

January 27, 1949.

Dear Jacques,

Thank you very much for your manuscript. I have read it carefully, and with great interest. You have not indicated whether you wish it to be returned; I will hasten to do so at your word.

I have been doing some experiments lately on adaptation for galactosidase which may interest you. K-12 will develop this enzyme to varying extents on different substrates. If the activity per cell, as measured with nitrophenyl galactoside, is counted as 100 for lactose, the relative activities of cells harvest from broth with the indicated substance as secondary carbon source are as follows:

n-butyl β -galactoside	115	This is for K-12. Lac ₁ - and Lac ₃ - stocks do not respond to lactose but will to butyl galactoside and to galactose. Lac ₂ - does not form the enzyme under any condition tested, and the same is probably true for Lac ₄ - and Lac ₆ -.
lactose	100	
lactobionate	73	
galactose	23	
galactonate		
malate	ca 2	
dulcitol		
l-arabinose	less than 1, probably	You can probably see, therefore, why I have concluded that most of the genetic effects are indirect, and on the competence of the adaptation mechanism.
d-glucose	due to adaptation during the measurement (20 mins.)	

Cells of *E. coli* ML (17) will split nitrophenyl galactoside if, and they are grown on lactose, and to a far lesser extent if grown on galactose (5% of the lactose cells activity.) Glucose-grown cells, of course, have no measurable activity. I am enclosing a few mg. of nitrophenyl galactoside, for your use if you would like to test the activity of your "purified" lactase.

For the above table, I should note that lactobionate, which is a very effective evocator of galactosidase, is not utilizable for growth or fermentation by K-12. Likewise, galactose has the same adaptive potency for galactosidase formation on mutants which are incapable of using galactose as for K-12. Thus utilization and adaptation have been separated in both ways. (Lactose, for Lac₁- is not does not evoke the enzyme but is utilized by it; lactobionate is not utilized but does evoke.)

The pH optimum for galactosidase extracts is 7.3. For intact cells it is closer to 7.0. The Na stimulations and Rb inhibitions which have been noted with the extracts are not demonstrable with the intact cells, indicating that the enzyme may be protected. The apparent K_m is about 4×10^{-4} , almost 4x as high as for the extract. This difference may be due to the fact that diffusion is the rate limiting step, and this is being studied.

Good luck on your trip to London, and let me know if anything interesting comes up.
Sincerely,