

# Plaiting together

FINNISH COMPANIES LINKOSUO AND FOODCONSULT HAVE JOINED FORCES TO AUTOMATE THE PLAITING OF LOAVES



++ figure 1

++ figure 1  
Four dough strands are plaited in this unique machine

++ The development period lasted about seven years. When the practical tests will be completed in the near future, three plaiting stations will plait and deposit 400 loaves with a piece weight of 1000 g per hour. Linkosuo, the third largest bakery in Finland with its headquarters in Tampere, the second largest city in Finland, is considered to be the no. 1 when it comes to sweet yeast-raised plaited loaves. These products, made with and without raisins, are a popular dish for the afternoon coffee break. It is known that the people in Finland are the largest consumers of coffee in Europe. Thus the demand for “Kilopitko”, as this product is called in Finnish, is equally large.

For Linkosuo, Kilopitko is the most important product within their entire range and therefore well worth the effort. The goal was to reduce personnel costs, because Finnish companies have to combat competitors from Eastern Europe, too. This is because the ferry to the Baltic States takes only an hour and the costs of labor in these countries are significantly lower. In Finland, an operator in the production department who works only in day shifts costs in the range of 3,000 and 4,000 Euros each month (including different social taxes

and sick pay/holiday expenses). For a night shift, which is the time between 9.00 pm and 6.00 am, the additional pay is 100%, explains Aimo Jussila, managing director at Linkosuo. Linkosuo is a family-owned company that was founded in 1937 (70 years anniversary this autumn). The turnover today is about 23m Euro with five million Euros earned in seven cafés in and near Tampere. The remaining 18m Euros are generated from doing business with the retail trade. Fresh products are supplied within a radius of 200 km, dried rye bread and toast bread are delivered nationwide. About 170 employees produce and deliver more than 100 products per day which sums up to about 8m kg baked products annually.

Linkosuo is considered to be one of the most innovative bakery companies in Finland. Between five and ten per cent of the products are new developments. Every four months, product range, prices, and costs are reviewed.

Now, Linkosuo has developed the automated plaiting units in cooperation with Heikki Järvenkylä of Foodconsult, a specialized machine manufacturer to the baking industry. Every baker in Finland knows Oy Foodconsult Ab because they developed these fabulous ▶



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**++ figure 2**  
Hooks grab the strands and twist them



**++ figure 3**

**++ figure 3**  
End of plaiting process

**++ figure 4**  
Checking the quality of the plaited dough

**++ figure 5**  
Packed for distribution

machines that can fold the edge of a flat oval dough piece so perfectly to the inside that not only the dough looks good but also to keep the rice filling of the karjalanpiirakka (Carelain pie pastry) inside. Carelian pie pastry is a typical Finnish baked good comparable probably to the Swiss plaited bread eaten on Sundays. In Finland, plaited loaves are always made from sweet dough and without eggs. The recipe calls for three kilograms of flour, one liter of water and half a kilogram of both fat and sugar. The result is a heavy yeast-raised dough which needs a final proofing of 90 minutes and baking time of 30 minutes to develop its light and airy texture.

Plaited loaves in Finland are made with three

or four strands of dough; Kilopitko requires four. The dough strands are produced in equipment consisting of dough divider, rolling net, pressure board and proofer through which the 380 mm long strands are transported within 15 minutes. The next station is a type of baguette sheeter with three pressure boards in which the strands are expanded to a length of 880 mm. Four strands are then fed together into the plaiting machine. The plaiting machine consists of a core with three axes. Two metal open hooks are fastened to each axis so that they stick out on two sides. When the axis turns, the hooks also move, grab one strand each and deposit it on the other side of the axis. This patented process is used to cross

## Republic of Finland

Suomen tasavalta / Inhabitants: 5.2 mio / Area: 338,145 square kilometers

There are about 825 bakeries in Finland (and 5.2 million inhabitants). The two largest ones account for about 60% of all sales. Twenty of the 60 medium-sized bakeries have a market share of 20% while the remaining 760 bakeries fight for the remaining 20% of the market.

In Finland, baked goods are mainly sold in the supermarkets. Nowhere else in Europe is there such a comparably large product range. The bread section in a modern supermarket in the open countryside has the size of a soccer field not including the comprehensive range of frozen baked goods and frozen breads.

The assortment includes eight to ten different types of toast bread and flat breads of

any kind, dry or fresh, and sweet limpa bread (traditional rye bread) in light and dark variations. There is also a number of bread products for special dietary purposes such as gluten-free, lactose-free, low salt or bread with a high salt content or other added ingredients, whole meal bread, bread made from organically grown cereals and of course the inevitable range of ciabatta bread with and without herbs, spices, olives and more. Cakes and fine bakery wares are offered in a similarly broad range, but these products are partly provided by foreign suppliers. Except for a small chilled counter for filled, folded dough pies, everything else is pre-packed, even the gateaux and cake pieces found on the shelves. The prices are high compared to the average in Europe. One toast bread cost about 1.60 Euro in the retail store. +++



++ figure 4



++ figure 5

the two outer strands and the two strands in the middle. After the entire length of the strands has been plaited this way, the loaf moves on. Pressure is applied at the sides to push the loaf together and make it higher. A guillotine cuts off the beginning and end of the plaited loaves, and divides the plaited pieces in the middle, if needed. One shuttle device for all three plaiting station provides the baking trays covered by baking paper on which the loaves are then deposited. When the loaves are cut to their final length, 10-

15% rework dough are produced which is automatically discharged. Currently the feeding of the strands is not optimal and it could also make sense to air-condition the plaiting machines. The Finnish inventors, who are confident that this new technology will not just be appreciated in Europe, are currently looking for partners to solve these problems and to organize the worldwide sale. For Linkosuo, the partnership will be well worthwhile when the three plaiting machines do their daily work. +++

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