

Heart



They are tender and tasty and melt on the tongue. Marinated in olive oil and seasoned with oregano, thyme and rosemary, they are a treat for any lover of Italian antipasta or Spanish tapas. However, it is a long way before this delicacy lands on the plate. This is where pneumatics lend the chef a helping hand by creating pressure in the kitchen to reveal the appetising hearts.

The culinary connoisseur has long known what it is all about – artichokes. This thistle plant which, because of its sensitivity to frost, is cultivated mainly on the shores of the Mediterranean, is also increasingly gaining in popularity north of the Alps.

Removing the leaves of artichokes with compressed air

breaker



Long tradition

And yet this vegetable already has a long tradition – As long ago as the year 500 BC, the artichoke was regarded by Egyptians and Romans as a precious delicacy of the privileged and rich. Yet, international research regarding the production of artichokes did not start until the end of the second world war, when efforts were stepped up to find a suitable clone and methods of improving cultivation. In the Mediterranean area, cloned species are now predominantly used. For its optimum development, this plant requires temperatures of approximately 20 °C during the day and 12–14 °C at night. In the warm Mediterranean countries, this delectable vegetable is cultivated as an autumn and winter vegetable.



Top:
Finger-tip touch –
inserting the artichoke buds
into the clamping disc.

Below:
A look at the pneumatics
which actuate the artichoke clamping
fixture on the clamping disc.

However, in central-European climates with their cold winters, it is cultivated as a summer vegetable.

Over the last few years, interest in the cultivation of artichokes through the use of seeds has grown. What is more, this method of cultivation is of interest for Germany. Proving grounds already exist in the Hessian region of Gießen and in Weihenstephan in Bavaria. These are intended for the German pharmaceutical industry to develop artichoke-derived products from their own cultivated plants as opposed to solely from imports and leftovers from vegetable processing. As well as aiding the digestion of fat, this mediterranean plant is also claimed to have other health promoting properties.

The artichoke plant ...

... grows into shrubs of two metres in height, although only the flower bud and a short part of the stem are suitable for eating. The flower petals form round or elongated buds reminiscent of a pine cone. Depending on type, they can grow to 12-13 cm and weigh up to 500 grammes. The colour of the petals varies between green, purple, red and reddish-brown. Gourmets value the small, very young artichoke buds, because the smaller the buds, the better their taste. The delicious taste of the

artichoke is to some extent due to the fact that it contains the substance Cynarin. This substance lends it a slightly acidic and bitter taste. It has the effect of lowering cholesterol levels and preventing gall stones and is used to treat liver disease and also in conjunction with chemotherapy. Artichokes are high in vitamins B1 and C, vitamin A as well as minerals such as iron, calcium and magnesium.

Pneumatics for productivity

So far – so good, but how does one tackle this thistle plant? How does one get to the delicate artichoke hearts? With this in mind, an ingenious Neapolitan so-to-speak invented the “heartbreaker under the southern sun”. In 1978, Luigi Ferrara in Nocera Inferiore near Naples began with the construction of an artichoke peeling machine in order to “break the heart” of the artichoke. Although initially merely mechanically activated, pneumatics have latterly dominated the scene in this field since 1999. With the help of pneumatics, the artichoke flower is clamped and the bottom of the bud and any hard leaves are cut off with sharp knives. The heart drops from the clamping fixture and is then ready for further preparation – to be grilled or preserved in olive oil or marinated ...

Thanks to pneumatics

these machines achieve an output of 5,000 artichokes per hour. In each machine, 20 double-acting round cylinders from Festo are used to clamp the artichokes. These cylinders actuate a clamping fixture on a stainless steel disc with a diameter of 154 cm, onto which the artichoke buds have to be put manually. Once in the clamping fixture, the buds are fed past two electronically rotating sawing discs, which cut off the leaves of the flower from top to bottom. The artichoke hearts are then cut into an appetising and attractive shape by two knives which trim the vegetable from the bottom up. These two knives can be set individually according to the size of the artichoke. The machine processes artichokes of diameters ranging from 25 mm to 90 mm. The clamping pressure applied to the buds can be easily and quickly regulated with the help of pneumatics so that the right pressure is reached for every artichoke bud, raw or cooked and the artichoke is always positioned in the middle of the clamping fixture, irrespective of its size.

Partnership that creates partners

A double-acting cylinder with two piston rods presses the shapely artichoke hearts through the clamping fixture of the steel disc in the direction of containers. Festo not only

supplies the necessary drives but also the pneumatic equipment for the entire system. This comprises all pneumatic one-way flow control valves, quick exhaust and pressure regulating valves, compressed air filters, branching modules, mounting brackets, silencers, Quick Star push-in fittings, pressure switches and the necessary plastic tubing – in short everything harmonised and from a single source.

Although subjected to heavy use, these pneumatics unstintingly perform their tasks. Whilst delicious to eat, the basic artichoke juice seriously affects the cylinders, because of the effect of corrosion. However, this does not bring the processing of artichokes to a halt because Festo and Ferrara work in close partnership and the service network in the Southern part of Italy, the stronghold of the Italian artichoke processing industry, are closely linked.

The machines in Southern Italy are in use from March to May; this is the duration of the harvesting season of this delectable vegetable. During this time, Da Paola in Orta Nova near Foggia in Apulia, a company in the Southern region of Italy and one of numerous artichoke processing companies, processes 400,000 artichokes a day on eight machines. The cut off leaves do



Top:
Heartbreakers in action.

Below:
Artichoke hearts – freshly peeled.



Artichokes as far as the eye can see –
the delicious prospect of a tasty vegetable in Apulia.

Artichokes – all around the world

In 2000, global artichoke production reached 1,2 million tonnes. Italy alone covers 39 % of global production, followed by Spain with a share of 21 %, and after Argentina, France is the fourth largest producer country for artichokes. American farmers cultivating artichoke fields can be found mainly in the sunshine state of California. The highest productivity in the cultivation of artichokes is recorded by Argentina with a production of 19 tonnes per hectare, followed by Egypt with 18 tonnes per hectare.

not simply finish up on the compost heap, but provide tasty meals for sheep ...

Compared with mechanical artichoke peeling machines, pneumatics have made huge progress in productivity. The systems, operated by means of compressed air, process almost 50% more artichokes in the same time as mechanical artichoke peeling machines. Ferrara hold the patent for these pneumatically operated systems – after all, they want to be the bearers of this unique idea to the world. However, the designers have not quite finished yet with the machine that is currently on the market, since Renato Tavassi, a retired teacher, is working on a new clamping retainer for artichokes. Press fits which can be adjusted to different sizes of artichokes are to ensure even greater efficiency with this further development of the machine.

Widening horizons

Ferrara are looking to the future with great optimism. In 2001, the company sold 30 machines using pneumatics from Festo. Projections for the current trading year are 50 systems, to be delivered worldwide. An interest in purchasing 20 machines in the Spring of 2002 was shown by Spanish artichoke processors alone as a result of Ferrara taking part at the BTA, the Barcelona Tecno Alimentare exhibition. Gianluca Ferrara, the fourth generation owner of the company proudly announced: “We even already have customers in Australia and in the US state of Arizona.” He also sees major market potential for his “artichoke heartbreakers” in Latin America, where mechanical or even manual systems are currently still in use ■