

Abstract for 31 October 2015, Kaohsiung, Taiwan

Simulation of the swallowing process along the pharynx

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The flow of bolus through the pharynx has been numerically investigated. For that purpose, a three-dimensional model of the transport of food bolus along the pharynx has been proposed using the immersed boundaries method. The pharyngeal wall has been considered to be an elastic membrane. Flow fields in terms of the axial velocity, pressure, shear rate and strain rate were obtained. The highest velocity in the flow concentrates in the central stream as the bolus enters the pharynx. On the other hand, recirculation zones, characterized by low velocity zones appear inside the pharyngeal cavity. Results from this research indicate that the bolus is not only subjected to shear but also to elongation. This can be further used for the rheological characterization (shear and extension) of oral nutritional supplements for patients suffering from swallowing disorders.

Experience:

Gabriel Ascanio got the PhD in Chemical Engineering from Montreal Polytechnique School (Canada). He is currently full professor at the University of Mexico (UNAM). He has published more than 50 technical papers and presented more than 120 papers in International Congresses. He has also supervised about more 40 theses at PhD, MSc and BSc levels. He has served as consultant for international companies such as Fresenius-Kabi Deutschland (Germany), Total Petrochemicals USA and Sumitomo (Japan). He organized twice the International Congress on Instrumentation and Applied Sciences and also he has served as reviewer of top journals including Chemical Engineering Research and Design, AIChE Journal, Chemical Engineering Science, and Biochemical Engineering Journal, among others. Currently, he serves as the Editor-in-Chief of the Journal of Applied Research and Technology.