

MJÖLKSPEGELN

NEWS FACTS RESEARCH DEBATE | SPECIAL EDITION MARCH 2001

THE BEVERAGE BOOM

BIOLOGICAL BEHAVIOR AFFECTS
TO SCHOOL RESULTS

Functional foods:
NEW REGIMEN FOR THE STOMACH

PHOTO: JOHAN OLSSON



you are now holding an English version of a magazine that is one of the mainstays of the Swedish Dairy Nutrition Council. It gives us great pleasure to be able to present our work in this way at a time when Sweden holds the presidency of the eu.

The task of the Swedish Dairy Nutrition Council is to disseminate knowledge regarding milk as a delicious and important product, and all the products made from milk. This is exciting and stimulating work. The most important aspect is children and milk, and various ways in which to promote

children's consumption of milk. In this magazine, we explain that milk contains 14 of the 18 important vitamins and minerals, the beverage boom, how biological behavior affects school results, and we promote quality food and meals.

The Chef of the Year is another of the Swedish Dairy Association's projects. The aim of the Chef of the Year contest is to encourage cooking and to promote good food and meals as an important focal point that offers an opportunity for recuperation, happiness and enjoyment. We have been arranging the Chef of the Year contest for 18 years. As the Swedish championship in professional cooking, it is the most prestigious cookery contest in the country.

I hope you enjoy getting to know us and becoming familiar with our work.

Ingela Stenson

ingela stenson, editor-in-chief



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– new regimen
for the stomach.

»The beverage boom«
– we are drinking more soft
drinks than ever.

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The Dairy Nutrition Council is part of the Swedish Dairy Association, the professional organization of Swedish dairy farmers and the Swedish dairy industry. The task of the Swedish Dairy Nutrition Council is to provide factual and reliable information about diet, health and the role of milk and dairy products in Swedish food.

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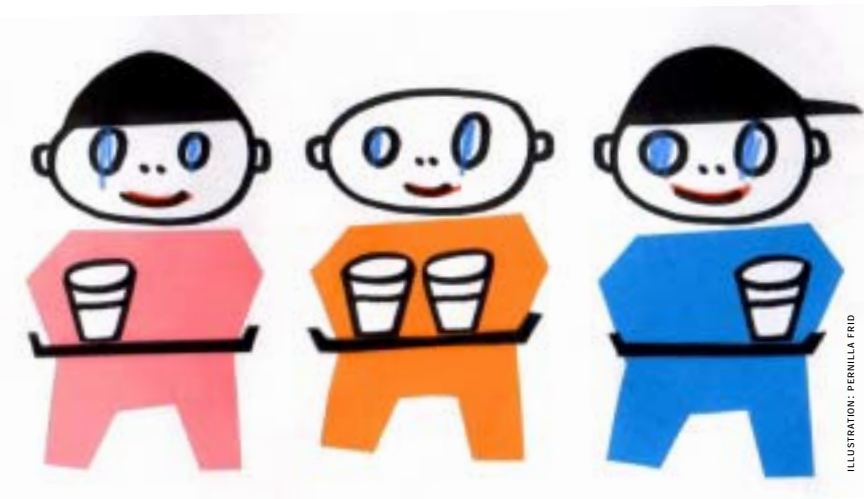


ILLUSTRATION: FERNILLA FRID

Children & school food

Never before have we Europeans had access to so much safe, good-quality food. Even so, ill-health due to improper nutrition is a major health problem. Improper nutrition results from the wrong type of food and too much of it, coupled with too little exercise.



the basis of people's eating habits is established at an early age. It is therefore important that we serve our children nutritious and appealing meals, and that we awaken in them a healthy interest in food.

For school-age children, lunch is one of the most important prepared meals of the day. Sweden is one of the few countries that has a long tradition of providing free meals to children at school. The school lunch exists because we have collectively decided that it is important that all students have a nourishing meal in the middle of the day, to enable them to be active and absorb knowledge during the rest of the day. The school lunch is an opportunity for students to sit down, relax and enjoy a good meal that will give them a large proportion of their

daily requirement of nutrition and energy. I have met with school cafeteria staff in many municipalities throughout Sweden to learn more about their important work. It gives me pleasure to follow the efforts being made throughout Sweden to develop school lunches and make them more tasty and enjoyable.

Free school lunches with milk
It is common in several countries to serve milk to children at school. In Sweden, milk served with school lunches is free, whereas in other countries, the parents have to pay. Serving milk at school lunches increases the likelihood of a nutritious meal.

Leads to better eating habits
In most countries, milk is a government concern in the form of subsidization of school milk. The eu program concerning school milk is an example. It increases the capacity to serve milk

and milk products to schoolchildren. Today, almost 100 percent of Swedish children are covered by the program. Sweden and several other eu member states have lobbied to keep government support for school milk. It is laudable that the range of products has been extended, so that government support includes lower-fat products such as skimmed milk.

In future, I hope that children who drink milk will also choose milk before other drinks. Today, consumption of soft drinks and other sugary beverages by children and teenagers is increasing at the expense of milk. In this case, the provision of milk in schools can encourage better habits, just as school lunches can, as I believe, lead to better eating habits overall. •

Margareta Winberg.

margareta winberg,
minister of agriculture



ILLUSTRATION: PERNILLA FRID

Laughter can increase blood circulation and the production of endorphins, reduce blood pressure, oxygenate the blood, strengthen the immune system and promote creativity, according to Indian laughter theory. Fifteen minutes a day is sufficient.

Laugh your way to less stress

Laughter was already being prescribed as the best medicine against depression and colds several hundred years ago and laughter therapy has also been used in the health care sector for more than ten years. Now there are “laughter instructors” in Sweden and two laughter clubs have been opened in Kalmar and Stockholm, following an Indian example. These clubs hold group sessions, where movement and breathing are used to bring out different forms of laughter – such as argumentative laughter, lion laughter, humming laughter, shy or growing laughter. The laughter instructors claim that laughter is the best anti-stress technique available. In India, some 80,000 members gather in various locations around the country to receive their daily dose of laughter.

Source: DN, October 28, 2000.

The Drop of Milk – forerunner to today’s child welfare centers

Poverty was widespread in Stockholm at the beginning of the 20th century. Many infants died at birth and those that survived were often undernourished.

Conditions were criticized by such people as Moritz Blumenthal, who showed compassion for the weak in society. He entered the history books in 1901 by forming the Drop of Milk association (in Swedish: “Mjölkdroppen”). The intention was to distribute milk to the most disadvantaged children, following a French example. At the Drop of Milk, the terms “legitimate” and “illegitimate” children did not exist – everyone was made equally welcome.

The first Drop of Milk was opened in December 1901 in the Södermalm district of the city and in no time mothers were standing in line. Such was the demand that there were soon Drop of Milk centers in every district. The model also spread to most large Swedish towns. It is interesting to note that the Nobel

Works in St. Petersburg organized its own Drop of Milk for personnel.

Suitable nutrition

The association’s regulations stated that the Drop of Milk was to provide suitable nutrition for infants. In Stockholm, the children were given pasteurized milk. However, since the experts disagreed on the advantages and disadvantages of pasteurization, many Drop of Milk centers in the provinces issued unboiled milk, which the mothers had to heat themselves. But not everyone followed the recommendations. In some cities there was a high rate of mortality among children registered with the Drop of Milk during the first decade. After pasteurization achieved general acceptance in 1910, mortality fell from 25.9 percent in 1909 to 6.1 percent. In the 1940s, the Drop of Milk centers were taken over by the county councils, which transformed them into child welfare centers.

Anna-Britta Ståhl

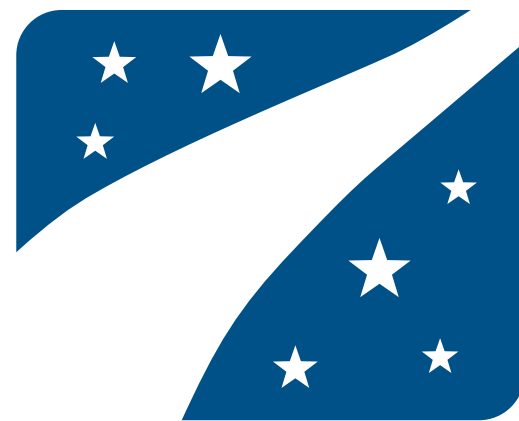


ILLUSTRATION: ANNA O

The Milky Way or Cow’s Path

Milk was linked with the heavens early on. This can be seen in the word galaxy, for instance, which comes from “ga’laktos,” the Greek word for milk. The English name “Milky Way” and “Milchstrasse” in German and “La Voie Lactée” in French, are based on the same concept.

Our forefathers sometimes referred to the ancient cow Audhumbla, the first living creature in the Nordic story of creation, as the “mother of the moon.” She was also the source of the ancient Nordic name for the Milky Way – Manavegr, the Moon Way. The Celts called the Milky Way Bothar-Bó-finné – The Trail of the White Cow. In the archaic dialect of Lancashire, in the UK, the galaxy was simply called the Cow’s Path.



ILLUSTRATION: ANNA O

The first mobile capital

The Indo-European “chatal” or “cattle” is the same word as “capital.” The cow didn’t get its name because it was a type of wealth – the word for wealth came from the first mobile capital: cattle. The Latin word for money, “pecunia,” comes from the word “pecus,” meaning cattle.

Source: Bergljot Börresen, Domestic Animals and their People

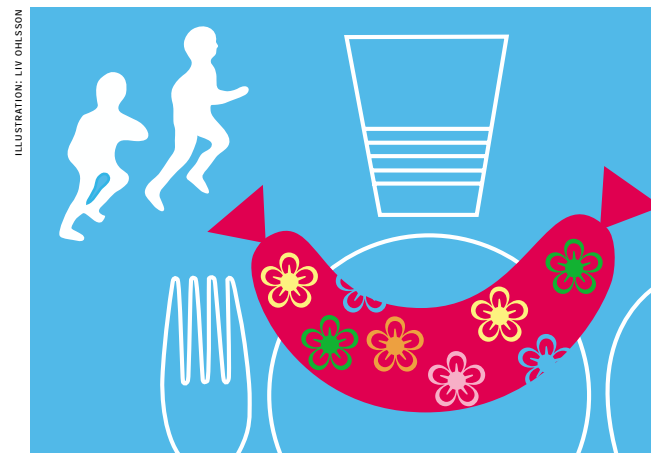


ILLUSTRATION: LIV OHLSSON

Dietary measures to relieve high blood pressure

Dietary treatment of high blood pressure has received a large amount of attention in the US in recent years.

The constituents of the Dietary Approaches to Hypertension (DASH) diet were selected by the Nutrition Committee of the American Heart Association.

They largely follow general dietary recommendations, but involve increased intake of magnesium, potassium and calcium.

The Swedish Dairy Nutrition Council, in collaboration with the Swedish Fruit & Vegetable Council, has adapted the American diet for use under Swedish conditions.

Children determine food choices

It is largely the children who determine a family’s food purchases. This has now been scientifically proven. Karin M Ekström of the Gothenburg School of Economics has investigated children’s influence on a family’s food consumption. Children want to share their experiences, while parents have a bad conscience because of lack of time, and that is why families with children are more open to trying new foods than other families, she says. The children are often also aware of the environmental aspects and influence their parents in this area.

Source: Kärnfullt, February 24, 2000

Vegetarian habits studied

Increasing numbers of young people who convert to a vegetarian diet do so for ethical and not health reasons. This is the preliminary result of an ongoing study being conducted by the Department of Food and Nutrition at the University of Umeå in northern Sweden.

Some 2,000 16-year-old school pupils (from Umeå, Stockholm and Bergen) are taking part in the study. In Umeå, 15 percent of the young people were vegetarians and 3 percent were vegans. In Stockholm, 5 percent were vegetarians, while less than 1 percent were vegans. Vegetarians eat vegeta-

bles alone once a day, a small amount of fruit, they prefer rice and pasta to potatoes, drink more tea than those with a mixed diet, but drink the same amount of alcohol. The health benefits are more a side-effect than a conscious choice, according to Christel Larsson, nutritionist at the department. Vegetarians smoke and take exercise to the same extent as people with a mixed diet. The survey also showed that vegetarians have a high consumption of dietary supplements. It should be pointed out that vegetarian school lunches are more common in Umeå.



ILLUSTRATION: PERNILLA FRID



14 out of 18

key vitamins and minerals

Most people know that milk contains a large amount of calcium, but they are unaware that it is also rich in many other important nutrients. Milk is a source of 14 of the 18 key vitamins and minerals.

By Git Karlsson, writer

“B₁₂, Phosphorus, Calcium, Riboflavin B₂, Iodine, Vitamin D, Zink, Vitamin A, Potassium, Niacin, Selenium, Magnesium, Thiamin B₁, B₆”

the latest analysis of milk's nutritional content shows that it contains more nutrition than previous measurements have revealed. Milk-drinkers will be pleased to hear that it contains considerable amounts of 14 of the 18 most important vitamins and minerals.

“14 out of 18”

– When we received new nutritional analyses for milk about a year ago, we could see that the content of certain minerals was considerably higher than had been shown by earlier studies, says Åsa Moberg, dietician. This applies particularly to iodine and selenium. At the Dairy Nutrition Council, we felt that it was important to pass on this information and we calculated how much of the recommended daily intake of various nutrients that milk can provide.

– Based on the half liter of milk that the National Swedish Food Administration recommends that we drink each day, significant amounts of 14 of the 18 vitamins and minerals that are recommended in Sweden, were found to be present.

– Many people think that we have to take pills and supplements to cover our vitamin and mineral needs, but milk is a natural “powerdrink.” We want to show that an ordinary, nutritious food exists. We believe it is a positive and significant message.

Sour milk and yogurt, too
Professor Åke Bruce of the National Food Administration believes that

milk's importance as a source of calcium has dominated nutrition information, due to the fact that there are no other foodstuffs that contain so much calcium.

However, he is well aware that milk is also an important source of other nutrients.

– When I lecture on milk, I usually point out that it contains a whole lot more than simply calcium.

Åke Bruce is keen that we consume the amount of milk or the corresponding amount of milk products that is recommended. He considers milk to contain much that is beneficial to humans.

– I also want to emphasize that sour milk and yogurt have the same nutritional content as milk, he says.

This view is shared by Stefan Branth, physician, nutrition researcher and specialist in gastro-intestinal diseases.

– The intestinal flora is of major importance for health. This is why the good bacteria in sour milk and yogurt produce a positive effect on general health.

For this reason, Stefan thinks that sour milk and yogurt are useful in several ways.

– Milk is an all-round foodstuff, which contains a large amount of nutrition. A sign of this is that many nutritional drinks within the health-care sector are based on milk, which is excellent from a nutritional point of view. In other words, if you eat sour milk and yogurt, you receive both the milk's nutrition and the good bacteria.

Stefan Branth has long been involved in research into, and worked with,

food for sportsmen. In this context, he has seen that milk and milk products are of major importance for sportsmen's success in covering their nutritional requirements.

– Milk products are actually an important last resort in avoiding nutritional deficiencies.

Milk contains all nutrition

When it comes to consuming “14 out of 18,” milk, sour milk and yogurt are the vital dairy products. Professor Rangne Fondén, of Arla Research & Development, explains why:

– Other milk products that have been refined lose some of their nutritional content.

One such example is cheese.

– When making cheese, the milk is separated into two parts: whey and cheese. The whey is accompanied by most of the water-soluble vitamins. The cheese retains most of the minerals, which is why it is a foodstuff that helps to build and maintain a strong skeleton, says Rangne Fondén.

The situation is different for milk.

– Milk undergoes such gentle treatment at the dairy that it retains its nutritional content intact.

Rangne Fondén finds this an important argument for the consumption of drinking milk.

– I consider milk, sour milk or yogurt, along with fruit and vegetables, as the best basis for positive eating habits. This combination provides all of the 18 nutrients. The food of your choice can then be added to provide complete nutritional intake. ●



The beverage boom

We are witnessing a veritable boom of product development in different types of soft drinks and non-carbonated fruit drinks. We are drinking more soft drinks than ever before, though at restaurants we tend to drink more stronger beer, with over 2.8 percent alcohol by weight and less beer with not more than 1.8 percent alcohol by weight.

By Jan Börjesson, journalist

milk-drinking is on the wane. Since 1980, milk consumption has declined by about one-third. Conversely, consumption of soft drinks and water amounted to slightly over 97 liters per capita in 1999. That is 34 liters more than in 1990.

There are many reasons for this development. The intensive marketing of cola drinks is probably one. Another, perhaps more important, is the veritable explosion of product development in soft drinks, water and juice. Tap water, too, is undergoing something of a renaissance as a mealtime drink.

According to a study carried out by Iui Marknadsinformation for the Swedish Dairy Nutrition Council, 45 percent of consumers drank tap water with their meals in 1999. The same proportion drank milk with their daily meals. Ten years ago, the ratio was 60:30 in favor of milk. One explanation for the popularity of tap water could be the economic argument.

Other reasons why milk is losing ground are people's changing eating habits, including more snacking, which promotes consumption of soft drinks and water.

The marked increase in juice consumption in the past decade has probably also contributed to the milk decline. Today, more people drink juice at breakfast than milk. Ten years ago, milk was, after coffee, the uncontested breakfast drink of choice.

Decline among children

Most striking is perhaps that milk consumption is declining among children. The Iui study shows a clear decline in milk consumption in the age groups 1–4 and 5–9. At the same time, consumption of juice and soft drinks has apparently increased in these age groups. If this shift has occurred, what effect has it had, or is it having, on children's health?

– The higher amount of soft-drinks consumption has resulted in inferior eating habits overall. Soft drinks are often combined with snacking – for example, on chips and candy. That, I believe, is the most negative effect, says Krister Sandström, dentist and chairman of the Swedish Association of Private Dental Practitioners. ▶

“ In the rapidly growing fast-food sector, milk is not even on the menus.”

– Sugary soft drinks are a less desirable alternative than milk from a nutritional point of view, particularly for growing children, he says.

– We have also noted a certain rise in the frequency of caries in children and teenagers in recent years.

Attitudes not reflected in behavior

People’s attitudes to milk are positive, however. A full 97 percent of the respondents in the Lui survey felt that it is important that children and teenagers drink a lot of milk. Milk is also considered important for women.

However, people’s attitudes are not always reflected in their behavior. Granted, daily milk consumption is relatively stable, but the percentage of consumers who say they never drink milk is steadily growing. Fifty-six percent said they drank milk at least once a day during the past year. The corresponding figure for 1991 was 68 percent. A total of 40 percent say they drink as much milk as before and six percent have increased their milk consumption. On the other hand, 50 percent say they drink less milk than before.

Of those who drink as much milk as before, 47 percent drink it primarily because they like the taste. A total of 31 percent drink it for their health. Among those who have reduced their milk consumption, 20 percent prefer water. A total of 16 percent say they do not like milk, and 14 percent prefer other drinks such as soft drinks, beer or wine.

More drinks drunk at restaurants

A clear trend is that restaurants and large-scale catering account for an increasing portion of beverage sales. Last year, the distribution between retail (grocery stores, convenience stores and the Systembolaget, i.e. state liquor store) and restaurants/large-scale catering was 80.4 to 19.6 percent. In 1996, the corresponding ratio was 81.5 to 18.5. The beverages that are increasing at restaurants are primarily carbonated water and beer.

Soft drinks have a relatively low position in the restaurant sector, except at fast-food restaurants.

It is hardly favorable for milk consumption that restaurants are increasingly taking over beverage sales. Milk is consumed at lunch restaurants and personnel cafeterias to a certain degree, but consumption is generally low in the restaurant sector. In the rapidly growing fast-food sector, the beverages sold are almost exclusively soft drinks and water. Milk is not even listed on the menus.



Consumption of Class III beer is steadily rising, increasing by 2.5 liters per person between 1998 and 1999. At the same time, we increased our consumption of soft drinks by a full six liters per person.

More soft drinks behind increase

One development that is probably related to consumption in restaurants is that we are increasingly favoring the stronger Class iii beer and eschew the beers with reduced alcohol content, Class i and Class ii beer.

Since 1990, Class i beer consumption declined from 12.2 liters per person and year to 7.6 liters in 1999. Class ii beer, which appeared in 1996, has declined by three liters per person since its peak year, 1997. Class iii beer, on the other hand, is steadily gaining ground every year. Between 1998 and 1999, the per-capita increase was a full 2.5 liters. The trend, in other words, is toward beverages with higher alcohol content.

For soft drinks, the increase was even stronger. In 1998, per-capita consumption rose by six liters. One reason, of course, was the hot summer, but the increasingly wide range of soft drinks also helps to increase consumption. The same can be said about carbonated water, which increased by two liters per person in 1998.

Swedes drank an average of about 81 liters of soft drinks

A clear trend: Restaurants and large-scale catering account for a growing share of beverage sales, in which carbonated water and beer are showing the strongest increase.

and 16.2 liters of bottled water per person in 1998. Since 1996, consumption of soft drinks and water in Sweden has increased by nearly 21 liters per person.

The health trend in eating is also reflected in people’s beverage choices. Consequently, there is a general upswing in “light” products such as mineral water and flat drinks – that is, non-carbonated fruit drinks. Non-carbonated mineral water, that is, “still water,” is increasingly popular. In recent years, new drinks have been developed for health-conscious consumers – for example, soft drinks with low sugar content.

Sharp upswing in energy drinks

A growing area in the beverages sector is that of energy and sport drinks, whose main purpose is to increase consumers’ performance capacity. The energy drinks contain ingredients that create alertness, whereas the sport drinks are designed exclusively to increase athletic performance capacity.

While the energy drinks account for a modest share of the total range of beverages on the markets, their rapid growth

What did you drink yesterday?

Beverage	1989 %	1999 %
Milk	60	45
Coffee	50	44
Water, tap water	30	45
Juice	16	29
Tea	17	19
Coffee with milk	12	18
Class I beer	14	12
Soft drink	6	16
Fruit drink	6	9
Table /Mineral water	9	10
Other	13	11
Class II	4	6
Te with milk	6	7
Wine	3	7
Cultured milk/ Cultured skimmed milk	6	5
Chocolate	4	4
Class III beer	1	3

Source: Lui/Burke Tracker 1999.

In 1989, the first study of people’s attitudes to and choices of beverages was carried out. This was followed up by a second study in 1999. The two studies involved interviews with slightly over 2,700 men and women between the ages of 15 and 74. The above table shows what the interview subjects drank on the preceding day for their breakfast, lunch, snack or supper.

shows that a new fashionable drink in the soft-drinks segment is in the making.

Milk drinks

Consumption of milk as a beverage is steadily declining. However, in the past few years, there has been increased interest in flavored milk and various drinks with milk as an ingredient. The coffee-shop trend, for instance, has played a key role in creating a new market for milk, primarily through products such as café au lait, caffè latte and various types of cappuccino.

The new coffee-drinking habits are so far of marginal importance for milk consumption. However, the rapid proliferation of coffee shops may eventually create an attractive new market for milk. According to the Lui study household use of milk in coffee is also increasing, though modestly. ●

Jan Börjesson is editor-in-chief of the Fast Food magazine. He prefers milk at breakfast and wine at dinner.

Functional Foods – new regimen for the stomach

It's down in the stomach, in the swarm of good and bad bacteria and microorganisms, that the key to tomorrow's healthy foods is to be found. The hunt for the right bacteria is fully under way. New products and rising health care costs could turn functional foods into the billion-dollar industry many are hoping for – and this includes Scandinavia.

By Anders Ingvarsson

cholesterol-reducing margarine, bread that strengthens the immune system, and new cheeses that only contain the bacteria that are really beneficial to our health – these could become the daily fare of the future.

Functional foods – or, as they are called in a report from the Swedish National Food Administration, foods containing product-specific health properties – form the most rapidly expanding segment of the food industry in the us. Growth is estimated at nearly 10 percent per annum and the market is valued at about sek 14 billion this year. Functional foods are foodstuffs that reduce the risk of people being affected by major diseases that are widespread and caused by prosperity.

These are not medicines, health supplements, health foods or natural medicines. They are food – but food containing additional healthy properties, which have been scientifically documented.

Food companies are not permitted to provide consumers with information about the unique health properties in a clear and distinct manner. Current legislation means that information about documented health properties can turn a bread into a pharmaceutical.

This is one explanation of why the market for these healthy foods has not expanded as rapidly as many had hoped.

It is nonetheless clear that food with particular health properties could have a major impact in coming years. Economic analysts are speaking of a market valued at several billions within the eu alone.

The reason is that the link between diet and health is becoming more distinct every day and awareness about the importance of food is increasing.

At the same time, medical research, which previously leaned towards the pharmaceutical industry, is showing an increasing interest in foods with health properties. The growing problems of resistance to antibiotics, alone, are creating enormous potential for products known as probiotics. These are foods that favor the good bacteria we have in our gastro-intestinal tract. Probiotic foods, particularly dairy products, could soon become a very valuable complement to antibiotics and, in particular, reduce the need for antibiotics, since probiotics strengthen the body's natural defenses.

Probiotic foods are a typical example of functional foods.

The search that may lead to new probiotic foods is taking place in the gastro-intestinal tract.

The intestinal flora of the stomach is the subject of intense research and it is suspected that many common illnesses are caused by bacteria, which is explained by the swarm of



ILLUSTRATION: FERNILLA FRID

intestinal bacteria. Some of these bacteria are harmful and cause illnesses, while others are beneficial and reduce the risk of sickness and poor health.

– This is an enormous research area, which will probably be of major significance in the future, says Göran Molin, Professor of Food Hygiene in Lund and one of the people researching bacterial floras in the gastro-intestinal tract.

With the advent of functional foods, the beneficial bacteria are receiving powerful support.

– What we want to do is stimulate the positive bacteria by providing the body with bacteria through, for example, yogurt. It is primarily people with poorer bacterial floras, such as many elderly people, who will benefit from this. However, there are also many others with deficient intestinal floras.

– We know that many of the bacteria that are found in ordinary sour milk have positive properties. The problem is simply that they have difficulty in surviving the tough environment they have to pass before reaching the gastro-intestinal tract, where they can be useful. This is why ordinary sour milk does not have the same benefits as sour milk with certain special bacteria.

The problem is finding and examining bacteria that fit the demands: surviving the handling at the dairy, then storage and, finally, the hostile environment in the stomach.

Bacteria with the correct properties could, for example, be used to manufacture new types of sour milk and yogurt with distinct health properties. And they could also replace antibiotics:

– This could have major importance for health care. There has been reliance on antibiotics for many years and, unfortunately, we know that this has caused problems. The positive bacteria are eliminated and resistance against antibiotics is becoming increasingly common. Probiotics open up new opportunities, Göran Molin points out.

This doesn't only apply to people – probiotics are also of interest for animal feed, in order to avoid giving antibiotics to animals such as dairy cows.

Why is it, then, that there aren't more functional foods? It's true that quite a large number of new products have recently been launched, including several new cholesterol-reducing margarines, and for a long time there have been dairy products like Verum Hälsofil, but the market should expand more rapidly than it has to date, given the increasingly serious health problems throughout the industrialized world.

One reason is that the market has not been receptive, according to several analysts. As in the biotechnology sector, there has been much talk about future successes



that have then failed to materialize. There is also a natural skepticism about “miracle foods” among consumers.

Another explanation is that companies have been hesitant, partly because the law has placed obstacles in the way of direct and easy-to-understand marketing.

– A considerable problem has been that companies are not permitted to talk about how good a product is or what unique health effects it has, says Karin Malmcrona, program director at the National Center for Functional Foods at Chalmers Institute of Technology in Gothenburg. The center’s purpose is to coordinate the research activities being conducted in Sweden and put researchers in touch with companies.

– There is research that could be translated into products at any time, with major significance for consumers, and which could contribute to an improved health situation. But, since companies are unsure of how to market functional foods, there is a reluctance to invest.

– It is really an insult to consumers that this area does not have a set of rules to open up the way for new healthy products, she says.

The only way to speak about a product at the moment is in general, rather sweeping terms, in accordance with the “two-step” principle. It is possible, for example, to say that calcium is beneficial and that a product contains calcium. But you are not allowed to say that a certain product contains unique health properties, even if that is the case, since it is then not a food, but a pharmaceutical, which must be sold at a pharmacy.

This is not a problem that is exclusive to Sweden; the same lack of clarity prevails within the eu and in the us.

– Clear rules are required that offer the possibility of showing scientifically documented results – and that a product is still a food in the legal sense, says Karin Malmcrona.

– As it is today, development is being hindered.

At the same time, this obstruction is creating a knock-on problem. Companies are less willing to invest in research into functional foods.

– The legal aspect is an obstruction that leads to research receiving less funding than would otherwise have been the case, says Göran Molin in Lund, who wants to see clearly defined rules for the clinical testing of foodstuffs.

Researchers and industry representatives nevertheless

agree that there are major possibilities for functional-food products.

– We have high-quality produce, agricultural land and livestock. And, in this regard, it is definitely a competitive advantage to have high-quality raw materials. At the same time, Sweden has high-quality research, and competent and efficient companies.

It is definitely not too late for Sweden to achieve a top international position in the area of functional foods, but we must coordinate and make use of our resources in an efficient manner.

Functional Foods

The Swedish National Food Administration submitted a proposal in April 2000 for continued efforts in the eu to establish guidelines for health claims relating to food. The report does not mention functional foods, but “product-specific health claims” and “food with product-specific health properties.”

The background to the report is the desire to increase the possibilities for the food industry to develop niche products and give consumers greater access to food products that have been “proven” to contribute to reducing the risk of illness.

The matter will be studied by the eu during the next few years. Codex Alimentarius is also treating the issue as an international problem.

According to the report, the authorities should “actively monitor scientific developments and encourage the acceptance of more (health) claims when... knowledge exists.”

The definition of product-specific claims that is being suggested is: Foods with specific, beneficial, health-promoting effects or which reduce the risk of illness. The products must be scientifically documented. •



Scientific reports

The research conducted by the Swedish Dairy Association encompasses important parts of the chain from the cow to the consumer. It includes such areas as the dietary importance of milk, the components of milk and their properties, hygiene between the farm and the dairy, and animal health and feeding. This research is partly conducted by the Swedish Dairy Association’s own researchers, but often in collaboration with external researchers and research groups. The externally funded research is most comprehensive in the area of nutrition. We also review research from other countries and institutes. The following pages provide a summary of important research linked to areas within our operations.

Probiotics – an example of Functional Foods

Probiotic is a very common concept used today on food packages and in food promotion. Usually it refers to foods containing some specific lactic acid bacteria, which are suggested to be healthy.

The scientific definition suggested by R. Fuller 1989 is a “live microbial feed supplement, which beneficially affects the host animal by improving its intestinal microbial balance”. This definition was partly broadened by Havenaar, Huis in’t Veld 1992 to include human use. Consequently, the definition of the impact on the intestinal microflora is the most important aspect to study.

History

The winner of the Nobel Prize in Physiology and Medicine 1908, Elie Metchnikoff, suggested as long as a hundred years ago that lactic acid bacteria were good for health. As yoghurt both contains lactobacilli and is frequently consumed by healthy individuals in Southeast Europe, he recommended yoghurt as a healthy food. Following new developments within

microbial taxonomy, it was demonstrated by Rahe (1915) that *Lactobacillus bulgaricus*, which is present in yoghurt, does not survive passage to the large intestine. As lactobacilli present in faeces was classified as *Lactobacillus acidophilus*, Rettger (1935) proposed that they were the bacteria that should be used.

Due to the early suggestions by Metchnikoff yoghurt acquired a reputation as being healthy. Subsequently, some products containing *L. acidophilus* were introduced, but with little impact due to taste and complex production technology.

Fermented milks in Sweden

Traditionally, milk was spontaneously fermented by a mixed microflora adapted to grow well in milk at +20°C. This starter contained the different strains of *Lactococcus* and *Enterococcus*, together with yeast. Consumption of fermented milk was most common during summer, as the milk could not be kept cold. As technology developed, these traditional products were substituted by industrial products produced





under standardized conditions. To begin with, various *Lactococcus* species were used. The introduction of yoghurt took place in 1917 and nowadays several new products have been developed based on either fermented milk or yoghurt.

Dofilus – the first probiotic

In the middle of 1975, Arla Foods was asked to produce some milk fermented by *L. acidophilus*. The technology involved inoculation of milk in bottles, giving a product with a marked burned taste.

The control of the product was quite complicated, as each bottle could be different from the others. A development project started, which involved selection of a suitable strain and development of economical technology, making it possible to use fermentation in a vat. It resulted in the only fermented milk in the world, exclusively fermented with *L. acidophilus* and with 10^9 cfu/g of the probiotic strain.

This product was tested and the strain was proven to survive passage to and through the large intestine. Preliminary studies indicated that intake of Dofilus could reduce constipation in the elderly and suggested that it "is definitely worth trying to put patients with inflammatory bowel disease on an acidophilus milk regimen as adjuvant therapy" (XV Symp. The Swedish Nutrition Foundation, 1983).

New probiotics

In the past ten years, several new probiotics have been identified and studied in Sweden. An example relating to the old Swedish tradition of fermented milks is Verum Hälsofil. It contains one specific strain, *Lactococcus lactis* 11a, which *in-vitro* is inhibitory to pathogenic bacteria. It was isolated by selection of strains isolated from traditional starters. Like all probiotics studied to date, it survives the passage to the colon.

Lactobacillus plantarum 299v was isolated from the human intestinal mucosa. When given in a mixture of several different strains of *Lactobacillus*, it was the strain with the highest adhesion to the mucus (Johansson 1993). This strain has also been shown to reduce the level of other potentially pathogenic bacteria on the intestinal mucosa. In contrast to other products with a high level of buffering

substances, like fermented milks, this strain has been used in ProViva a rosehip drink. It is quite different from dairy products and illustrates another possibility to distribute probiotics.

Lactobacillus reuteri was selected due to its production of reuterin, an inhibitory substance formed from glycerol (Lindgren 1990). Like other lactobacilli, it has been proven to survive the passage and adhere to the intestinal mucosa. It has also been shown to reduce the time of diarrhoea after infection with rotavirus.

Lactobacillus F19 – documented in EU research programmes.

The EU FLAIR and FAIR research programs within have funded Probiotic research. As a part of these programs, a new potential probiotic *Lactobacillus* F19 has been characterized. It combines excellent technological properties with good adherence to the colonic mucosa. In contrast to many other probiotics *Lactobacillus* F19 has been reisolated from healthy individuals as well as from cheeses. This might illustrate the common transfer of bacteria from food to humans and the vice versa, a chain has been partly broken by modern food hygiene (Fondén 2000).

Safety

Lactobacilli are a part of the human intestinal microflora and everyone harbors billions of lactobacilli on all mucosa. We are also exposed to lactobacilli continuously from the environment and mainly from the foods. As long as probiotic lactobacilli consists of species present both in foods and the intestinal microflora, safety concerns should be minimal (Salminen 1998).

Probiotics as Functional Foods

Foods with some specific advantage relating to health have stimulated research within food science. Probiotics are at present the most important part of the Functional Foods, if judged in terms of impact on science or on economic importance. Evidently, consumers select products that can prove they offer some advantage compared with standard products. To be successful in the future, new questions should be asked and answers sought. It is a challenge to prove that a probiotic improves health as long as knowledge about the impact of intestinal microflora on health remains insufficient.

By Rangne Fondén, professor

A list of references can be obtained from rangne.fonden@arlafoods.com

Selenium and selenoproteins in milk

Selenium was defined as a toxic element until 1957, when it was found that the addition of selenium to the diet could prevent liver necrosis in rats. In 1973, selenium was discovered to be an essential component of the antioxidative enzyme glutathione peroxidase. Nowadays, selenium is regarded as an essential trace element in the nutrition of humans and animals. Most of the selenium present in mammals is associated with proteins, and it occurs mainly as the amino acids selenocysteine and selenomethionine, which differ from cysteine and methionine in having a selenium atom in place of the sulphur atom. The functional selenoproteins contain the amino acid selenocysteine, while other proteins contain non-specifically incorporated selenomethionine. The selenium content of food varies considerably, depending on region, natural selenium content in the soil and fertilization strategy. This leads to corresponding variations in the intake of selenium by humans and animals.

Milk is an important source of selenium in the diet, but its forms are not well known. In a research project, one of the antioxidant selenoproteins, the enzyme extracellular glutathione peroxidase, was studied. A purification strategy for its isolation from bovine plasma was described for the first time. The purified extracellular glutathione peroxidase was used to develop a new immunological assay of this and, moreover, a method of measuring its activity in milk and whey was optimized. The glutathione peroxidase activity in bovine milk was found to be similar to that in human milk. The effect of storage and heating on glutathione peroxidase in milk and on pure enzymes was also studied. An important finding was that the activity of glutathione peroxidase in milk and whey persisted after heat treatment at 72°C for 2 minutes, indicating that normal pasteurization used for consumption milk will not affect the enzyme activity. This research project was conducted in collaboration with Professor Björn Åkesson, Biomedical Nutrition, Lund University.

Helena Lindmark Månsson, Ph.D

Nutrients in dairy products

Reliable information on the nutritional composition of foods is the essential basis for the quantitative study of human nutrition, its application in management of disease and the provision of appropriate diets for individuals and populations. It is therefore of greatest utmost importance to measure and control the composition of foods continuously, since the contents of nutrients change over time.

Factors influencing the milk composition include breed of cows, feeding systems, seasonal changes and environmental factors like milking frequencies and -systems.

Other factors influencing the nutrient content in dairy products are the different heat treatments used in the dairy industry, various milk processing techniques for dairy products, distribution of components between the fat and water phase and the influence of different starter cultures on the content of some water-soluble vitamins.

To update the food tables on milk and milk products, an extensive investigation of the composition of dairy milk was performed. The aim was also to study variations

according to season and region. Milk from nine dairy plants located in different parts of Sweden was analyzed every second month from November 1995 to November 1996. A range of components that are important from a nutritional point of view were analyzed, including proteins and amino acid composition, fat content and fatty acid composition, lactose, vitamins, minerals and trace elements. The weighted average for the year was calculated for each component.

The results of this investigation have been utilized to update the nutritional value of different Swedish milk products, e.g. milk with varying fat content and cream products.

These results show that milk contains most of the vitamins and minerals needed from a nutritional point of view. The findings give possibilities to evaluate the role of milk and milk products in the diet. The nutrient content in fermented milks and in cheeses with various fat contents was also determined.

Helena Lindmark Månsson, Ph.D

Milk may cure bone fragility



ILLUSTRATION: PERNILLA FRID

Osteoporosis – "porous bones" – is a metabolic bone condition leading to enhanced bone fragility and, consequently, an increase in the risk of fracture. People who oppose milk and dairy foods in the diet of adults often claim that it is remarkable that osteoporosis is prevalent and increasing in Nordic countries where dairy foods are traditionally a major component of the diet. This is not a contradiction since osteoporosis is associated to many other factors, e.g. vitamin D deficiency due to winter darkness and indoor living in sub-arctic areas, menopause in women, high average life expectancy, physical inactivity and poor nutrition.

A sufficient daily intake of calcium throughout life is necessary. Calcium is not only necessary for healthy bones, but also for staying alive. All living things possess powerful mechanisms to conserve calcium and to maintain constant cellular and extra-cellular fluid of calcium concentrations. When diet is sufficient in calcium, bone provides a vital and readily source of calcium.

Milk is an exceptionally good source of bone nutrition, 500 grams of milk provides almost 80 percent of the recommended daily intake of calcium and phosphorus.

Maria Lennernäs Junberger, Ph.D, nutritionist



ILLUSTRATION: PERNILLA FRID

Links between diet and health are difficult to define

People often get confused when they hear or read that food items and food habits might harm health and cause disease. One should bear in mind that such relationships are difficult to define in diet-health surveys for many reasons.

We consume many food types in various amounts throughout life. It is thus difficult to differentiate between health effects linked to certain foods, to combination of foods or to the intake of certain nutrients.

It is difficult to obtain reliable data from subjects about their current food habits, and even more complicated to have them report on their diet 30 years ago (when diet was hypothesised to trigger a certain disease).

Subjects do not respond in the same way to the foods they eat or even from time to time. Differences in metabolic response are related to genetic factors, body fat mass, physical (in-) activity and energy expenditure, hormonal factors and such lifestyle factors as sleep quality, physical and environmental stress.

In dietary surveys, food consumption and nutrient intake is calculated by use of nutrient data bases. Standard recipes in databases may differ from database to database, in your way of cooking and also in recipes used in restaurants where you eat.

It is impossible for the investigator to get valid data on the amounts and types fatty acids you eat, the amounts of salt you consume or even the fiber content in your bread!

On the other hand, there is always a link between food, health and life. Eating and sleeping is a prerequisite for life. Cardiovascular disease, cancer and metabolic disorders occur sooner or later in life and are the major causes of death when people do not die from accidents, murder, infections or starving. Thus, statistical associations between food habits and (un-) health are impossible to avoid.

Maria Lennernäs Junberger, Ph.D, nutritionist



Swedish championship in professional cooking

The highlight of the year for the Swedish food industry is the Chef of the Year Competition and the presentation of the Gastronomic Academy's Dairy Medal. Each year, the competition attracts young chefs from throughout Sweden, who want to show off their cooking ability and measure their skills against those of their expert colleagues.

this is the eighteenth year that a Swedish championship in professional cooking has been held. The Chef of the Year 2001 is Christian Hellberg from the Trädgår'n Restaurant in Gothenburg at the west coast of Sweden.

It was by chance that Christian ended up pursuing a career in cooking. He was out traveling at the time he was due to submit his application for upper secondary school, so his mother was entrusted with the task. Perhaps she sensed his cooking talent and she registered Christian for both the economics program and the cookery program. Christian was accepted for both and was forced to make a choice, which the cookery program won. His strength as a chef is his

ability to work with others and to keep calm in stressful situations.

– Sweden has a head start when it comes to good produce and the high quality of such products as meat and fish. The fun aspect about Swedish food is that it is so international. We no longer need to salt and preserve food as we did in the days before refrigeration. We excel at picking up trends from other countries and when these are combined with our Swedish produce, we can achieve excellent results with a high international standard, says Christian.

– In Sweden, we have a culinary tradition that we can be proud of and this is often on show in international contexts, where we have the opportunity to participate and do well.

CHEF OF THE YEAR 2001

Name: Christian Hellberg
Born: 1972, in Fjällbacka on the west coast of Sweden
Family: Girlfriend Isabel
Favorite ingredients: Fish and seafood, but also has a "childlike fondness for black truffles and duck liver."
Drinks: Favors milk, fine Chablis, and vodka with lime
Interests: Skiing and socializing with close friends

Championship challenge

Eight finalists took part this year. The first part of the championship was to create "Modern Swedish Food" using cod and at least one dairy product, as well as an unrestricted number of accompaniments. The second part involved the creation of a soup with accompaniments – Street Food, food that can be eaten on the move, on a street corner or back at the office. This latter dish was also required to follow the Swedish nutrition recommendations and provide one-third of a day's requirements, that is, 750 kilocalories. As a comparison, it can be stated that 1 g of fat equals 9 kcal, which meant that 25g of fat could be used in the meal. If the nutritional value exceeded the recommendations, points were deducted in the assessment.

The finalists had five hours in which to prepare their competition dishes. The jury consisted of the collected Swedish cooking elite, chaired by Gert Klötzke, professor in gastronomy.

The Chef of the Year competition is of major importance for setting and reinforcing trends. All of Sweden's food elite comes to inspect the culinary event. In recent years, the championship has evolved to include a more streamlined look, a cleaner kitchen, a more reserved approach to sauces and greater awareness of produce, which was generally handled brilliantly. There was a trend in this year's event for mashed potato and soft herbs, such as dill, chervil and chives. Other popular ingredients were shallots, cauliflower, Jerusalem artichokes and almond potatoes.

– I guessed that the judges' taste-buds would be getting tired and decided to add color and design, Christian Hellberg comments.

– This is more important than you think – people eat with their eyes, too.

The contest is arranged by the dairy companies in Sweden, in collaboration with the Gastronomic Academy, the Swedish Hotels and Restaurants Association, the Swedish Head Chefs' Association, and the Chef of the Year Association.

In addition to becoming the Swedish champion in professional cooking, with the title "Chef of the Year," Christian Hellberg received the Gastronomic Academy's Dairy Medal and a study trip to a country of gastronomic interest. ●

Read more about Christian Hellberg on our website, where you can also find the recipes for the winning dishes. www.aretsock.se



Christian Hellberg's street food consisted of lemon and chervil soup, served with a chicken roll flavored with ginger, and a crouton filled with vegetables and cottage cheese.



The winning dish consisted of grilled salted cod, with a tomato and thyme mojjo and ragout of asparagus, onion and Jerusalem artichokes, served with almond potato and cauliflower purée and a small cress salad.

LÄR A UGG L A



ILLUSTRATION: MARITA ERIKSSON

Biological behavior affects school results?

Can people simply decide whether they are morning people – “larks” – or evening people – “owls”? Or does nature have the last word in whether we function best at the crack of dawn or long after the sun goes down?

By Jennifer Lindblad, nutritionist and dietician

The preliminary results of a survey among secondary school children on sleeping habits, eating habits and school performance, show that many pupils are alert in the evening, which means they are “owls,” who often skip breakfast and lunch, and frequently feel tired and listless during the day. These initial results appear to support the theory that going to bed late leads to poor performance in school.

Associate professor Gerhard Nordlund, of the University of Umeå, in northern Sweden, is heading this study, which is being conducted in collaboration with nutrition researcher Associate Professor Maria Lennernäs Junberger at Uppsala University, and sleep researcher Associate Professor Mats Gillberg of the Karolinska Institute in Stockholm.

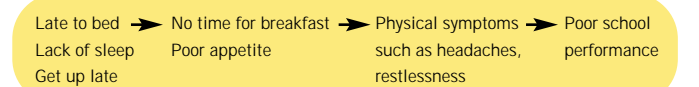
Thus, it could be that as many as one-third of Swedish teenagers are suffering physically, psychologically and perhaps even academically, from having to start the day out of balance with their biological daily rhythm.

Performance linked to amount of sleep

The lark and the owl seem to be two very different animals: for the lark, the morning can't come soon enough, while for

the owl, the sound of the alarm clock cuts into the mists of sleep like a runaway train.

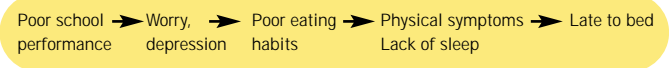
Children and young people normally start school early in the morning, regardless of when they go to bed. It is reasonable, therefore, to ask whether the larks who are alert in the morning, perform better at school than the owls, and if their performance, in that case, is directly linked to the amount of sleep they have had. It is also reasonable to attempt to identify other factors, such as good eating habits, which could help to explain the relationship between sleeping habits and school performance. Maria Lennernäs Junberger summarizes the research conducted by her and her colleagues in the following hypothetical cause model (See fact box).



The model is intuitively attractive. Most of us are aware from our own experience that lack of sleep and missed meals don't encourage mental alertness. The researchers, however, ►



ILLUSTRATION: MARTA ERIKSSON



It is also possible that depression is the factor that causes both sleeping problems and poor school performance. This is why it is important to recognize and investigate symptoms of depression in teenagers, such as worry, low levels of self-confidence, poor appetite and sleeping problems.

It is difficult to establish the “direction of cause” between sleeping habits and school performance in this type of study. This is primarily because it is difficult for researchers to determine from the gathered material which of the problems arose first. However, this is not an insurmountable obstacle, but simply presents the researchers with a challenge.

If the preliminary results of the study are confirmed by the final results, they could be of major importance for the well-being of many pupils. Maria Lennernäs Junberger suggests possible solutions to this dilemma:

- The school timetable can be changed so that pupils start an hour later and the owls have the possibility of longer, much-needed sleep.
- Breakfast or snacks could be served in the morning, so that those who have skipped breakfast at home receive an extra nutritional boost.
- School nurses could inform pupils about the possible links between physiological symptoms, such as headaches, and poor eating habits, says Associate Professor Gerhard Nordlund. A simple snack, such as milk and a sandwich or a little yogurt, could in many cases prevent headaches or absence through sickness.

Important to research teenagers’ sleeping patterns
The importance of sleep for our health and mental performance has been known since ancient times. More recently, researchers have identified various stages of sleep, found pharmacological aids to ease the process of falling asleep and have even been able to explain the importance of dreaming for our health. Although we already know a large amount about sleep, there is still much research to be done.

- This is the first study to research sleep patterns among Swedish teenagers, Mats Gillberg points out.
- Since teenagers are still growing and growth hormones are produced when we sleep, it is important that we investigate the effects caused by sleeping problems within this age group.

Biological research into sleeping patterns is relatively new. The way sleeping patterns can affect eating habits, personality and school performance is a largely unexplored area. The research being carried out among secondary school pupils can help us to find new knowledge within this subject area. Using increased knowledge, maybe the larks and the owls will be able to fly together with a common feeling of fulfillment and success. ●

Jennifer Lindblad is a morning person, who likes an early start to her day. In the evening, she unwinds by reading Chinese detective stories.

require data to be able to answer their questions and the material gathered from the survey is currently being processed. In total, the survey was responded to by 2,150 secondary school pupils in Jönköping, Gävle and Umeå in Sweden. Out of this total, 27 percent were classified as owls, 10 percent as larks, and 51 percent did not fall into either category. A random selection of 80 pupils was made among the larks and the owls for a more detailed interview.

The results from the detailed interviews in Jönköping have now been compiled.

Of the 29 pupils interviewed in Jönköping, 19 were owls and 10 were larks. The majority of the owls reported that they did not eat breakfast (63 percent) or lunch regularly (84 percent) and that they often had headaches (63 percent), and felt tired or listless (79 percent).

The owls also showed signs of low self-confidence, dissatisfaction with their bodies (particularly the girls) and had a negative view of their schoolwork and study results.

By contrast, the larks reported that they ate breakfast and school lunches regularly, that they felt bright and alert, that they were physically active and that they had high levels of self-confidence.

Clash between biological rhythm and school timetable

The substantial differences between the larks and the owls when it comes to eating habits, health, body awareness and the approach to schoolwork may seem surprising. These astonishing differences further clarify the consequences of clashes between biological rhythms and inflexible schedules in society. But, as Associate Professor Sven Bromberg of the Child and Adolescent Public Health Unit pointed out, alternative explanations for this type of research outcome should be taken into consideration. For example, one might reverse the cause model and find that poor school performance leads to sleep problems – a model that has completely different implications, but is also intuitively attractive:

School Meal Supporters

Giving students a taste for healthy food is the vision of the School Meal Supporters (Skolmatens vänner in Swedish). Promoting the availability of healthy food in schools and preschools and heightening students’ knowledge of food are two of its objectives.

- We want to support catering supervisors and school personnel by increasing the involvement of municipal politicians, says project manager Annichen Kringstad.

By Veronika Nysten, home economics and journalist

One of the major nutrition-related news stories last autumn highlighted the School Meal Supporters, a joint effort by the Federation of Swedish Farmers and the farmer-owned food companies to focus attention on meals served at preschools and schools.

- More municipal involvement and more food-preparation kitchens are key issues for the School Meal Supporters, says project leader Annichen Kringstad. Catering supervisors and school personnel are making an enormous effort to serve children healthy meals despite very tight budgets.

The project is backed by government authorities and organizations.

- As minister responsible for food, I am delighted with the School Meal Supporters, says Margareta Winberg, Minister of Agriculture. Their aim of giving students a taste for healthy food is wholly in line with our philosophy at the Ministry of Agriculture. There is great value in using school mealtimes in a pedagogical manner while promoting Swedish food production.

Bertil Norbelie, Director-General of the Swedish National Food Administration, also backs the School Meal Supporters in this important task:

- School meals are a high-priority area for the National Food Administration. The further support to school and preschool meals that is now being provided by the School

Meal Supporters is an important and laudable initiative.

The farmer-owned companies cooperating with the Federation of Swedish Farmers in this initiative are Arla, Cerealia, the Swedish Dairy Nutrition Council/Swedish Dairy Association and Scan Foods.

The aim of the School Meal Supporters is to give children in preschool and school a taste for eating healthy food at school, to encourage healthy eating habits and an awareness of food and how it is produced.

An extensive study report – Food in school and preschool – shows that people do not believe that schools and preschools have sufficient resources to serve children healthy meals.

Eight hundred parents of children between 2 and 15 years were interviewed. When asked if they felt their children’s school had sufficient resources to serve good, nourishing meals, the majority were doubtful or answered “No.” The parents also believed there is a clear connection between children’s eating habits and how they feel and behave at school.

School kitchens create better appetites

Another part of the study shows that there was greater enjoyment of food at preschools that had their own kitchens.

Municipalities that shut down the kitchens of preschools and primary schools and build large-scale central kitchens instead are on the wrong track. The best solution, for the

municipality and the children, is food-preparation kitchens, where food is prepared at the school at which it is to be served.

Food served at preschools with their own kitchens and their own cooks was generally given higher marks. The children have better appetites and meals are perceived as more exciting and varied. Children at preschools with their own kitchen often participate more in meal preparation and service. Food is used in a natural manner in teaching. All the groups interviewed – children, parents and personnel – agree on the results of the evaluation.

Having a food-preparation kitchen at school is also given as an important prerequisite in guaranteeing children good and nutritious meals. Other important factors are good produce, knowledgeable personnel and financial resources.

- We want to eliminate ‘transported food’ and break the trend of food-preparation kitchens being replaced by central kitchens, says Annichen Kringstad. The report shows that municipalities have everything to gain from having individual kitchens. Produce is used efficiently, food becomes a part of the educational process and children have better appetites.

The same pattern applies to food for primary schools. At schools that have their own kitchens, the food is generally given higher marks. ●

Swedish Dairy Association

The Swedish Dairy Association is the joint organization of the Swedish dairy farmers and the Swedish dairy industry, combining all available knowledge in these fields. The organization is owned by approximately 12,400 farmers through their eight dairy companies, eleven livestock cooperatives, two artificial insemination centers, and nine breed societies.

PROFESSIONAL COOKING
FOOD/NUTRITION
MILK RECORDING
FEEDING/MANAGEMENT
MILK POLICY
BREEDING
ENVIRONMENT
MILK QUALITY
ANIMAL HEALTH
MILK ECONOMY

In the entire chain from cow to consumer, the Swedish Dairy Association endeavors to develop and communicate expert knowledge, as well as influence public opinion and rules of practice, to allow our owners to improve their long-term competitiveness and give Swedish milk added value for consumers.

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