



SDI Review Form 1.6

Journal Name:	Journal of Advances in Mathematics and Computer Science
Manuscript Number:	Ms_JAMCS_36131c
Title of the Manuscript:	PERISTALTIC PUMPING AND DISPERSION OF A MHD COUPLE STRESS FLUID WITH CHEMICAL REACTION AND WALL EFFECTS
Type of the Article	Original Research Article

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments	This paper needs a lot of English editing. In the abstract, the word “deliberated” isn’t correct. Also, the authors write “couple stress” What is this? Do they mean “coupled stress”? Even if they mean “coupled stress” what is the meaning?	Incorporated. The theory of couple stress was first introduced by V. K. Stokes [4] and presented the simplest generalization of classical theory which allows for polar effects such as presence of couple stresses and body couples in the fluid medium. This model defines the rotation field in terms of velocity field, (i.e., the rotation vorticity vector) is equal to one half of the curl of the velocity vector. Couple stress fluids are fluids consisting of rigid, randomly oriented particles suspended in a viscous medium. Eg. Blood, lubricants containing small amount of high polymer additive, electro-rheological fluids and synthetic fluids. Couple stress fluid is known to better model for bio fluids.
	There has been recent work on coupled fluid flow and structure objects for biofluidics that the author may want to cite to broaden the importance of this paper. For instance, J.P. Abraham, B.D. Plourde, B. Sun, L.J. Vallez, and C.S. Staniloae, The Effect of Plaque Removal on Pressure Drop and Flowrate Through a Stenotic Lesion, <i>Biology and Medicine</i>, Vol. 8, article no. 1000261, 2015. L.J. Vallez, B. Sun, B.D. Plourde, J.P. Abraham, and C.S. Staniloae, Numerical Analysis of Arterial Plaque Thickness and its Impact on Artery Wall Compliance, <i>J. Cardiovascular Medicine and Cardiology</i>, Vol. 2, pp. 26-34, 2015. B. Sun, L.J. Vallez, D.B. Plourde, J. R. Stark, and J.P. Abraham, Influence of Supporting Tissue on the Deformation and Compliance of Healthy and Diseased Arteries, <i>Journal of Biomedical Science and Engineering</i>, Vol. 8, pp. 490-499, 2015. B.D. Plourde, L.J. Vallez, B. Sun, B.B. Nelson-Cheeseman, J.P. Abraham, Alterations of Blood Flow Through Arteries Following Atherectomy and the Impact on Pressure Variation and Velocity, <i>Cardiovascular Engineering and Technology</i>, Vol. 7, pp. 280-289, 2016.	Incorporated. Few reference papers are included as per the suggestion made by the reviewer.
	What does “MRI glancing” mean?	MRI glancing means MRI (Magnetic Resonance Imaging) Scanning.
	Please define “dispersion”. Typically dispersion means to diffuse or spread out. Is that how you are using this word?	Dispersion or diffusion of a solute describes the spread of particles through random motion from regions of higher concentration to regions of lower concentration. So, our emphasis is to understand mathematically dispersion of solute in couple stress fluid model. e.g. i) The knowledge of substances injected in to a blood vessel is useful for many clinical and physiological purposes. ii) The distribution of drugs in the human body.
	Please recheck equation 2. I think there might be a unit’s error. Is m really mass per unit area or is it mass per unit length?	Here, we considered the two dimensional Cartesian geometry in which fluid flow takes place. So, ‘m’ is mass unit area.
	In section 2.1, the first sentence, what does “the scattering condition for the concentration C” mean?	The scattering or diffusion condition for the concentration C means the diffusion equation for the concentration $\frac{\partial C}{\partial t} + u \frac{\partial C}{\partial x} = D \frac{\partial^2 C}{\partial y^2} - k_1 C$
	Why are you assuming Ubar approximately equals C (just before equation 2.20).	Fick’s Law gives the diffusive flux relative to the average velocity of the fluid mixture. In absence of any convective transport, the diffusive flux and total flux are the same. So, we assumed Ubar approximately equals C in our article. Fick's law have been commonly used to model transport processes in foods, neurons, biopolymers, pharmaceuticals, porous soils, population dynamics, nuclear materials, plasma physics etc



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	The discussion of the results presented in multiple graphs is almost nonexistence.	We are not agree with reviewer comment in this regard, the mathematical models on peristaltic transport deal with a prescribed train of waves moving with constant speed on the flexible boundaries. The flow is studied in either a fixed frame of reference or a wave frame of reference. In our present work we studied wave frame of reference with constant velocity of the wave and obtained analytical solution, which is found to be realizable. Further, we are giving following information regarding closely available experiments that support analytical solution in the wave frame. Hung and Brown (1976), Brown and Hung (1977) have carried out experimental investigations in peristaltic flow in the moving and fixed frame. Experimentally visualized bubble path lines were used in the delineation of the size and location of the closed-loop orbits for trapped fluid. It was observed that the fluid within the bolus moves with a net advance velocity equal to wave speed. So, based on analytical solution, the discussion of the results presented in multiple graphs is almost existence (realistic).
	How did you assess accuracy?	In the case of analytical solution, it is quite difficult to assess accuracy and at the most we can compare our findings with previous published articles in the peer reviewed journals.
<u>Minor</u> REVISION comments		
<u>Optional/General</u> comments		