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| **Reviewer Comments** | **Author’s Response** |
| **Reviewer A**  INTRODUCTION  Lines 39-40: It should be: Soares et. al. and Sparks et. al. have employed supercritical CO2, compressed liquefied petroleum gas and liquid propane for RBO extraction.  As stated in the manuscript it could be understand that scCO2 and petroleum gas were used together.  Lines 40-41: “Although, oil quality is improved but the operational costs of this process are very high.” There are actually 3 high pressure processes (scCO2, high pressure petroleum gas and liquid propane), also operational costs are lower than in conventional solvent extraction with hexane but investments costs are much higher, so please put:  Although, oil quality is improved the INVESTMENT costs of these process are very high.  Lines 41-42: “Moreover, percentage recovery of bran oil is also very low in this technique.” This is not true so it should be corrected. In extraction process with scCO2 and high pressure petroleum gas the oil recovery is 82% (Soares et al.), while according to Sparks et al. for scCO2 recovery is 85% and for liquid propane 86% - so the recoveries are not very low. Maybe the authors could state the numbers.  METHODS Part 2.2.3  Was the heating also provided during 15 min of stirring? Is pre-heating duration always 3 min? – please provide these data.  RESULTS AND DISCUSSION Lines 98-100: “First, on preheating, the oil becomes less viscous with volumetric increase and tends to secrete out from these pockets. The secreted out oil forms a layer over the solid surface of bran particles, from where solvent dissolves it.” The free oil from the oil containing cells (the authors call them pockets) disrupted by the grinding process is also part of this oil which is extracted in the first part of extraction. This should be added when explaining the mechanism of extraction.  Lines 102-103: “The recovery of oil with prior mechanism is very little due to lower change in volume of oil, which forces it to secrete.” This is not understandable. Please explain.  Parts 3.1 and 3.2 are pure theory and do not present any results from the study, so they should be placed into the Introduction. It refers especially to part 3.1 because the extraction mechanism has not been studied at all (extraction yield versus time). It had been studied, the part 3.1 would have been used for the extraction curve explanation.  Lines 131-133: “Since, the binary mixture S8 affords maximum recovery of oil. Therefore, rest of the extraction parameters has been analyzed using this solvent system.” Please rephrase to something like: Since the binary mixture S8 affords maximum recovery of oil, the rest of  extraction parameters have been analyzed using this solvent system.  Lines 177-182: The effect of larger quantities of free oil released from the disrupted process when the particle size is smaller should be mentioned. I suppose that all the experiments were performed once. If there are triplicates please provide standard deviation in Figures.  CONCLUSION Line 268: “Further, the oil quality did not alter even after its storage for two weeks.” The oil quality tests should be incorporated into the study, or this sentence should be deleted. | **Response to Reviewer A**  Lines 39-40  Correction has been made into the revised manuscript according to the reviewer suggestion as: “Soares et. al. and Sparks et. al. have employed supercritical CO2, compressed liquefied petroleum gas and liquid propane for RBO extraction”.  Lines 40-41  I have consulted the relevant research article to compare the operational and investment costs of RBO extraction. And I have found that investment costs are higher compared to that of operational costs and that is why, OPERATIONAL cost has been replaced with INVESTMENT cost in the manuscript.  Lines 41-42  Since, I have rechecked the solvent efficiencies and these are very good for all solvents namely; scCO2, liquid propane and high pressure petroleum gas. Therefore, the line “moreover, percentage recovery of bran oil is also very low in this technique” has been deleted from the manuscript.  Stirring was done without any further heating of the bran solvent mixture. Further, in all experiments pre heating temperature has always been 3 minutes.  Details have been incorporated in the revised manuscript’s 2.2.3 section.  Lines 98-100  Rice bran was just sieved after acquiring from rice processing mill and no grinding was done and it was used as it is. That is why the details of grinding process and its impact on RBO extraction have not been added in the manuscript.  Lines 10-103  Since, heating lowers the viscosity of oil followed by minute increase in volume of oil within bran oil particles, due to which RBO is secreted out. That is why; recovery of oil from this mechanism is lower compared to the solvent aided recovery mechanism.  Part 3.1  One of the extraction mechanisms i.e. oil secretion from bran particles can be visually verified by simply heating the rice bran as the bran color darkens, indicating that some liquid (oil) has moved onto the surface of bran particles and imparting darker color to it.  Although, extraction mechanism is not experimentally studied but it is presented to comprehend and support the observed results. (Apart from that, **Other reviewer** has also not objected its presence in the results section)  Part 3.2  It has been placed in introduction section according to the reviewer suggestion. (Revised Manuscript)  Lines 131-133  These lines have been rephrased as “Since the binary mixture S8 affords maximum RBO recovery, the rest of extraction parameters has been studied using this solvent system.”  Lines 177-182  Since, release of free oil from disrupted bran particle cells after grinding was not studied due to processing of sieved rice bran. Therefore, the suggested details are not necessary.  All experiments were performed once, and therefore existing figures are appropriate.  Line 268  This line was written based on the fact, apparent smell/odor of oil was not altered and thus negating any signs of rancidity. Generally, the oil which undergoes rancidity process, its density is altered but density of RBO also remained uniform after two weeks preservation suggesting no signs of rancidity.  However, the line has been deleted as suggested by the reviewer. |
| **Reviewer C**  Major remarks refer to following: **1.** Authors outlined significance of the solvent for the oil quality (susceptibility to rancidity). In conclusion, the authors even stated that oil quality did not alter after two weeks. But, no chemical composition (fatty acid composition) of the RBO was provided. If author provide the effect of the EA:DCM vol. ratio, preheating temperature, agitation time and rate (for the chosen, S8 solvent mixture), and storage time on the chemical composition of the oil this paper will have sufficient scientific and commercial contribution to the current state of art in the field of RBO extraction.  **2**. Writing style and English must be substantially improved.  **3.** Authors are using equations for calculating i.e. concentration gradient, dimensionless No for agitation, solubility parameter, etc. without giving / correlating this parameters with oil recovery and varied parameters (EA:DCM ratio, preheating temperature, stirring rate and time, solvent-to-solid ratio).  **4.** The last figure in the manuscript gives concentration gradient of the RBO in bran and miscella without explanation of the procedure for determination of these concentrations in time. | **Response to Reviewer C**  **1-**  The focus of this study was to enhance the RBO extraction using more efficient solvents with reduced environmental impact, rather than the investigation of solvent and other processing parameters impact on RBO quality.  Apart from that, once maximum oil has been extracted from rice bran. Some sort of post extraction, processing is always necessary for final product stabilization and preservation. Therefore, RBO quality can be maintained.  In introduction section (lines 45-52), explains why other solvents may produce lower quality of RBO, because of their higher miscibility with water. On the contrary, both solvents used in this study have negligible miscibility with water making their mixture less prone to humidification and ultimately reduce the chance of rancidity.  In conclusion section, line 268 was written based on the fact, apparent smell/odor of oil was not altered and thus negating any signs of rancidity. Further, the oil which undergoes rancidity process, its density is altered but density of RBO also remained uniform after two weeks preservation suggesting no signs of rancidity.  However, the line has been deleted as suggested by other reviewer.  **2-** Reviewer guidelines have been followed to improve the writing style in the Revised manuscript. All the suggested changes in the detailed Pdf version supplied by reviewer have been taken into consideration including figures and changes have been made accordingly.  **3-** Equations are not used for calculations of processing parameters. Instead, these are used for the sole purpose of supporting and validating the obtained results. For instance in line 222, the variable N i.e. number of revolutions is used to support the observed result that with rise in stirring rate RBO recovery is enhanced. Further, in literature many author’s have adapted the same style.  **4-** Figure has been modified according to the reviewer guidelines. And the following text has been added in 2.2.3 section of the manuscript:  To determine RBO concentration in solid bran and miscella, 10 samples of rice bran were simultaneously processed. The RBO concentration in miscella was calculated by measuring its percentage recovery after regular time intervals of 1 min, from 1 to 10 min. Similarly, concentration of RBO in solid bran was also calculated using subtraction method . |