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### Effects of levan on the growth of intestinal microorganism of rat

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High Molecular-mass  $\beta$ -(2,6)-linked fructose polymer (levan) were examined as a carbohydrate source for the growth of intestinal bacteria in the rat. More than 80% of levan was recovered after *in vitro* incubation with salivary enzymes and following artificial stomach fluids treatment, implying resistance to degradation in the upper intestinal tract. In the *in vivo* experiment, we examined the effects of levan on the growth of intestinal microorganism in three groups of male Sprague Dawley rats fed one of the experimental diets for 3 weeks: a control diet, a diet containing 7% levan, a diet containing 7% inulin, which is low-molecular-mass  $\beta$ -(2,1)-linked fructose polymer. The large quantity of levan was found from the small intestine which is supportive data to the *in vitro* analysis. No or trace amount of levan were found from the feces of rat after grown the presence of 7% (w/v) levan, suggesting that levan was utilized by the intestinal bacteria. The cecal enlargement with the acidification of cecal pH was shown significantly in rats fed with levan and inulin diets, with more higher value with rats fed levan than other groups. Addition of 7%(w/v) levan to the basal medium increased the numbers of total microorganism up to 10-fold, when compared to that of control medium. Effect of levan on the some important lumen enzymes ( $\beta$ -glucosidase,  $\beta$ -glucuronidase and tryptophanase) were also investigated in parallel with inulin. Our data demonstrated that levan can be used as a candidate to improve intestinal conditions and serve as carbon source in intestinal microorganism. (This work was supported by the Brain Korea 21 Project in 2000).

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### *Escherichia coli*와 *Salmonella typhimurium*에 대한 박하(*Mentha arvensis* var.piperascens malinvaud), 배초향(*Agastache rugosa* O. Kuntze) 정유성분의 항균활성

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꿀풀과 식물에 속하는 박하와 배초향의 정유성분을 Schultz의 방법으로 추출하여 추출용매로 diethyl ether 와 pentane을 1:1의 비율로 혼합하여 3시간 추출한 후 용매층만을 분리하여 sodium sulfate anhydrous로 탈수 처리하여 40°C에서 농축하고 N<sub>2</sub> 가스로 1ml까지 농축하여 GC/MSD로 분석하였다. 박하 정유성분은 Isomenthol이 26.84%, Menthol이 25.48%로 가장 높았으며, 배초향의 정유성분은 Rosefuran이 42.70%으로 가장 많았다. 정유성분의 항균활성은 생균수의 차이, 생육저해환의 크기, 최소억제 농도 및 최소사멸농도로서 비교하였으며, 세균의 내부구조를 관찰하기 위하여 전자현미경(TEM)으로 정유성분에 의한 세균내부구조의 손상정도를 관찰하였다. *E. coli*에 대한 항균활성은 정유를 2~10mg 첨가했을 때 박하 0.00~14.61mm, 배초향 10.95~18.79mm, *S. typhimurium*은 2~10mg 첨가시 박하 0.00~13.76mm, 배초향 13.84~20.78mm로 나타났으며, 세균의 내부구조를 관찰한 결과 세포벽과 세포막의 분리가 일어났으며, 세포벽의 손상정도가 심하게 나타났다.