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Health-promoting foods from cabbage using lactic acid bacteria

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Consumption of cruciferous vegetables, which are rich in secondary metabolites glucosinolates, has been shown in numerous studies to reduce cancer risk at several organ sites including breast carcinoma. Indoles and isothiocyanates, the hydrolytic products of glucosinolates, have shown chemoprotective efficacy against various cancers. The functional effect of fermented cabbage was studied in a pre-clinical trial. A lactic acid bacterium (LAB) *Lactobacillus sakei* was isolated and used in sauerkraut production at MTT. The results of the study showed that *L. sakei* was able to increase the amount of glucosinolate degradation products.

The study was conducted using an experimental hormone-responsive mammary gland cancer model, in which a single dose of the carcinogen dimethylbenzanthracene (DMBA) induced mammary tumorigenesis in rats. Four different test feeds and a control feed were prepared using a semi-synthetic basic feed in order to control the feed composition. Test feeds contained either 2 % or 10% of freeze-dried cabbage or sauerkraut. The compositions of all feeds were equilibrated for their nutrient, salt and energy concentration.

This experiment showed that the addition of fermented sauerkraut or unfermented cabbage to the feed retarded the growth of mammary gland tumors in rats. The effect was dose-responsive in animals fed unfermented cabbage, while in animals given sauerkraut, tumor growth inhibition was equal both at 2 % and 10% of sauerkraut content. The findings suggest that both in unfermented cabbage and in fermented cabbage (sauerkraut) there are tumor growth repressing components. However, the ratio of decreasing tumors did grow only in the animals which were fed sauerkraut, while at the same time the ratio of increasing tumors decreased. This result suggests that the fermentation of cabbage increases the amount of components in cabbage (i.e. breakdown products of glucosinolates) which more efficiently slow down tumor growth in comparison to unfermented cabbage.

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