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Determination of probiotic properties of bacteria isolated from various foods and supplements S. Brusselmans, J. Callens, E. Geudens, L. Huybrechts, M. Kwisthout, B. Wederholdt

Aim

Dairy departments in supermarkets trying to tempt consumers with promising claims, pharmacies offering a range of probiotic supplements; from curing intestinal complaints to reinforcing the immune system. **There's no denying that** probiotics have made their way to the broad public, but are these products really that promising?

To investigate the probiotic character of the bacteria, both adhesion to mammalian cells and toxicity were verified. Bacteria must be able to attach to human epithelial cells to a certain extent in order to have a local effect but may not be toxic. Finally, the influence of the passage through the gastro-intestinal system on the bacteria is investigated, to evaluate how resistant they are to stomach acid and intestinal enzymes.

Conclusion

The bacteria in the examined dairy products have a sufficient adhesive activity and are not or hardly toxic, these are important characteristics of probiotics. A remarkably low adhesion activity was found in the bacteria that were isolated from supplements and furthermore high toxicity values were obtained. Since the results of bacteria from supplements conflict with the expected probiotic characteristics, an additional study is necessary to confirm or disprove the obtained results. Survival rates after passage through the gastrointestinal system were tested for a number of products. Imutis and Actimel appear to have the best resistance and are present in the largest numbers after passage through the digestive system. The applied techniques can serve in future analyzes of new probiotics as well as in selecting optimal probiotics available on the market today.

Assays

Isolation of bacteria from probiotic products The probacterial products were homogenized, suspended in sterile water and plated on TSA-agar to obtain single colonies.

Adhesion to mammalian cells

Bacteria were added to preseeded and pregrown HeLa-cells, incubated for 90 min, after which the unattached cells were washed off. Cells adherend to the HeLa-monolayer were detached, diluted and plated to obtain a countable number of CFU.

Cytotoxicity to mammalian cells

Bacteria were added to preseeded and pregrown HeLa-cells and incubated for 24 hrs. The CyQuant toxicity kit from Promega was used to quantify the extent of HeLa-lysis withing each well and compared to a positive control where lysis buffer was added.

Passage through the gastro-intestinal tract

To test whether the probiotics survive the journey through the intestinal system, the bacteria were exposed to simulated (pH and enzymatic) conditions of the mouth, stomach, duodenum and ileum. After each step, a sample was taken and plated on a TSA-plate to compare it with the control sample.



Toxic Not passing through GI tract

Results

acteria were isolated from food sources and sup- lements A total of 28 bacteria were isolated from arious diary products and nutritional supple- nents.				Toxicity of b Next these s discover if th Very little to
	Yalacta (2)	Protectis (2)		they are con nary results to 47%, so to determine the mended.
	Alpro nature yogurt (2)	L. fermentum		
	Activia (2)	Puur (2)		
	Actimel (3)	Imutis (2)		
	Parmesan cheese (2)	Bacterie 2 – Imutis		Most bacter ons
	Yakult (3)	My immunity (2)		
Bacterial probiotics show relatively low adhesion The experiment firstly focused on the selected				The final exp mouth_stor
acteria's adhesion degree. The results showed a elative low adhesive percentage below 20%, hough all bacteria species had some degree of dhesion to attach themselves to human cells.				which condi- graph shows species in nu stomach.





Promotor research: L. Demuyser

pacterial probiotics is low

species' cytotoxicity was looked into to hey would be harmful to our bodies. no toxicity in the cells was noticed, so sumable. A couple of very extraordisurfaced with percentages around 38 o be certain, another experiment to he exact toxicity value is recom-

ria are inhibited by stomach conditi-

periment tried to mimic the human nach and gut condition, to detect in ition these species would survive. The s a clear decline of even 90% fors ome umbers when they pass through the