of experience in food technology, KRONEN prides itself on its quality awareness and constantly strives to achieve the best possible solutions in its day-to-day work. The machine manufacturer focuses on taking a sustainable, holistic

approach toward the hygienic, reliable and resource-friendly production of fresh foods. KRONEN considers itself to be a think tank that provides innovative solutions to benefit its customers and meet all their needs. It guarantees top-quality advice and planning expertise in close cooperation with the industry and research establishments.

For more information, please visit www.kronen.eu

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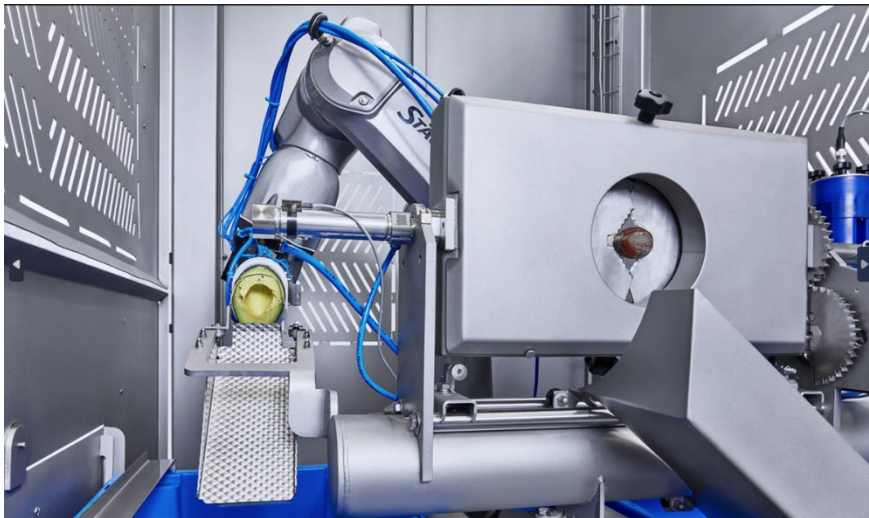
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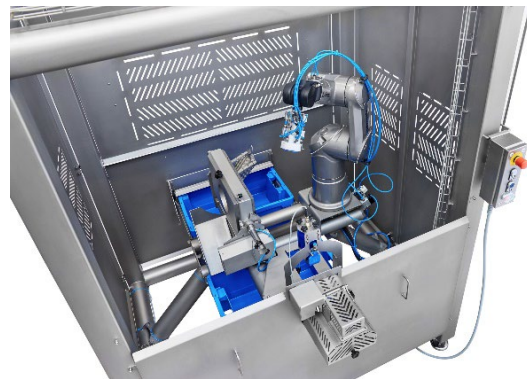
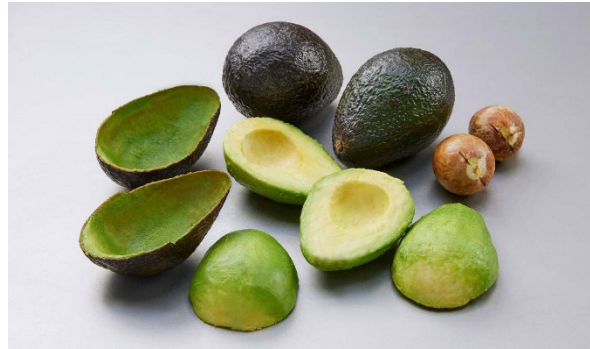
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KRONEN GmbH photo material:



The patented tools for pitting, halving and peeling avocados are used in the Robot Avocado Line.



High reliability, temperature independence, maximum hygiene, flexible use and capacity planning are just some of the advantages offered by KRONEN's automatic robotic solution for processing avocados and other types of fruit in the middle segment.