

The Safety of Capsules Containing Lactic Acid Bacilli

Thomas P and Lee SH. The safety of capsules containing lactic acid bacilli, *Annal Dent Univ Malaya* 1999; 6: 56 - 57.

ABSTRACT

The population in Malaysia use various types of health and food supplements. These products are considered safe and are used without any concern for their toxicity. Among the products used as health supplements are products that contain lactic acid bacteria. This project studied the acute and subacute toxicity of a product containing minerals, herbs, vitamins and live lactic acid bacteria, on Sprague-Dawley rats. Acute toxicity was tested 24 hours after a single dose and subacute toxicity was studied 24 hours after 7 days of daily dosing. The parameters that were studied were alanine aminotransferase (ALT, SGPT), aspartate aminotransferase (AST, SGOT), serum urea, ratios of weight of kidney and liver weight to body weight and percentage changes in body weights. The contents of capsules of the product (6, 8 or 10 capsules for acute studies and 6, 10 and 12 for subacute studies) were mixed with corn oil and fed orally to rats. Control rats were fed with corn oil alone. In the acute studies, the level of ALT in the rats treated with the contents of the capsule was lower than controls. There were no significant changes in the other parameters of the rats in the treatment groups as compared to controls. There were no significant differences in all the parameters between rats in the treatment groups as compared to controls in the subacute studies. Sprague-Dawley rats fed with high doses of the product did not show signs of toxicity in the parameters that were studied.

INTRODUCTION

Products containing lactic acid bacteria have long been available in the market. They may be in the form of food such as yogurt (thairoo, dadih) or they may be marketed in pharmaceutical formulations such as capsules and liquids. In the last decade or so, with increasing interest in natural foods, the number of such products have increased.

Although the use of such products either as food or as health supplements is quite widespread, there isn't much information available about the presence or absence of toxicity of such preparations. Some may be tempted to say "but, these are natural products!", however it must be borne in mind that some of the most powerful toxins known to man are natural substances. Therefore, natural does not equal safe. In this study we looked at the acute and sub-acute toxicity of a type of lactic acid bacteria capsule, a product containing live lactic acid bacilli, minerals, herbs and vitamins.

MATERIALS AND METHODS

The lactic acid bacteria capsules were supplied by OMX Malaysia Sdn Bhd.

Male Sprague Dawley rats weighing about 220-250 g and aged between 53 to 58 weeks were purchased from the Institute of Medical Research and housed in the

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ALT, AST and serum urea assays were carried out using the Reflotron dry chemistry analyser and the corresponding test strips purchased from Roche Diagnostics Sdn Bhd. Blood was collected using heparinised capillary tubes.

The contents of the capsules were suspended in corn oil and the animals were fed using a syringe and a feeding needle.

In the acute toxicity studies, the animals were fed one dose of the product and then they were sacrificed after 24 hours. There were 4 groups of animals; they were the controls that were fed just corn oil, the treatment groups that were fed the contents of 6 capsules, 8 capsules or 10 capsules. Each group had 5 rats.

In the sub-acute toxicity studies, the animals were fed the product once a day for 7 days and then sacrificed on the 8th day. In these studies also, there were 4 groups of animals, the control group that was fed corn oil, the treatment groups that were fed the contents of 6 capsules, 10 capsules or 12 capsules. Each group had 5 rats.

The animals were sacrificed by cervical dislocation 24 hours after the last dose was fed. The viscera was opened and the liver and kidneys removed, rinsed, blotted dry and weighed. Blood was collected in heparinised tubes and a drop placed on the test strips and the readings obtained from the Reflotron dry chemistry analyser.

The parameters that were looked at were body-weight, kidney weight, liver weight, ALT, AST and serum urea. The animals were also observed for any visible physical changes.

RESULTS

In the acute toxicity studies, there was a significant decrease as compared to controls in the ALT levels of the rats fed with lactic acid bacteria capsules. However, no dose-related effects were observed. There was no significant differences in ALT levels between rats in the control group and treatment groups in the sub-acute studies.

No differences were observed in AST levels of rats between any of the groups in both the acute as well as subacute toxicity studies.

No differences were observed in serum urea levels of rats between any of the groups in both the acute as well as the subacute toxicity studies.

The ratio of weight of kidney and liver to body weight was not different between all groups of rats in both the acute as well as the subacute toxicity studies.

In the acute toxicity studies, there was a trend towards a decrease in body weight in the rats in the treatment groups as compared to rats in the control group.

In the subacute studies, however, the trend was towards an increase in body weight of the rats in the treatment groups as compared to the control rats, after 7 days of treatment. However, these differences were not statistically significant.

There were some changes in the fur of the animals fed the higher doses of the product. Diarrhoea was seen in the rats fed with corn oil alone (controls) after the first day of feeding.

DISCUSSION

The sale of health supplements was until recently on the increase. Consumers with extra cash to spend did not mind spending a little extra on health supplements "hoping" that they would help to keep them healthy. Another reason for the popularity of health supplements was that they were considered as "natural" and therefore safer than the synthetic drugs and vitamins. This opinion stems from a belief that all things chemical or synthetic are toxic and harmful. Such generalisation is not safe because some of the most toxic substances are "natural", such as botulinum toxin and aflatoxin.

Products containing lactic acid bacteria have been available for a long time. Initially they were home-produced products, but more recently they have been made into pharmaceutical dosage forms such as capsules. One such product is OMX capsule which contains a mixture of minerals, vitamins, herbs and live lactic acid bacteria.

The product is approved by the Ministry of Health as a health supplement. Among the effects that have been reported for the product include action against MRSA, restoration of gut flora, treatment of hypercholesterolemia, hepatic encephalopathy and gut infections. There have been anecdotal reports of patients, in certain instances, taking more than a few capsules a day. Being a "natural" product, the possible toxicity of the product is often not considered especially since the ingredients have been part of our native foods. However,

large numbers of live bacteria in a capsule can have different effects from the amounts found in foods and so it is important to study the toxicity of these products.

Our results show that there is no significant toxicity of lactic acid bacteria capsules tested in rats, even at the extremely high doses that were used. While an increase in the levels of the hepatic enzymes ALT and AST are indicators of liver damage, a reduction in the levels of activity of these enzymes do not necessarily mean a beneficial effect on the liver. The absence of any effect on serum urea levels indicates that there may not be any toxic effect on the kidney. These results taken together with an absence of changes seen in the ratio of kidney and liver weight to body weight as compared to controls indicates an absence of toxicity in the kidney and liver.

The rats in the treatment groups as compared to control rats showed a reduction in body weight in the acute toxicity studies, while they increased in body weight in the subacute toxicity studies. This trend may indicate that in the first day of feeding with the contents of the lactic acid bacteria capsules, the rats may not have eaten as well as the controls, but, with repeated feeding an adaptation was made, such that after 7 days they were eating as well as the controls.

The results of this study show that, for the parameters that were studied, products containing live lactic acid bacteria do not produce toxicity in Sprague-Dawley rats.

REFERENCES

1. Alm L. Effect of fermentation on lactose, glucose and galactose content in milk and suitability of fermented milk products for lactose intolerant individuals. *J. Dairy Sci.* 1982; 65:346-352
2. Gilliland SE, Nelson CR, Maxwell C. Assimilation of cholesterol by *Lactobacillus acidophilus*. *Appl. Environ. Microbiol.* 1985; 49:377-381.
3. Gotz V, Romankiewicz JA, Moss J, Munay HW. Prophylaxis against ampicillin-associated diarrhoea with a *Lactobacillus* preparation. *Amer. J. Hosp. Pharm.* 1979; 36:754
4. Macbeth WAAG, Kass EH, McDennolt WV. Treatment of hepatic encephalopathy by alteration of intestinal flora with *Lactobacillus acidophilus*. *Lancet.* 1965; i:399-403.