

Final Abstract Number: 41.283
 Session: Poster Session I
 Date: Thursday, March 3, 2016
 Time: 12:45-14:15
 Room: Hall 3 (Posters & Exhibition)

Mathematical modelling of the effects of prebiotic concentration on *Lactobacillus casei* growth

V.S. Shankar Kumar*, U.J. Anantharaj, M. Sakthioli, R. Vinnakota, K. Krishnamurthy

Anna University, Chennai, India



Background: Probiotics are microorganisms that are beneficial to the human digestive system. *Lactobacillus Casei* is a beneficial probiotic bacterium present naturally in the human digestive system. Also, *Lactobacillus Casei* helps in treatment of several gastric disorders and in inhibiting the growth of *Helicobacter Pyroli* that causes gastro-intestinal ulcers. Prebiotics, in general, refers to substances that help in stimulating the growth of the beneficial probiotic bacteria. Further, the growth of probiotics is sustained by the optimized concentration of prebiotics.

Methods & Materials: In this work, the growth of *Lactobacillus Casei*, in response to the prebiotic concentration is obtained experimentally. The growth curves of *Lactobacillus Casei*, in response to a 10% nutrient solution (10grams of milk powder in 100ml) was obtained using UV spectrophotometer (Model: UV 1800) under sterile laboratory conditions. The absorbance was measured at a wavelength of 600nm for a time period of 150 minutes. Further, using the measured data, the growth of *Lactobacillus Casei* in response to the nutrients was modeled using a mathematical modeling approach namely the transfer function model.

Results: Results demonstrate that the developed model is efficient in capturing the dynamics of *Lactobacillus Casei* growth, with an accuracy of 88.81%. Further, by analyzing the model, it was found that the growth of *Lactobacillus Casei* is stable. Hence, the model can be efficiently used to develop suitable control systems for sustaining the growth of *Lactobacillus Casei*.

Conclusion: This work appears to be of high clinical and industrial importance since *Lactobacillus Casei* helps in treatment of several gastric disorders and the development of mathematical models of probiotic growth is highly useful for mass production of probiotics.

<http://dx.doi.org/10.1016/j.ijid.2016.02.470>

Final Abstract Number: 41.284
 Session: Poster Session I
 Date: Thursday, March 3, 2016
 Time: 12:45-14:15
 Room: Hall 3 (Posters & Exhibition)

Low and declining attack rates of imported typhoid fever in the Netherlands despite restrictive vaccination policy

G.J.B. Sonder*, F. Suryapranata

Department of Infectious Diseases, Public Health Service (GGD), Amsterdam, Netherlands



Background: Typhoid fever occurs mainly in the developing world where sanitary conditions remain poor. In Western countries typhoid fever occurs mainly in returning travelers or their direct contacts. The aim of this study was to evaluate the current Dutch guidelines for typhoid vaccination.

Methods & Materials: Crude annual attack rates (AR) per 100,000 Dutch travelers were calculated during the period 1997 to 2014 by dividing the number of typhoid fever cases by the estimated total number of travelers to a specific country or region. Regions of exposure and possible risk factors were evaluated.

Results: During the study period 607 cases of typhoid fever were reported. Most cases were imported from Asia (60%). Countries with the highest AR's were India (30), Indonesia (11) and Morocco (11). The absolute number of typhoid cases reported in the Netherlands declined significantly ($p < 0.001$), despite an increase in the number of travelers. There was a significant decline in AR's among travelers to Morocco, Turkey and Indonesia, which are popular travel destinations. AR's among travelers to intermediate risk areas according to the LCR guidelines (Figure 1) like Latin-America or Sub-Saharan Africa were very low (0.3 and 2 respectively), despite the restrictive vaccination policy to these areas. Almost half of the cases were ethnically related to typhoid risk regions and 37% were cases visiting friends and relatives.

Figure 1. High and intermediate typhoid risk areas according to LCR guidelines



Conclusion: The overall AR of typhoid fever in returning travelers to the Netherlands is very low despite the restrictive vaccination policy compared to some other countries. There has been a significant decrease in overall number of cases. The Dutch vaccination policy not to vaccinate short-term travelers to Latin-America, Sub-Saharan Africa, Thailand and Malaysia seems to be justified, because the AR's for these destinations remain very low. These results might suggest that further restriction of the Dutch vaccination policy is justified. Furthermore, the available data helps to specify risk regions for Dutch travelers.

<http://dx.doi.org/10.1016/j.ijid.2016.02.471>