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| **Reviewer Comments** | **Author’s Response** |
| **Reviewer A**INTRODUCTIONLines 39-40: It should be: Soares et. al. and Sparks et. al. have employed supercritical CO2, compressed liquefied petroleum gas and liquid propane forRBO extraction.  As stated in the manuscript it could be understand thatscCO2 and petroleum gas were used together.Lines 40-41: “Although, oil quality is improved but the operational costsof this process are very high.” There are actually 3 high pressureprocesses (scCO2, high pressure petroleum gas and liquid propane), alsooperational costs are lower than in conventional solvent extraction withhexane but investments costs are much higher, so please put:  Although, oilquality is improved the INVESTMENT costs of these process are very high.Lines 41-42: “Moreover, percentage recovery of bran oil is also very lowin this technique.” This is not true so it should be corrected. Inextraction process with scCO2 and high pressure petroleum gas the oilrecovery is 82% (Soares et al.), while according to Sparks et al. for scCO2recovery is 85% and for liquid propane 86% - so the recoveries are not verylow. Maybe the authors could state the numbers.METHODSPart 2.2.3  Was the heating also provided during 15 min of stirring? Ispre-heating duration always 3 min? – please provide these data.RESULTS AND DISCUSSIONLines 98-100: “First, on preheating, the oil becomes less viscous withvolumetric increase and tends to secrete out from these pockets. Thesecreted out oil forms a layer over the solid surface of bran particles,from where solvent dissolves it.” The free oil from the oil containingcells (the authors call them pockets) disrupted by the grinding process isalso 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 littledue to lower change in volume of oil, which forces it to secrete.” This isnot understandable. Please explain.Parts 3.1 and 3.2 are pure theory and do not present any results from thestudy, so they should be placed into the Introduction. It refers especiallyto 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 havebeen used for the extraction curve explanation.Lines 131-133: “Since, the binary mixture S8 affords maximum recovery ofoil. Therefore, rest of the extraction parameters has been analyzed usingthis solvent system.” Please rephrase to something like: Since the binarymixture S8 affords maximum recovery of oil, the rest of  extractionparameters have been analyzed using this solvent system.Lines 177-182: The effect of larger quantities of free oil released from thedisrupted process when the particle size is smaller should be mentioned.I suppose that all the experiments were performed once. If there aretriplicates please provide standard deviation in Figures.CONCLUSIONLine 268: “Further, the oil quality did not alter even after its storagefor two weeks.” The oil quality tests should be incorporated into thestudy, or this sentence should be deleted. | **Response to Reviewer A**Lines 39-40Correction 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 40-41I 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 41-42Since, 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 98-100Rice 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 10-103Since, 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 3.1One 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 3.2It has been placed in introduction section according to the reviewer suggestion. (Revised Manuscript) Lines 131-133These 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 177-182Since, 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 268This 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 thatoil 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, preheatingtemperature, agitation time and rate (for the chosen, S8 solvent mixture),and storage time on the chemical composition of the oil this paper will havesufficient scientific and commercial contribution to the current state ofart 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:DCMratio, preheating temperature, stirring rate and time, solvent-to-solidratio).**4.** The last figure in the manuscript gives concentration gradient of theRBO in bran and miscella without explanation of the procedure fordetermination 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 . |