Effects of dietary β-cyclodextrin supplemented with a culture of *lactobacillus acidophilus* on plasma lipid in a cholesterol enriched diet

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INTRODUCTION
Heart disease is a major cause of death for humans. Nutritional studies has indicated that high concentrations of total serum cholesterol and low density lipoprotein (LDL) cholesterol correlate highly with the incidence of coronary heart disease. Several reports have showed that consumption of certain culture dairy products or culture containing dairy products supplemented with *Lactobacillus acidophilus* reduced concentrations of serum cholesterol (1,2).

OBJECTIVE
The objective of the present study was to investigate the effects of dietary β-cyclodextrin (BCD) supplemented with a culture of *lactobacillus acidophilus* on plasma lipid in pigs fed with a cholesterol enriched diet.

MATERIAL AND METHODS
1. Twenty-four gilts pigs 5-7 weeks old placed in individual pens.
2. Fed base diet for one week along with being trained to drink 50 mL of milk from a bowl once daily (evening feeding period).
3. At the end of the one week-adjustment period, assign the pigs at random to four treatment groups:
   - Treatment I: Control high cholesterol diet plus 50 mL milk.
   - Treatment II: Control diet plus 50 mL milk containing 5x10¹⁰ cells of *L. acidophilus*.
   - Treatment III: BCD diet* plus 50 mL milk.
   - Treatment IV: BCD diet* plus 50 mL milk containing 5x10¹⁰ cells of *L. acidophilus*.

* Control high cholesterol diet plus 3% BCD.

Pigs fed the required weight of dry ration twice daily at 12 hr intervals, milk and milk plus *L. acid* fed once daily.

4. All pigs weighed and blood samples drawn on days 0, 7, 14, and 21 days. Serum prepared from blood samples and frozen until analyzed.

Start pigs on basal diet (without β-cyclodextrin and crystalline cholesteral). Start training them to drink 50 mL of control milk. Day 0: Assign pigs to experimental groups, weigh, draw blood samples and start high cholesterol diet with and without β-cyclodextrin; also start the treatments with or without *L. acidophilus* in the milk.

After mixing with a Marion mixer (Rapids Machinery Co., Marion, Iowa), 504 lb was removed for adjustment period feeding, and 2.4 lb of cholesterol (purity at least equivalent to USP; Sigma) was added and mixed into the remaining 1487 lb. Including that from the butter, the diet contained 1775 mg of cholesterol per kg. After mixing, 22.3 lb Beta Cyclodextrin was added to 743.5 lb to provide the BCD Diet (for treatments III and IV) and the remaining 743.5 lb provides the Control Diet (for treatments I and II).

ACKNOWLEDGMENTS
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Table: Component (basal diet)³

<table>
<thead>
<tr>
<th>Component (basal diet)³</th>
<th>(lb)</th>
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<tbody>
<tr>
<td>Ground shelled corn</td>
<td>840.0</td>
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<tr>
<td>Butter</td>
<td>150.0</td>
</tr>
<tr>
<td>Dried sweet whey</td>
<td>400.0</td>
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<tr>
<td>Soybean meal</td>
<td>540.0</td>
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<tr>
<td>Salt</td>
<td>5.0</td>
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<tr>
<td>Dicalcium phosphate</td>
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<tr>
<td>Calcium carbonate</td>
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<tr>
<td>Vitamin and trace mineral premix°</td>
<td>8.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1991.0</strong></td>
</tr>
</tbody>
</table>

REFERENCE
- Gilliland, S.E., and D.K. Walker. 1990. Factors to consider when selecting a culture of *Lactobacillus acidophilus* as dietary adjunct to produce a hypocholesterolemic effect in humans. J. Dairy Sci. 73:905.

Figure: Possible correlation of the BCD-*L. acidophilus* on deconjugation of bile acids in the small intestine in controlling serum lipids. Further work is needed to evaluate the effects of both *L. acidophilus*-BCD on serum lipid metabolim in a cholesterol enriched diet.