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Peer Review

Health Scope
Article DOI: https://doi.org/10.5812/jhealthscope.69158
Published in: Health Scope: 8(2) ; e69158

Peer Review Report for "Adsorption of Sulfur Dioxide on Clinoptilolite/Nano Iron Oxide and Natural Clinoptilolite"

Author(s): mina mahmoodi, Neda Javid, Mohammad Malakootian

Review Timeline:

Submit Date:	7 Apr 2018
Revised Date:	30 Jun 2018
Accepted Date:	9 Jul 2018

Revision (0)

Here, you can see the **Reviewers**, **Associate Editors** and **EICs'** comments from the beginning to the end of the revision process.

Edris Bazrafshan : Reviewer

21 Apr 2018

Dear editor:
This manuscript presents “Comparative study of Sulfur dioxide adsorption process by natural clinoptilolite zeolite and clinoptilolite containing iron oxide nanoparticles”. This is an article whose findings are important to those with closely related research interests, but some modifications are needed before it's accepted for possible publication.
The title of the manuscript is not informative or clear. Please revise it.
- Key words must be selected from Mesh; please revise them.
- Please revise the abstract section according to the style of the Health Scope Journal. This section must be written as non-structural.

- In this study, the literature review is very weak. Several works have been done and published about SO2 and its removal. Please revise it.
- The authors should explain the reason for selecting these variables and quantities in their study.
- The authors should explain the reason for selecting the clinoptilolite as an important adsorbent in their study.
- The materials and methods section is concise. Please add more details of the performed experiments and the model of the apparatus used for this study. Also, statistical analysis details must be added.
- Various parameters can affect on adsorption process, such as dose of adsorbent, contact time, pH, initial concentration of pollutant, temperature, etc. But in this study. Consequently, the effect of these variables must be surveyed and mentioned in the text.
- Discussion and conclusion are weak and need to be revised. In the discussion section obtained results should be compared with other studies.
- It would be interesting to have more details on the cost analysis compared with the final efficiency, which can clarify the relevance of the process.
- The manuscript is not written very well as a scientific text, and also many language problems in the text. Please revise it carefully.
- Please add some new and relevant studies about SO2 removal from aqueous solutions by various methods, and also the adsorption process, and some related references from current journals.
- Please revise the list of references according to the style of the Health Scope Journal.

hamideh akbari : Reviewer

30 Apr 2018

Thanks to the efforts of the distinguished authors:
The following corrections are proposed for the article with the title “Comparative study of Sulfur dioxide adsorption process by natural clinoptilolite zeolite and clinoptilolite containing iron oxide nanoparticles”:
1- Writing an English article requires a grammar edit.
2- Add Clinoptilolite word to keywords.
3- The structure of the abstract should be corrected according to the journal's format.
4- The procedure is mentioned, which uses diesel exhaust gas as an SO2 source. In exhaust emissions, there are contaminants besides SO2 gas. Please describe the method of eliminating contaminating pollutants.

Notes on the results and discussion:
- In the results section and the discussion of the effect of temperature, the sentence “ Maximum value of SO2 removal efficiency is at a temperature of 25 ° C by natural and
Modified zeolite 43.8 ±2.46 and 80.3±6.8 percent, respectively,” is repeated two times, please change.

- In different parts of the discussion, in sentences referring to previous articles, it is best to delete the dot after the author's name.
- The authors' names are written according to the letter of the first letter and the rest of the lower case. The small names of the authors are not necessary.
- Comparing the results with other studies, it is better to use better writing. There is no need to write a study with the title of ".....".
- It is better to compare the results of this study with similar pollutant studies. What is the nature of SO2 with nickel or aniline, or antibiotics?
- In general, it seems that in the discussion section, comparison of results with non-related pollutants and adsorbents has been done, and it is better to compare with so2 pollutant, with other methods, and with similar gases with zeolite adsorbent.
- At the end of the study, the author of the study conducted a comparison between the iron oxide nanoparticles (this study) and copper oxide (studies of others). Further, they conclude that the nanoparticle of iron oxide is better. This comparison cannot be done, because you can compare two nanoparticles in a situation that study based on this purpose and the same conditions of the laboratory and the same pollutant are designed and implemented. It is suggested that this paragraph be removed from the discussion.

Hossein Ansari : Reviewer

6 May 2018

Dear Authors,
1-The authors should mention the number of examinations and experiments in this study.
2-the authors should explain about parameter R-squared in Table 1.
3-in table 1, it would be better if the researchers mention the parameters in two different methods (that have mentioned in the title) and use appropriate statistical tests to compare them.
4- It would be better if the results and discussion were presented separately.

Ferdos kord Mostafapour : Reviewer

13 May 2018

There are many reports on the removal by clino... adsorbent. In this study, only the results are useful as a database, but there is no attractive new result or new knowledge.
The added explanation causes the reader to be misled. There are additional explanations in all parts of this article. So I recommend that authors carry out a general review and delete additional information that isn’t necessary.
Abstract shall be written briefly according to the Health Scope journal style. -
Keywords should not repeat the words of the manuscript title and contain any abbreviations
Comparison of the removal of nitrate with phenol is not appropriate and should be corrected.
The comparison is not well done, and the reasons are not mentioned.
References need to be reviewed.

The manuscript in English must not bear any errors. Some sentences need to be revised severely.
Add clino.... to keywords.

Where were you prepared the clino....?

Why the diesel engine was used to produce the sulfur dioxide?

The topics of the discussion and conclusion sections should be changed and should be better written.

The location of the study does not need to be included in the article.

The schematic diagram presented does not conform to the working method.

Edris Bazrafshan : Associate Editor

14 May 2018

Reviewer 1:
Dear editor:
This manuscript presents “Comparative study of Sulfur dioxide adsorption process by natural clinoptilolite zeolite and clinoptilolite containing iron oxide nanoparticles”. This is an article whose findings are important to those with closely related research interests, but some modifications are needed before it's accepted for possible publication.
The title of the manuscript is not informative or clear. Please revise it.
- Key words must be selected from Mesh; please revise them.
- Please revise the abstract section according to the style of the Health Scope Journal. This section must be written as non-structural.
- In this study, the literature review is very weak. Several works have been done and published about SO2 and its removal. Please revise it.
- The authors should explain the reason for selecting these variables and quantities in their study.
- The authors should explain the reason for selecting the clinoptilolite as an important adsorbent in their study.
- The materials and methods section is concise. Please add more details of the performed experiments and the model of the apparatus used for this study. Also, statistical analysis details must be added.
- Various parameters can affect on adsorption process, such as the dose of adsorbent, contact time, pH, initial concentration of pollutant, temperature, etc. But in this study. Consequently, the effect of these variables must be surveyed and mentioned in the text.
- Discussion and conclusion are weak and need to be revised. In the discussion section obtained results should be compared with other studies.
- It would be interesting to have more details on the cost analysis compared with the final efficiency, which can clarify the relevance of the process.

- The manuscript is not written very well as a scientific text, and also many language problems in the text. Please revise it carefully.
- Please add some new and relevant studies about SO2 removal from aqueous solutions by various methods, and also the adsorption process, and some related references from current journals.
- Please revise the list of references according to the style of the Health Scope Journal.

Reviewer 2:

There are many reports on the removal by clino... adsorbent. In this study, only the results are useful as a database, but there is no attractive new result or new knowledge.

The added explanation causes the reader to be misled. There are additional explanations in all parts of this article. So I recommend that authors carry out a general review and delete additional information that isn't necessary.

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The topics of the discussion and conclusion section should be changed and should be better written.

The location of the study does not need to be included in the article.

The schematic diagram presented does not conform to the working method.

Reviewer 3:

Thanks to the efforts of the distinguished authors:

The following corrections are proposed for the article with the title "Comparative study of Sulfur dioxide adsorption process by natural clinoptilolite zeolite and clinoptilolite containing iron oxide nanoparticles":

1-Writing an English article requires a grammar edit.

2-Add Clinoptilolite word to keywords.

3-The structure of the abstract should be corrected according to the journal's format.

4-The procedure is mentioned, which uses diesel exhaust gas as the SO2 source. In exhaust emissions, there are contaminants besides SO2 gas. Please describe the method of eliminating contaminating pollutants.

Notes on the results and discussion:

-In the results section and the discussion of the effect of temperature, the sentence " Maximum value of SO2 removal efficiency is at a temperature of 25 ° C by natural and Modified zeolite 43.8 ±2.46 and 80.3±6.8 percent, respectively" is repeated twice; please modify.

-In different parts of the discussion, in sentences referring to previous articles, it is best to delete the dot after the author's name.
-The authors' names are written according to the letter of the first letter and the rest of the lower case. The small names of the authors are not necessary.
-Comparing the results with other studies, it is better to use better writing. There is no need to write a study with the title of ".....".
-It is better to compare the results of this study with similar pollutant studies. What is the nature of SO2 with nickel or aniline, or antibiotics?
- In general, it seems that in the discussion section, comparison of results with non-related pollutants and adsorbents has been done, and it is better to compare with so2 pollutant, with other methods, and with similar gases with zeolite adsorbent.
- At the end of the study, the author of the study conducted a comparison between the iron oxide nanoparticles (this study) and copper oxide (studies of others). Further, they conclude that the nanoparticle of iron oxide is better. This comparison cannot be done, because you can compare two nanoparticles in a situation that study based on this purpose and the same conditions of the laboratory and the same pollutant are designed and implemented. It is suggested that this paragraph be removed from the discussion.
Reviewer 4:
1-The authors should mention the number of examinations and experiments in this study
2-the authors should explain about parameter R-squared in Table 1
3-in table 1, it would be better if the researchers mention the parameters in two different methods (that have mentioned in the title) and use appropriate statistical tests to compare them
4- It would be better if the results and discussion were presented separately.
Final decision: Major revision

Ramazan Mirzaei : EIC

14 May 2018

Reviewer 1:
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The title of the manuscript is not informative or clear. Please revise it.
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- Please revise the abstract section according to the style of the Health Scope Journal. This section must be written as non-structural.
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- The authors should explain the reason for selecting these variables and quantities in their study.

- The authors should explain the reason for selecting the clinoptilolite as an important adsorbent in their study.
- The materials and methods section is concise. Please add more details of the performed experiments and the model of the apparatus used for this study. Also, statistical analysis details must be added.
- Various parameters can affect on adsorption process, such as the dose of adsorbent, contact time, pH, initial concentration of pollutant, temperature, etc. But in this study. Consequently, the effect of these variables must be surveyed and mentioned in the text.
- Discussion and conclusion are weak and need to be revised. In the discussion section obtained results should be compared with other studies.
- It would be interesting to have more details on the cost analysis compared with the final efficiency, which can clarify the relevance of the process.
- The manuscript is not written very well as a scientific text, and also many language problems in the text. Please revise it carefully.
- Please add some new and relevant studies about SO2 removal from aqueous solutions by various methods, and also the adsorption process, and some related references from current journals.
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There are many reports on the removal by clino... adsorbent. In this study, only the results are useful as a database, but there is no attractive new result or new knowledge.

The added explanation causes the reader to be misled. There are additional explanations in all parts of this article. So I recommend that authors carry out a general review and delete additional information that isn't necessary.

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References need to be reviewed.

The manuscript in English must not bear any errors. Some sentences need to be revised severely.

Add clino.... to keywords.

Where were you prepared the clino....?

Why the diesel engine was used to produce the sulfur dioxide?

The topics of the discussion and conclusion sections should be changed and should be better written.

The location of the study does not need to be included in the article.

The schematic diagram presented does not conform to the working method.

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-The authors' names are written according to the letter of the first letter and the rest of the lower case. The small names of the authors are not necessary.

-Comparing the results with other studies, it is better to use better writing. There is no need to write a study with the title of ".....".

-It is better to compare the results of this study with similar pollutant studies. What is the nature of SO2 with nickel or aniline, or antibiotics?

- In general, it seems that in the discussion section, comparison of results with non-related pollutants and adsorbents has been done, and it is better to compare with so2 pollutant, with other methods, and with similar gases with zeolite adsorbent.

- At the end of the study, the author of the study conducted a comparison between the iron oxide nanoparticles (this study) and copper oxide (studies of others). Further, they conclude that the nanoparticle of iron oxide is better. This comparison cannot be done, because you can compare two nanoparticles in a situation that study based on this purpose and the same conditions of the laboratory and the same pollutant are designed and implemented. It is suggested that this paragraph be removed from the discussion.

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1-The authors should mention the number of examinations and experiments in this study

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3-in table 1, it would be better if the researchers mention the parameters in two different methods (that have mentioned in the title) and use appropriate statistical tests to compare them

4- It would be better if the results and discussion were presented separately.

Final decision: Major revision

OPEN PEER REVIEW

Revision (1)

Reply to Reviewers

Ideally, the reviewing process can significantly improve the submitted manuscripts by allowing the authors to take into account the advice of reviewers. Author(s) must reply to all reviewers' comments in a separate Word file, point by point. A "**Reply to Reviewers**" document is submitted along with revised manuscript during submission of revised files, summarizing the changes that the authors made in response to the reviewers' comments. The responses to reviewers' comments specifies how the authors addressed each comment the reviewers made.

You can read the authors' responses to the reviewers' comments in the next page.

Manuscript ID: 69158
" *Adsorption of Sulfur Dioxide on Clinoptilolite/Nano Iron Oxide and Natural Clinoptilolite*"
Health Scope Journal

Dear Editor

I would like to inform you that the manuscript entitled “Adsorption of sulfur dioxide on clinoptilolite/nano iron oxide and natural clinoptilolite " has been revised according to the referee comments.
All referee comments were revised point-by-point. All changes are highlighted in the main text of the manuscript.
Please find the attached files.

Yours sincerely
Corresponding Author

Reviewers' Comments:
Reviewer 1:
Dear editor:
This manuscript presents “Comparative study of Sulfur dioxide adsorption process by natural clinoptilolite zeolite and clinoptilolite containing iron oxide nanoparticles”. This is an article whose findings are important to those with closely related research interests, but some modifications are needed before it's accepted for possible publication.
Reviewer: The title of the manuscript is not informative or clear. Please revise it.
Author: The title of the manuscript has been revised and changed to “Adsorption of sulfur dioxide on clinoptilolite/nano iron oxide and natural clinoptilolite.”
Reviewer: Key words must be selected from the Mesh; please revise them.
Author: Keywords selected from Mesh and revised according below:
Keywords: Cardiovascular Diseases; Clinoptilolite; Environmental Pollution; Industry; Nanoparticles
Reviewer: Please revise the abstract section according to the style of Health Scope Journal. This section must be written as non-structural.
Author: The abstract section was revised according to the style of the Health Scope Journal.
Reviewer: In this study, the literature review is very weak. Several works have been done and published about SO2 and its removal. Please revise it.
Author: literature review revised, and the following studies added to the text:
- **Luo et al. reported that single gas adsorption results show that zeolite is more effective for SO2, NO, and CO2 removal among the four adsorbents.**
- **Ivanova and Koumanova studied the modification of natural clinoptilolite from Bulgaria with salt solutions and examined the samples obtained for SO2 adsorption.**
- **Erdoˇgan-Alver found that the SO2 adsorption capacities of the clinoptilolite samples were superior to those of the C2H4 adsorptions.**
- **Abbasi et al. used TiO2 nanoparticles in the removal and sensing of SO2.**
- **Arcibar-Orozco et al. found that iron nanoparticles of about 3–4 nm enhanced the SO2 adsorption capacity by about 80% by providing well-dispersed reactive centers.**

Reviewer: The authors should explain the reason for selecting these variables and quantities in their study.
Author: The effect of variables such as the type of adsorbent, contact time, and temperature has been investigated in this study. Studies have indicated that temperature and contact time are the most important variables that affect the adsorption capacity. The amount of SO2 removed by adsorption is highly dependent on the temperature and favors low temperatures. Hence, these variables were selected in this study. Quantities were selected according to the references below:
Al-Harahsheh M, Shawabkeh R, Batiha M, Al-Harahsheh A, Al-Zboon K. Sulfur Dioxide Removal using Natural Zeolitic Tuff. Fuel Processing Technology. 2014;126:249-58.
Sun L, Zhu X. Practical and Theoretical Study of the Adsorption Performances of Straw-Based Tertiary Amine-Supported Material toward Sulfur Dioxide in Flue Gas. BioResources. 2017;13(1):1132-42.
Reviewer: The authors should explain the reason for selecting the clinoptilolite as an important adsorbent in their study.
Author: The reason for selecting the clinoptilolite as an important adsorbent is mentioned in text according bellow:
Many different adsorbents, including activated carbon, alumina, graphite, rice husk ash, metal surfaces, and natural and synthetic zeolites, have been applied for SO2 removal. Luo et al. reported that single gas adsorption results show that zeolite is more effective for SO2, NO, and CO2 removal among the four adsorbents. Due to its abundance and low cost, clinoptilolite has been used often in adsorption.
Reviewer: The Materials and Methods section is concise. Please add more details of the performed experiments and the model of the apparatus used for this study. Also, statistical analysis details must be added.
Author: Materials and methods section revised and more details added:
- **Clinoptilolite zeolite was purchased from the Afrazand Company.**
- **The required temperature was supplied using a 250-watt electric heating element, which was wrapped around the chamber covering the cylinder. In order to set the exact temperature, the chamber's temperature was continuously controlled by a sensor, which was placed inside the chamber. The sensor acted quickly when the temperature was changed. If the chamber temperature was reduced from the desired temperature, the electronic thermostat quickly turned the heater on, and if it was increased from the desired temperature, the thermostat turned the heater off.**
- **The removal efficiency was calculated based on the reactor input and output concentration difference.**

Removal Efficiency (%) = Input SO2 concentration-output SO2 concentration/Input SO2 concentration
The model of apparatus used for this study was the Midget Impinger.
Reviewer: Various parameters can affect on adsorption process, such as dose of adsorbent, contact time, pH, initial concentration of pollutant, temperature, etc. But in this study. Consequently, the effect of these variables must be surveyed and mentioned in the text.
Author: The mentioned parameters by the reviewer are more suitable for investigating the adsorption process in aqueous environments rather than gaseous environments. In this study, the sulfur dioxide adsorption process from the air has been investigated, where, according to the following references, the studied parameters of contact time and temperature has been

investigated. As well as, no more facilities were available, so more parameters needed to be considered.

Al-Harahsheh M, Shawabkeh R, Batiha M, Al-Harahsheh A, Al-Zboon K. Sulfur Dioxide Removal using Natural Zeolitic Tuff. Fuel Processing Technology. 2014;126:249-58.

Sun L, Zhu X. Practical and Theoretical Study of the Adsorption Performances of Straw-Based Tertiary Amine-Supported Material toward Sulfur Dioxide in Flue Gas. BioResources. 2017;13(1):1132-42.

Reviewer: Discussion and conclusion are weak and need to be revised. In the discussion section obtained results should be compared with other studies.

Author: Discussion revised and non-related studies removed from the discussion, and results compared with similar studies:

- **Parast et al. found that by increasing the temperature, xylene adsorption on clinoptilolite declines.**
- **In the adsorption process, molecules physically adsorb to the adsorbent and separate from the gas stream. When all the pores of the adsorbent are filled, it is unable to adsorb more contaminants.**
- **Zhang et al. found that with increasing contact time, the SO2 removal efficiency by CaO as desulfurizers decreased; this is similar to the results of the current study.**
- **In another study by Mofidi et al., the removal efficiency of activated carbon for VOCs adsorption declined after a certain time (99 min).**
- **Bahiraei et al. investigated the adsorption performance of γ-Fe2O3 nanoparticles for sulfide, sulfite, and thiosulfate from aqueous solutions. They reported that the adsorption process followed pseudo-second-order kinetics, which is similar to the results of this study.**
- **Sekhavatjou et al. investigated the removal of sulfur components from sour gas through the application of zinc and iron oxide nanoparticles.**
- **Liu et al. found that Fe additions on activated carbon showed higher SO2 adsorption capacity than the original activated carbon.**

Reviewer: It would be interesting to have more details on the cost analysis compared with the final efficiency, which can clarify the relevance of the process.

Author: Due to the availability, affordability, and efficiency of adsorbents, it is economical to use clinoptilolite zeolite as the adsorbent.

Reviewer: The manuscript is not written very well as a scientific text, and also many language problems in the text. Please revise it carefully.

Author: English edited by a native English speaker, and the certificate of Radan English Edit was attached.

Reviewer: Please add some new and relevant studies about SO2 removal from aqueous solutions by various methods, and also the adsorption process, and some related references from current journals.

Author: The new and relevant studies about SO2 and other gaseous pollutants removal, and also three references of current journals added:

- **Geravandi S, Goudarzi G, Mohammadi MJ, Taghavirad SS, Salmanzadeh S. Sulfur and nitrogen dioxide exposure and the incidence of health endpoints in Ahvaz, Iran. Health Scope. 2015;4(2).**
- **Chen Y, Huang B, Huang M, Lu Q, Huang B. Sticky rice lime mortar-inspired in situ sustainable design of novel calcium-rich activated carbon monoliths for efficient SO2 capture. Cleaner Prod. 2018;183:449-57.**

- Rosas JM, Ruiz-Rosas R, Rodríguez-Mirasol J, Cordero T. Kinetic study of SO2 removal over lignin-based activated carbon. Chem Eng. 2017;307:707-21.
- Luo L, Guo Y, Zhu T, Zheng Y. Adsorption Species Distribution and Multicomponent Adsorption Mechanism of SO2, NO, and CO2 on Commercial Adsorbents. Energy & Fuels. 2017;31(10):11026-33.
- Abbasi A, Sardroodi JJ, Ebrahimzade AR. The adsorption of SO2 on TiO2 anatase nanoparticles: a density functional theory study. Can J Chem. 2015;94(1):78-87.
- Arcibar-Orozco JA, Rangel-Mendez JR, Bandosz TJ. Reactive adsorption of SO2 on activated carbons with deposited iron nanoparticles. Hazard Mater. 2013;246:300-9.
- Liu XL, Guo JX, Chu YH, Luo DM, Yin HQ, Sun MC, et al. Desulfurization performance of iron supported on activated carbon. Fuel. 2014;123:93-100.
- Garshasbi V, Jahangiri M, Anbia M. Equilibrium CO2 adsorption on zeolite 13X prepared from natural clays. Appl Surf Sci. 2017;393:225-33.
- Jesudoss S, Vijaya JJ, Grace AA, Kennedy LJ, Sivasanker S, Kathirgamanathan P. Hierarchical ZSM-5 Zeolite Nanosurfaces with High Porosity—Structural, Morphological and Textural Investigations. Recent Trends in Materials Science and Applications. Springer. 2017. p. 109-18.
- Zhao C, Guo Y, Li W, Bu C, Wang X, Lu P. Experimental and modeling investigation on CO2 sorption kinetics over K2CO3-modified silica aerogels. Chem Eng. 2017;312:50-8.
- Sun L, Zhu X. Practical and Theoretical Study of the Adsorption Performances of Straw-Based Tertiary Amine-Supported Material toward Sulfur Dioxide in Flue Gas. BioResour. 2017;13(1):1132-42.
- Parast ZV, Asilian H, Jafari AJ. Adsorption of Xylene From Air by Natural Iranian Zeolite. Health Scope. 2014;3(3).
- Mofidi A, Asilian H, Jafari AJ. Adsorption of volatile organic compounds on a fluidized activated carbon bed. Health Scope. 2013;2(2):84-9.
- Zhang T, Li J, Yu S, Wang Y. Preparation and Characterization of a New Desulfurizer and Its Performance on Removal of SO2. Geosci Environ Prot. 2014;2(02):68.
- Bahiraei A, Afkhami A, Madrakian T, Gheitaran R. Preparation and characterization of γ-Fe2O3 nanoparticles and investigation of its adsorption performance for sulfide, sulfite, and thiosulfate from aqueous solutions using ultrasonic assisted method: Modeling and optimization. Ultrason Sonochem. 2018;40:1049-58.

Reviewer: Please revise the list of references according to the style of the Health Scope Journal.
Author: The list of references has been revised according to the style of the Health Scope Journal.

Reviewer 2:
There are many reports on the removal by clino… adsorbent. In this study, only the results are useful as a database, but there is no attractive new result or new knowledge.
The added explanation causes the reader to be misled. There are additional explanations in all parts of this article. So I recommend that authors carry out a general review and delete additional information that isn't necessary.
Author: The manuscript has been revised, and additional information has been added.

Reviewer: Abstract shall be written briefly according to the Health Scope journal style. -

Author: The abstract section was revised according to the style of the Health Scope Journal and written briefly.
Reviewer: Keywords should not repeat the words of the manuscript title and contain any abbreviations
Author: Keywords selected from Mesh and revised according below:
Keywords: Cardiovascular Diseases; Clinoptilolite; Environmental Pollution; Industry; Nanoparticles
Reviewer: Comparison of the removal of nitrate with phenol is not appropriate and should be corrected.
Author: Comparison of the removal of nitrate deleted from text and replaced with the following sentences:
- Zhang et al. found that with increasing contact time, the SO2 removal efficiency by CaO as desulfurizers decreased; this is similar to the results of the current study. In another study by Mofidi et al., the removal efficiency of activated carbon for VOCs adsorption declined after a certain time (99 min).
Reviewer: The comparison is not well done, and the reasons are not mentioned.
References need to be reviewed.
Author: The reasons mentioned and references reviewed which are identified with highlighted text in the manuscript.
Reviewer: The manuscript's English language must not bear any errors. Some sentences need to be revised severely.
Author: English edited by a native English speaker, and the certificate of Radan English Edit was attached.
Reviewer: Add clino…. to keywords.
Author: Clinoptilolite added to keywords. Keywords selected from Mesh and revised according below:
Keywords: Cardiovascular Diseases; Clinoptilolite; Environmental Pollution; Industry; Nanoparticles

Reviewer: Where were you prepared the clino….?
Author: Clinoptilolite zeolite was purchased from the Afrazand Company in Semnan.
Reviewer: Why was the diesel engine used to produce the sulfur dioxide?
Author: Among the sources of real sulfur dioxide production, such as industry stack outlet and diesel automobiles, the exhaust outlet of a diesel automobile was more accessible to produce the actual sulfur dioxide.
Reviewer: The topics of the discussion and conclusion sections should be changed and should be better written.
Author: The results and discussion are presented separately, and the topics of them changed.
Reviewer: The location of the study does not need to be included in the article.
Author: The location of the study was deleted from the text.
Reviewer: The schematic diagram presented does not conform to the working method.
Author: The schematic diagram is revised as shown below:

Reviewer 3:
Thanks to the efforts of the distinguished authors:

The following corrections are proposed for the article with the title “Comparative study of Sulfur dioxide adsorption process by natural clinoptilolite zeolite and clinoptilolite containing iron oxide nanoparticles”:
Reviewer: Writing an English article requires a grammar edit.
Author: English edited by a native English speaker, and the certificate of Radan English Edit was attached.

Reviewer: Add Clinoptilolite word to keywords.
Author: Clinoptilolite added to keywords. Keywords selected from Mesh and revised according below:
Keywords: Cardiovascular Diseases; Clinoptilolite; Environmental Pollution; Industry; Nanoparticles

Reviewer: The structure of the abstract should be corrected according to the journal's format.
Author: The abstract section was revised according to the style of the Health Scope Journal.

Reviewer: The procedure is mentioned, which uses diesel exhaust gas as the SO2 source. In exhaust emissions, there are contaminants besides SO2 gas. Please describe the method of eliminating contaminating pollutants.
Author: Sulfur dioxide gas was used alone for the laboratory and synthetic sample, but to check the efficiency of the method in real conditions in the presence of other intervening factors, the diesel exhaust was used. The results showed that the efficiency of this method in actual conditions and in the presence of other intervening factors is 13.6% and 12.5% less than the laboratory sample. The removal rate obtained was 66.7% and 31.3% by modified zeolite with iron oxide nanoparticles and natural zeolite, respectively, which indicates the efficiency of this method in real terms.

Notes on the results and discussion:
Reviewer: In the results section and the discussion of the effect of temperature, the sentence “ Maximum value of SO2 removal efficiency is at a temperature of 25 ° C by natural and Modified zeolite 43.8 ±2.46 and 80.3±6.8 percent, respectively,” is repeated two times, please modify.
Author: The duplicate sentence was removed from the text of the article.

Reviewer: In different parts of the discussion, in sentences referring to previous articles, it is best to delete the dot after the author's name. The authors' names are written according to the letter of the first letter and the rest of the lower case. The small names of the authors are not necessary.
Author: The authors' names modified in the following format:

-	Zhang et al.	Zhang et al.
-	the study of Ping Li et al	the study by Li et al.
-	Shen YF et al.	Shen et al.

Reviewer: Comparing the results with other studies, it is better to use better writing. There is no need to write a study with the title of ".....".
Author: Comparing the results with other studies used better writing and text of article revised.

Reviewer: It is better to compare the results of this study with similar pollutant studies. What is the nature of SO2 with nickel or aniline, or antibiotics?
- In general, it seems that in the discussion section, comparison of results with non-related pollutants and adsorbents has been done, and it is better to compare with so2 pollutant, with other methods, and with similar gases with zeolite adsorbent.
Author: To compare of results with related pollutants and adsorbents in the discussion section, the following sentences were deleted:
- **P. Panneerselvam et al. (2011) in Malaysia reported that with increasing temperature decreases the adsorption of nickel ions on zeolite and it is inherently a process of exothermic process.**
- **In another study by Mehdizadeh et al. (2016), in Iran with Title of study on the p-Nitroaniline removal from aqueous solution by surface modified Multi-Walled Carbon Nanotubes (MVCNTs) using Nitric Acid-Sulfuric Acid, concluded that adsorption process occurs quickly in the preliminary minutes of reaction due to high sorption of carbon nanotubes and it arrives the balance and there is no effect on removal efficiency after passing of time. While in this study adsorption process happened quickly in the preliminary minutes of reaction because of the fast adsorption of the adsorbent, but the adsorption efficiency increased with further increase of time. The increase in uptake rate on the clinoptilolite containing iron oxide nanoparticles as compared to natural zeolite can be due to the increase in the number of empty sites on the surface of the adsorbent containing nanoparticles.**
- **Garcia et al. in England in 2006, investigated the removal of Naphthalene from the air by metal oxide catalysts such as CuO.**

And the following sentences were added to the discussion with reference:
- **Parast et al. found that by increasing the temperature, xylene adsorption on clinoptilolite declined.**
- **Zhang et al. found that with increasing contact time, the SO2 removal efficiency by CaO as desulfurizers decreased; this is similar to the results of the current study.**
- **In another study by Mofidi et al., the removal efficiency of activated carbon for VOCs adsorption declined after a certain time (99 min).**
- **Bahiraei et al. investigated the adsorption performance of γ-Fe2O3 nanoparticles for sulfide, sulfite, and thiosulfate from aqueous solutions. They reported that the adsorption process followed pseudo-second-order kinetics, which is similar to the results of this study.**
- **Sekhavatjou et al. investigated the removal of sulfur components from sour gas through the application of zinc and iron oxide nanoparticles.**
- **Liu et al. found that Fe additions on activated carbon showed higher SO2 adsorption capacity than the original activated carbon.**
Reviewer: At the end of the study, the author of the study conducted a comparison between the iron oxide nanoparticles (this study) and copper oxide (studies of others). Further, they conclude that the nanoparticle of iron oxide is better. This comparison cannot be done, because you can compare two nanoparticles in a situation that study based on this purpose and the same conditions of the laboratory and the same pollutant are designed and implemented. It is suggested that this paragraph be removed from the discussion.
Author: This paragraph was removed from the discussion:

- The use of iron nanoparticles with copper oxide nanoparticles (Cu2O) to remove compounds of BTX showed that the total catalysis efficiency of removed pollutants and treatment efficiency average were 82.78 % and 56.98% respectively. In another study by Rostami et al. (2012) in Iran, application of copper oxide nanoparticles on zeolite decreased the average removal efficiency of BTX compounds. The results of the study show more efficiency of iron nanoparticles than copper oxide nanoparticles for the removal and complete decomposition of BTX compounds.

Reviewer 4:

Reviewer: The authors should mention the number of examinations and experiments in this study
Author: All experiments were repeated three times. Average results were obtained. Results were reported as the mean. The error bars were added in the figures.

Reviewer: The authors should explain about parameter R-squared in Table 1
Author: The corresponding correlation coefficient (R2) is the linearity percentage of the equation mentioned in the text.

Reviewer: In Table 1, it would be better if the researchers mention the parameters in the two different methods (that have mentioned in the title) and use appropriate statistical tests to compare them
Author: In Table 1 kinetics of pseudo-first order and pseudo-second-order have been presented for both adsorbents (natural zeolites and modified zeolite with nanoparticles), corresponding correlation coefficients (R2) are compared between both models, and more value of R2 shows that the adsorption of SO2 on natural zeolites and modified zeolite with nanoparticles follows the Pseudo-second-order kinetic model.

Reviewer: It would be better if the results and discussion were presented separately
Author: The section of results and discussion has been revised and presented separately.

OPEN PEER REVIEW

Revision (1)

Edris Bazrafshan : Reviewer — 7 Jul 2018

Dear associate editor:
The authors have modified their manuscript based on the comments of reviewers. Hence, I have decided to accept this manuscript.

Edris Bazrafshan : Associate Editor — 7 Jul 2018

Dear editor:
The authors have modified their manuscript based on the comments of reviewers. Hence, I have decided to accept this manuscript.

Ramazan Mirzaei : EIC — 9 Jul 2018

Dear EIC,
According to the statement AE; the Authors have modified their manuscript based on the comments of reviewers. Hence, I have decided to accept this manuscript.