

## IN THIS ISSUE

- Lactic bacteria *against colon cancer*
- Fermented milk fighting hemorrhagic rectocoliti
- Promising results using probiotics *against Helicobacter pylori infections*
- A fermented milk active *against blood pressure*
- New probiotics effective *against eczema*
- Fermented milk fighting *winter infections in the elderly*
- Influence of *Lactobacillus GG* on the development *of intestinal flora in premature infants*
- Probiotics may reduce *the pathogens present in the nasal cavity*

This survey letter on lactic acid bacteria is produced by the scientific committee of

**SYNDIFRAIS**

*Publishing director*

Arnauld de Miollis (Syndifrais)

*Scientific coordinator*

Brigitte Laurent

*Reviewing board,*

*the Scientific Committee of Syndifrais*

Jean Louis Bresson (Hôpital des enfants

malades, Paris), Nadine Cerf-Bensussan

(Hôpital Necker, Paris), Jean Fioramonti

(INRA, Toulouse), Robert Ducluzeau

(Directeur de recherche INRA),

Jean-Marie Eustache (MLC),

Irene Lenoir-Wijnkoop (Danone Vitapole),

Marie-France Pagerey (Affaires scientifiques

et réglementaires, Nestlé France),

Patricia Ramos (Yoplait)

*Scientific Survey*

Judith Benrekassa (Cerin)

*Editor*



*Responsible for the information*

Eric Labouze (BIO Intelligence Service)

*Writer*

Lamy Moulay (BIO Intelligence Service)

# Yoghurts & fermented milks

September 2003 - Letter N°14

Health • Nutrition • Flora

SCIENTIFIC SURVEY . LACTIC ACID BACTERIA . PROBIOTICS

## edito Fermented milks and yoghurts :

“live” as a specific type recognized by the Codex Alimentarius

A regulatory success owing much to scientific results...

**Pr Jean-Louis Bresson**

*President of the Scientific Committee of SYNDIFRAIS*

After almost 20 years of debates, the standard defining fermented milks and yoghurts was definitively adopted at the time of the XXVI<sup>th</sup> session of the Codex Alimentarius\* Committee joined in July 2003 in the head office of FAO, Roma. The representatives of 124 countries devoted the use of the terms “yoghurts” and “fermented milks” to indicate products containing alive cultures.

Initiated by the International Dairy Federation (IDF) in the years 1980, the discussion of the text was prolonged since 1996 within the Codex Committee on Milk and Milk Products (CCMMP). Beyond the technical discussions, the divergences between delegations about the properties of these products and their denomination, therefore of their protection on the industrial level, made the debates long and difficult. One needed several sessions of the CCMMP, the activity of a special working group within the framework of the Codex and work of the IDF to lead in 2002 to the text of compromise which was definitively adopted last July.

It is about a true international recognition, because the Codex Alimentarius works out standards which constitute at the same time a guide for the legislation of the various States Members and a legal reference for the international trade. These standards, which aim at the first safety of the products and the honesty of the transactions, naturally integrate scientific knowledge specific to the field considered.

The knowledge obtained for several years as well as the recent developments, which unambiguously make a link between the majority of the beneficial effects on human health and the consumption of alive bacteria in sufficient quantity, has probably been of a great weight in this decision.

The denomination “yoghurt” from now on is protected and could not be used - except for situations related to a particular national legislation or a historical use - for heat-treated products whose cultures have all, or almost, be inactivated by heat.

That represents for the consumer, the insurance of information minus ambiguity and the possibility of choosing in knowledge a product of which it could await benefit for his health. It is reassuring to note that a family of products of which the use is very old and anchored in many culinary cultures could profit from such a regulation.

\* The Committee of the Codex Alimentarius was created in 1963 by FAO (Food and Agriculture Organization) and WHO (the World Health Organization) in order to work out food standards, hot lines and other texts within the framework of mixed Program FAO/OMS on the food standards.

## Lactic bacteria against colon cancer

Tangible proof has been obtained in animals of the efficacy of lactic bacteria in fighting cancer. Recently published data continues to emphasize this positive effect of probiotics.

An Italian team from the University of Perugia has sought to test *in vitro* the ability of different strains of lactic bacteria to inhibit the genotoxic effects of 4-nitroquinoline-1-oxide (4NQO), a powerful carcinogen capable of causing DNA adducts\* (1).

The 67 tested isolates were obtained from commercially available dairy products. Inhibition of the genotoxicity of 4NQO was at a maximum for 31/67 of the isolates tested (evaluated using the SOS-chromotest method) corresponding to the strains shown in the table below.

Strains	Inhibition of genotoxicity
<i>L. casei</i>	99.1 %
<i>L. plantarum</i>	93.3 %
<i>L. rhamnosus</i>	93.4 %
<i>L. acidophilus</i>	90.9 %
<i>L. bulgaricus</i>	85.7 %
<i>B. bifidum</i>	89.6 %

The results of this study show that, when incubated *in vitro* with 4NQO, some probiotic strains have the power to inhibit the genotoxic activity of this carcinogen. It should be noted that some isolates belonging to strains of *L. acidophilus* and *L. bulgaricus* showed little antigenotoxic activity while others belonging to the strains *L. casei* and *L. bulgaricus* were totally inactive.

Another molecule, 2-amino-9H-pyrido[2,3-b]indole (AAC), was tested *in vivo* on mice bearing human intestinal flora (2). This carcinogen, belonging to the family of heterocyclic amines, is very common in food, in particular in roasted meat. It has been shown that AAC plays a major role in initiating colon cancer (3).

Mice that received a mixture of probiotics during the two weeks that preceded gavage with the carcinogen, showed

levels of DNA adducts in the colon that were lower than in mice not given the treatment. This indicates that the consumption of probiotics (*Streptococcus faecalis*, *Clostridium butyricum* and *Bacillus mesentericus*) prevented the formation of DNA adducts in the colon epithelium. In other words, the probiotics had an antigenotoxic effect.

G. Perdigon's team has attempted to elucidate the mechanisms behind the preventive effect of probiotics in cancer of the colon (4). The mice used were fed yoghurt and then given the carcinogen 1,2 dimethylhydrazine (DMH) by subcutaneous injection. These researchers chose to measure the number of apoptosis and mitosis cells, since the carcinogenesis process causes modifications to the balance between proliferation (mitosis) and programmed cell death (apoptosis). Apoptosis can be seen as a mechanism for protecting cells against damage to the DNA. The transformation of adenomas into cancer involves the inhibition of apoptosis and the stimulation of cell proliferation (5).

Histological examinations showed hyperplasia of the colon epithelial cells and inhibition of apoptosis in the mice treated only with DMH. In those that were also given yoghurt, the histological structure of the tissues was not modified, apoptosis was stimulated and cell proliferation modified. In those mice fed yoghurt and not treated with the carcinogen, apoptosis was also activated.

It appears that DMH causes cancerous damage to the colon epithelium that yoghurt consumption can prevent by favourably modulating cell proliferation and apoptosis. The role played by probiotics in regulating apoptosis is seen in the work of Yan and Polk (6) but in the opposite way. These authors have shown that *Lactobacillus GG* added to cultures of human or murine colon cells stimulates B/Akt kinase protein that has anti-apoptotic activity and inhibits activation by cytokines of the mitogen-activated protein kinase p38 with pro-apoptotic activity. In the same way, depending on the concentration, the supernatant fluids of *Lactobacillus GG* cultures activate Akt protein and inhibit apoptosis

caused by cytokines. In other words, *Lactobacillus GG* would appear to inhibit apoptosis, which, according to the authors, would explain its role in protecting intestinal flora and ensuring the survival of intestinal cells in a hostile environment.

Therefore, probiotics appear to be potential apoptosis regulators, either as stimulators or inhibitors depending on the study. Clearly, the mechanisms involved in anticancer effects have not yet been clarified, although various hypotheses of differing weights have been put forward (7). The second point to be determined concerns the data available for humans. There is in fact very little. As I. Rowland emphasizes (8), given the strength of the results obtained in animal tests, studies on humans should now be encouraged.

\* A DNA adduct is the addition of a chemical molecule to DNA. This results in genotoxic mutation that is transmitted to daughter cells. A correlation exists between the number of adducts produced experimentally and the number of tumours that will develop.

- 1• Cenci G, Rossi J, Trotta F, Caldini G (2002). Lactic acid bacteria isolated from dairy products inhibit genotoxic effect of 4-nitroquinoline-1-oxide in SOS-chromotest. *Syst Appl Microbiol.* 25(4):483-90.
- 2• Horie H, Zeisig M, Hirayama K, Midtvedt T, Moller L, Raftter J (2003). Probiotic mixture decreases DNA adduct formation in colonic epithelium induced by the food mutagen 2-amino-9H-pyrido[2,3-b]indole in a human-flora associated mouse model. *Eur J Cancer Prev.* 12(2):101-7.
- 3• Hirayama K, Raftter J (2000). The role of probiotic bacteria in cancer prevention. *Microbes Infect* 2:681-686.
- 4• Rachid MM, Gobatto NM, Valdez JC, Vitalone HH, Perdigon G (2002). Effect of yogurt on the inhibition of an intestinal carcinoma by increasing cellular apoptosis. *Int J Immunopathol Pharmacol.* 15(3):209-16.
- 5• Tsujitani S, Shirai H, Tatebe S, Sugamura K, Ohfuji S, Gomyo Y et al (1996). Apoptotic cell death and its relationship to carcinogenesis in colorectal carcinoma. *Cancer* (5) 77:1711-1716.
- 6• Yan F, Polk D (2002). Probiotic bacterium prevents cytokine-induced apoptosis in intestinal epithelial cells. *J Biol Chem.* 277(52):50959-65.
- 7• Burns AJ, Rowland IR (2000). Anti-carcinogenicity of probiotics and prebiotics. *Curr Issues Intest Microbiol.* 1(1):13-24.
- 8• Syndiffrais (2003). *Yoghurts & Fermented milks* n° 13, p. 1.

## Fermented milk fighting hemorrhagic rectocolitis : a clinical trial

Ulcerative colitis is a non specific inflammation resulting in erosion and colorectal ulceration. Effective drugs are available but relapses are frequent. The challenge is to find an effective therapy that also prevents relapses occurring. Since intestinal bacteria play a role in chronic inflammatory diseases of the intestine, researchers have put forward the hypothesis that the consumption of probiotics could extend the remission time. A Japanese team from the Yakult Research Centre has attempted to show this in a randomised, long-term, clinical study (9).

The study included 21 patients suffering from ulcerative colitis all receiving the same medicines. Eleven of them were asked to consume 100 ml/day of fermented milk containing the following live

bacterial strains - *B. breve*, *B. bifidum* and *L. acidophilus* YIT 0168 - in quantities of  $10 \times 10^{12}$ /ml for one year (to the exclusion of all other fermented products). The 10 other volunteers formed the control group and received no fermented dairy products.

A worsening of the symptoms occurred in 3 of the 11 patients receiving the fermented milk as opposed to 9 out of 10 of the control group patients. This difference between the two groups is significant ( $p=0.0184$ ). An analysis of the microflora and the faecal organic acids showed a significant reduction in the relative proportions of *Bacteroides vulgatus* in the bacteroids group and the concentration of butyrate between the beginning and end of the study (a gap of one year).

Although this study only concerned a small number of patients, its long duration is commendable. The result would seem to indicate that long-term consumption of the fermented milk extends the remission time in hemorrhagic rectocolitis and therefore prevents relapses. Taking medicines and probiotics simultaneously would appear to be a promising alternative for the management of this disease.

9• Ishikawa H, Akedo I, Umesaki Y, Tanaka R, Imaoka A, Otani T (2002). Randomized controlled trial of the effect of bifidobacteria-fermented milk on ulcerative colitis. *J Am Coll Nutr.* 22(1):56-63.

## Promising results using probiotics against *Helicobacter pylori* infections

*Helicobacter pylori* is a pathogenic bacteria responsible for peptic ulcers and chronic gastritis. *H. pylori* infection is known to be a factor predisposing patients to gastric cancer (10). The medicines that are currently available, essentially antibiotics and antacids, do not eradicate infection and may often cause side effects and even make the bacteria more antibiotic-resistant. The hypothesis that is currently being debated is that probiotics may be able to reduce the bacterial load in patients infected with *H. pylori*.

Studies conducted in vitro show that probiotics are able to inhibit the growth of *H. pylori*. This is the case, for example, of *Lactobacillus casei Shirota* (11), *Lactobacillus acidophilus* (12, 13) and *Lactobacillus johnsoni La1* (14). And in vivo in humans?

In an intervention study (11), 14 patients infected with *H. pylori* received *Lactobacillus casei Shirota* ( $2 \times 10^{10}$  cfu/day) fermented milk for 6 weeks. Six other patients, the control group, received no fermented milk. None of the patients had taken any medication during the month preceding the start of the study. The *H. pylori* bacterial load was

assessed by the breath urea test at the start and end of the study.

Ureolytic activity was reduced in 64% of the patients (9/14) consuming fermented milk and in 33% of the control group (2/6) ( $p=0.22$ ). This result shows that, at short term, the probiotic *L. casei Shirota* is able to reduce the *H. pylori* bacterial load.

A similar study (15) involved 12 asymptomatic patients infected with *H. pylori*. They were asked to take a dairy product fermented with *L. johnsonii La1* ( $10^7$  cfu/ml) for 2 weeks in quantities of 640 ml/day at 2 hours intervals, i.e. over a period of 10 hours. The ureolytic activity measured at the end of the 2 weeks had decreased by 40 % compared to the basal level.

These two studies show that the probiotics *L. casei Shirota* and *L. johnsonii La1* were able to stop, at least in part, the growth of *H. pylori* in humans. However, the small number of patients involved in these studies, the short length of the studies and the large quantities of probiotics used mean no firm conclusions can be drawn. The results should rather be seen

as preliminary and should now be supported by clinical studies on a much wider scale.

10• Moss S (1999). The carcinogenic effect of *H. pylori* on the gastric epithelial cell. *J Physiol Pharmacol.* 50(5):847-56.

11• Cats A, Kuipers EJ, Bosschaert MA, Pot RG, Vandenbroucke-Grauls CM, Kusters JG (2003). Effect of frequent consumption of a Lactobacillus casei-containing milk drink in Helicobacter pylori-colonized subjects. *Aliment Pharmacol Ther.* 17(3):429-35.

12• Lorca GL, Wadstrom T, Valdez GF, Ljungh A (2001). Lactobacillus acidophilus autolysins inhibit Helicobacter pylori in vitro. *Curr Microbiol.* 42(1):39-44.

13• Chatterjee A, Yasmin T, Bagchi D, Stohs JG (2003). The bactericidal effects of Lactobacillus acidophilus, garcinol and Protykin compared to clarithromycin, on Helicobacter pylori. *Mol Cell Biochem.* 243(1-2):29-35.

14• Michetti P, Dorta G, Wiesel PH, Brassart D, Verdu E, Herranz M, Felley C, Porta N, Rouvet M, Blum AL, Corthey-Theulaz I (1999). Effect of whey-based culture supernatant of Lactobacillus acidophilus (johnsonii) La1 on Helicobacter pylori infection in humans. *Digestion.* 60(3):203-9.

15• Gotteland M, Cruchet S (2003). Suppressive effect of frequent ingestion of Lactobacillus johnsonii La1 on Helicobacter pylori colonization in asymptomatic volunteers. *J Antimicrob Chemother.* 51(5):1317-9.

This scientific letter "Yoghurts & fermented milks" is also available on the following websites:

[www.maison-du-lait.com](http://www.maison-du-lait.com) and [www.syndifrais.org](http://www.syndifrais.org)

### A fermented milk active against blood pressure

In a previous study on spontaneously hypertensive rats, Hayakawa *et al* (16) had highlighted the hypotensive effect of a new fermented dairy product. This same team from the Yakult Research Centre has now adapted this study for humans (17).

The fermented milk used contained strains of *L. casei Shirota* and *Lactococcus lactis* YIT 2027 and  $\gamma$ -aminobutyric (GABA) acid resulting from the fermentation process. GABA is an amino acid whose hypotensive properties have been well known for a long time in both animals and humans (18).

This clinical study was conducted randomized, double blind and placebo controlled and involved 39 moderately hypertensive patients. The study took place over 14 weeks. During the first twelve weeks, the tested patients drank the fermented milk and the control group

patients a placebo. The daily intake of 100 ml of fermented milk provided 10-12 mg of GABA. The peripheral blood pressure and heart rate were measured at various intervals.

Between the second and fourth week, the arterial pressure fell significantly among the tested patients and this fall was maintained until the twelfth week. The values obtained differed significantly from the basal values ( $p < 0.01$ ) and those measured in the control group ( $p < 0.05$ ). At the end of the study, the mean decrease was  $17.4 \pm 4.3$  mmHg for systolic pressure and  $7.2 \pm 5.7$  mmHg for diastolic pressure. Heart rate, seric concentrations of total cholesterol, triglycerides, proteins and glucose neither differed between the groups nor changed during the study.

The GABA fermented milk was effective in reducing arterial pressure in hyper-

tensive patients. The volume of fermented milk required is compatible with a normal food intake. It remains to be verified if such consumption of fermented milk remains effective on arterial pressure long term.

- 16• Hayakawa K, Kimura M, Kamata K (2002). Mechanism underlying gamma-aminobutyric acid-induced antihypertensive effect in spontaneously hypertensive rats. *Eur J Pharmacol.* 438(1-2):107-13.
- 17• Inoue K, Shirai T, Ochiai H, Kasao M, Hayakawa K, Kimura M, Sansawa H (2003). Blood-pressure-lowering effect of a novel fermented milk containing gamma-aminobutyric acid (GABA) in mild hypertensives. *Eur J Clin Nutr.* 57(3):490-5.
- 18• Elliot KA, Hobbiger F (1959). Gamma aminobutyric acid : circulatory and respiratory effects in different species : re-investigation of the anti-strychnine action in mice. *J Physiol.* 146:70-84.

### New probiotics effective against eczema

It has recently been shown that the consumption of probiotics may prevent atopic dermatitis in children (19). Two studies have shown that the oral administration of *Lactobacillus GG* to new born babies suffering from atopic dermatitis and allergies to cow's milk reduced the severity of the eczema (20, 21).

Rosenfeldt *et al* (22) had as their goal to evaluate the effect of two new strains of lactobacillus *L. rhamnosus* 19070-2 and *L. reuteri* DSM 12460 on atopic dermatitis in children.

The 58 children aged between 1 and 13 were split into two groups. One consumed both probiotics ( $2 \times 10^{10}$  cfu/day, ratio 1/1) for 6 weeks then, after stop-

ping for 6 weeks, a placebo for another 6 weeks. The second group took the placebo before the probiotics. The result was that 56 % of the patients saw their eczema improve during the period they took the probiotics, as opposed to 15 % during the placebo period ( $p = 0.001$ ). The eczema was also less severe during the treatment period ( $p = 0.02$ ). The efficacy of probiotic consumption in treating atopic dermatitis was also greater in children also suffering from allergies.

The authors conclude that giving these two probiotics to children suffering from atopic dermatitis results in an improvement in the clinical symptoms of the eczema. Although significant, the effects remain however discrete - com-

parisons between groups of similar ages would perhaps have been more appropriate.

- 19• Kalliomaki M, Salminen S, Arvilommi H, Kero P, Koskinen P, Isolauri E (2001). Probiotics in primary prevention of atopic disease: a randomised placebo-controlled trial. *Lancet* 357(9262):1076-9.
- 20• Isolauri E, Arvola T, Sutas Y, Moilanen E, Salminen S (2000). Probiotics in the management of atopic eczema. *Clin Exp Allergy* 30(11):1604-10.
- 21• Majamaa H, Isolauri E (1997). Probiotics: a novel approach in the management of food allergy. *J Allergy Clin Immunol.* 99(2):179-85.
- 22• Rosenfeldt V, Benfeldt E, Nielsen SD, Michaelsen KF, Jeppesen DL, Valerius NH, Paerregaard A (2003). Effect of probiotic *Lactobacillus* strains in children with atopic dermatitis. *J Allergy Clin Immunol.* 111(2):389-95.

### Fermented milk fighting winter infections in the elderly

A pilot clinical study, conducted by researchers from Danone Vitapole, had as its aim to evaluate the impact of consuming Actimel\* on winter infections of viral origin in the elderly (23).

360 volunteers, aged on average between 60 and 70 years, were divided into two groups. One group was asked to consume 300 ml of Actimel per day for three weeks and the second group (control) received no products. The illnesses endured (influenza, gastro-intes-

tinal syndrome, bacterial broncho-pneumopathy, ENT infections) were significantly shortened ( $p = 0.024$ ) in the patients consuming the fermented milk, whereas the incidence of the infections did not change.

Compared to the patients in the control group, the reduced length of the winter infections in elderly patients consuming Actimel fermented milk was estimated at 20 % by the authors. This study should lead to studies being carried out on a

wider scale in order to lend support to the results obtained.

\* Actimel is a fermented milk containing yoghurt starters and *Lactobacillus casei* DN-114 001.

- 23• Turchet P, Laurenzano M, Auboiron S, Antoine JM (2003). Effect of fermented milk containing the probiotic *Lactobacillus casei* DN-114 001 on winter infections in free-living elderly subjects: a randomised, controlled pilot study. *J Nutr Health Aging.* 7(2):75-7.

## Influence of *Lactobacillus GG* on the development of intestinal flora in premature infants

The consumption of probiotics is beneficial to the health of humans, in particular gastro-intestinal health (24). These effects would appear to be either exerted directly by the probiotic or indirectly via modifications exerted on the ecology of the microflora.

Agarwal's team investigated the impact of *Lactobacillus GG* on the development of intestinal flora in premature infants (25). In such infants, the intestinal flora differs from that of full term babies. It is characterised by the lateness of its development and the lack of diversity of the bacterial species (26, 27). The underlying idea is that by assisting a more rapid development of intestinal flora, risk of the various infections affecting premature infants could be avoided.

This randomized study involved 39 infants weighing less than 1.5 kg (group 1) and 32 weighing between 1.5 and 2 kg (group 2). The lyophilised probiotic was administered in milk at  $2 \times 10^9$  bacteria/day for 21 days in the infants weighing less than 1.5 kg and during 8 days for the others. Treatment

begin within 3 days of birth. The faeces underwent microbiological analysis on d0, d7, d8, d14 and d21.

Initially, the infants in group 1, compared to those in group 2, showed less diversity in their intestinal flora ( $p < 0.03$ ) and less bacterial density ( $p < 0.05$ ). Although *Lactobacillus GG* colonisation was slight (it had occurred for 21 % of the low weight infants and 47 % of those in the higher weight group), on d7 and d21, the number of bacterial species had increased in the group 1 infants who had received the probiotic compared to those in the same group receiving no probiotics. Contrary to the Gram- bacteria, the number of Gram+ bacteria increased significantly between day d0 and d21 ( $p < 0.05$ ). For the children in group 2, no quantitative or qualitative changes to the flora were observed.

These results lead to three conclusions: 1) The response to the probiotic depends on the gestational and post-natal age, 2) *Lactobacillus GG* was able to modify the profile of intestinal colonisation in low weight newborn infants and 3) *Lacto-*

*bacillus GG* does not need to colonise the intestinal system effectively to have an impact on the native flora of the premature infant. According to the authors, it is expected that an increase in Gram+ bacteria will provide a better balanced intestinal flora and will prevent the harmful effects of possible pathogenic bacteria.

- 24• Gorbach SL (2000). Probiotics and gastrointestinal health. *Am J Gastroenterol.* 95(1 Suppl):S2-4.
- 25• Agarwal R, Sharma N, Chaudhry R, Deorari A, Paul VK, Gewolb IH, Panigrahi P (2003). Effects of Oral *Lactobacillus GG* on Enteric Microflora in Low-Birth-Weight Neonates. *J Pediatr Gastroenterol Nutr.* 36(3):397-402.
- 26• Long SS, Swenson RM (1977). Development of anaerobic fecal flora in healthy newborn infants. *J Pediatr.* 91(2):298-301.
- 27• Sakata H, Yoshioka H, Fujita K (1985). Development of the intestinal flora in very low birth weight infants compared to normal full-term newborns. *Eur J Pediatr.* 1985 Jul;144(2):186-90.

## Probiotics may reduce the pathogens present in the nasal cavity

The nasal cavity is a reservoir of bacteria. Some of these bacteria are pathogenic and may cause infections in other locations than the respiratory tract. For example, a multicentric study has shown that several cases of *Staphylococcus aureus* septicaemia are of nasal origin (28). In the same way, 30 % of *Staphylococcus aureus* infections caused by injury are of nasal origin (29).

Starting with the hypothesis that probiotics are able to stimulate the immune system, Glück and Gebbers have evaluated the effect of ingesting probiotics on nasal bacterial flora (30).

The 209 healthy volunteers enrolled for the study were asked to consume, over 3 weeks and twice a day, either milk fermented with *Lactobacillus GG*, *Bifidobacterium sp.* B420, *Lactobacillus acidophilus* 145 and *Streptococcus thermophilus* (65 ml, n=108) or yoghurt (180 g, n=101). The nasal flora was exa-

mined blind on d1, d21 and d28. *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Haemophilus influenzae* and  $\beta$ -haemolytic streptococcus were sought. These are potentially pathogenic agents that are frequently found in the nasal cavity.

It was seen that between d1 and d21, the occurrence of the sought pathogenic agents was significantly reduced in the volunteers consuming the fermented milk. ( $p < 0.001$ ). This effect was predominant in the bacteria of the Gram+ group, whose number diminished ( $p < 0.05$ ). There was no change in those who consumed yoghurt.

It would seem that regular consumption of some probiotics may make it possible to eliminate potentially pathogenic agents present in the nasal cavity. The authors attribute this beneficial effect to the impact of the probiotics on the intestinal lymphoid immune system with

repercussions on the respiratory system. However, this hypothesis does not make clear the mechanisms by which an immune effect initiated locally (in the intestine) can act on potentially infectious bacteria located remotely (in the nasal cavities).

- 28• Von Eiff C, Becker K, Machka K, Stammer H, Peters G (2001). Nasal carriage as a source of *Staphylococcus aureus* bacteremia. Study Group. *N Engl J Med.* 344(1):11-6.
- 29• Kluytmans JA (1998). Reduction of surgical site infections in major surgery by elimination of nasal carriage of *Staphylococcus aureus*. *J Hosp Infect.* 40 Suppl B:S25-9.
- 30• Glück U, Gebbers JO (2003). Ingested probiotics reduce nasal colonization with pathogenic bacteria (*Staphylococcus aureus*, *Streptococcus pneumoniae*, and beta-hemolytic streptococci). *Am J Clin Nutr.* 77(2):517-20.

## LAB-DOC bibliographic selection

The data base LAB-DOC organised by SYNDIFRAIS, brought together the bibliographic references of the international scientific publications accompanied by the authors' summaries.

- 31•** Annuk H, Shchepetova J, Kullisaar T, Songisepp E, Zilmer M, Mikelsaar M (2003). Characterization of intestinal lactobacilli as putative probiotic candidates. *J Appl Microbiol* 94(3):403-12.
- 32•** Costa-Ribeiro H, Ribeiro TC, Mattos AP, Valois SS, Neri DA, Almeida P, Cerqueira CM, Ramos E, Young RJ, Vanderhoof JA (2003). Limitations of probiotic therapy in acute, severe dehydrating diarrhea. *J Pediatr Gastroenterol Nutr* 36(1):112-5.
- 33•** de Champs C, Maroncle N, Balestrino D, Rich C, Forestier C (2003). Persistence of colonization of intestinal mucosa by a probiotic strain, *Lactobacillus casei* subsp. *rhamnosus* Lcr35, after oral consumption. *J Clin Microbiol* 41(3):1270-3.
- 34•** Dieleman LA, Goerres MS, Arends A, Sprengers D, Torrice C, Hoentjen F, Grenther WB, Sartor RB (2003). *Lactobacillus GG* prevents recurrence of colitis in HLA-B27 transgenic rats after antibiotic treatment. *Gut* 52(3):370-6.
- 35•** Fernandez MF, Boris S, Barbes C (2003). Probiotic properties of human lactobacilli strains to be used in the gastrointestinal tract. *J Appl Microbiol* 94(3):449-55.
- 36•** Hou RC, Lin MY, Wang MM, Tzen JT (2003). Increase of viability of entrapped cells of *Lactobacillus delbrueckii* ssp. *bulgaricus* in artificial sesame oil emulsions. *J Dairy Sci* 86(2):424-8.
- 37•** Jens W, Heng NC, Hammes WP, Loach DM, Tannock GW, Hertel C (2003). Identification of *Lactobacillus reuteri* genes specifically induced in the mouse gastrointestinal tract. *Appl. Environ. Microbiol* 69(4):2044-2051.
- 38•** Kim HJ, Camilleri M, McKinzie S, Lempke MB, Burton DD, Thomforde GM, Zinsmeister AR (2003). A randomized controlled trial of a probiotic, VSL#3, on gut transit and symptoms in diarrhoea-predominant irritable bowel syndrome. *Aliment Pharmacol Ther* 17(7):895-904.
- 39•** Krasaekoopt W, Bhandari B, Deeth H (2003). Evaluation of encapsulation techniques of probiotics for yoghurt. *Int. Dairy J* 13:3-13.
- 40•** Macfarlane GT, Cummings JH (2002). Probiotics, infection and immunity. *Curr Opin Infect Dis* 15(5):501-6.
- 41•** Mercenier A, Pavan S, Pot B (2003). Probiotics as biotherapeutic agents: present knowledge and future prospects. *Curr Pharm Des* 9(2):175-91.
- 42•** Pena JA, Versalovic J (2003). *Lactobacillus rhamnosus GG* decreases TNF-alpha production in lipopolysaccharide-activated murine macrophages by a contact-independent mechanism. *Cell Microbiol* 5(4):277-85.
- 43•** Ronka E, Malinen E, Saarela M, Rinta-Koski M, Aarnikunnas J, Palva A (2003). Probiotic and milk technological properties of *Lactobacillus brevis*. *Int J Food Microbiol* 83(1):63-74.
- 44•** Wallace TD, Bradley S, Buckley ND, Green-Johnson JM (2003). Interactions of lactic acid bacteria with human intestinal epithelial cells: effects on cytokine production. *J Food Prot* 66(3):466-72.

Your suggestions and comments will draw all our attention. Please send them to :

SYNDIFRAIS

42 rue de Châteaudun • 75314 Paris Cedex 9  
Phone : 33 1 49 70 72 30 • Fax : 33 1 42 80 63 90  
e.mail : syndifrais@syndifrais-syndilait.org