Green Machine

(Survey Feedback About Recycling Plastic Waste into Fuel)

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1 Background

The huge amount of plastic waste that resulted from the dramatic increase in polymer production gives rise to serious environmental concerns, as plastic does not degrade and remains in the municipal refuse tips for decade [1].

According to a nation wide survey conducted in the year 2014, more than 9000 MT of plastic waste is generated daily in KSA, and only 40 wt% is recycled, and 60 wt% is not possible to dispose off. Plastic waste being more voluminous than organic waste takes up a lot of landfill space that is becoming a scare and expensive [2].

A new set of emerging technologies is helping to convert non-recycled plastics into an array of fuels, crude oil and industrial feedstocks. Processes vary, but these technologies, known as "plastics-to-fuel,". This is helpful in producing fuel-sulfur free and where landfill options are limited [3].

2 Scope & Methods

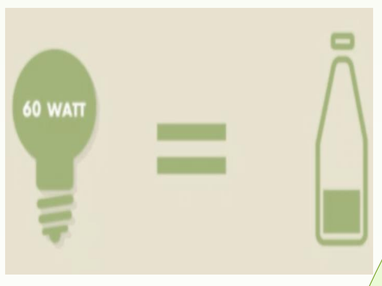
The main aim is to find a solution to the mountings problem of plastic disposal, for which the plastics are converted into valuable fuel, in addition to have a feedback survey about the plastic recycling in a blind group of secondary, undergraduate and postgraduate students

DESIGN OF SMART CONTAINER

The idea of smart container is to collect the plastic waste and give an approximate value of energy that can be generated from this waste. To achieve this aim the smart container was designed with internal hydrolytic piston to compress the plastic waste and a wall sensitive sensor to give immediately the corresponding amount of energy for this waste collection (Figure 1)

DESIGN OF FEEDBACK SURVEY

the survey was applied on 500 students (secondary, undergraduate and post graduate) and statistical analysis was performed.



3 Smart Container Design

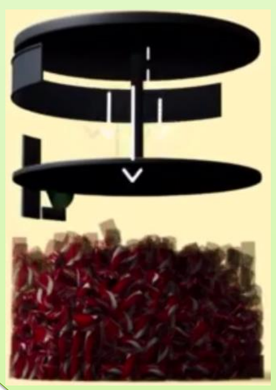


Fig. 1: Schematic diagram illustrates the idea of the smart container

4 Survey Results

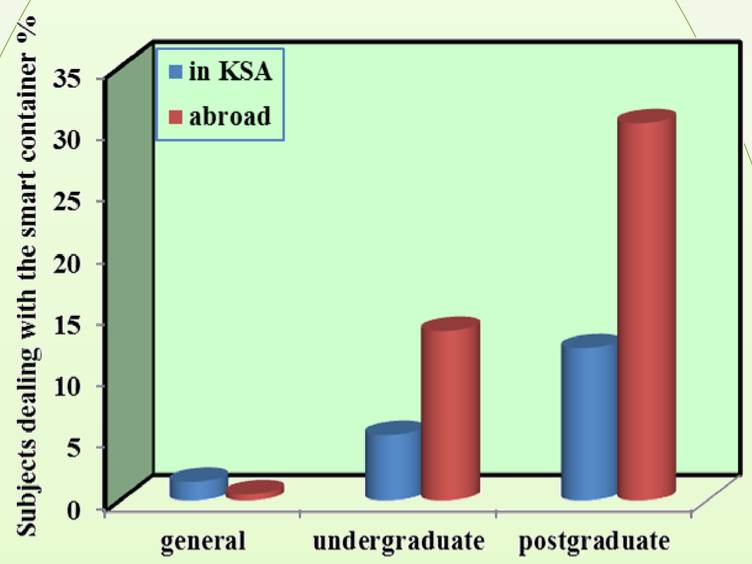


Fig.2: Percent comparison of subjects dealing with the smart container in KSA and abroad at different education levels.

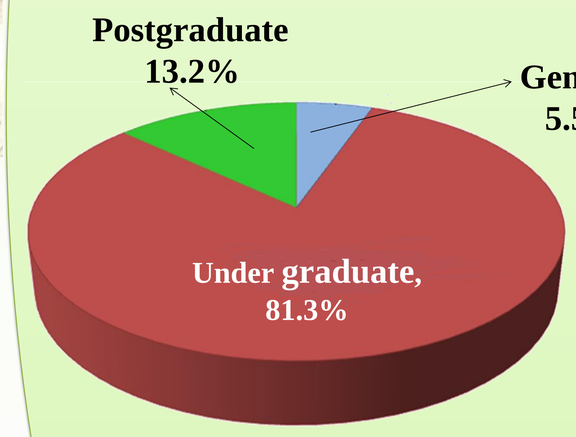


Fig.3: Percent of subjects participated in campaigns about the smart container at different educational levels..

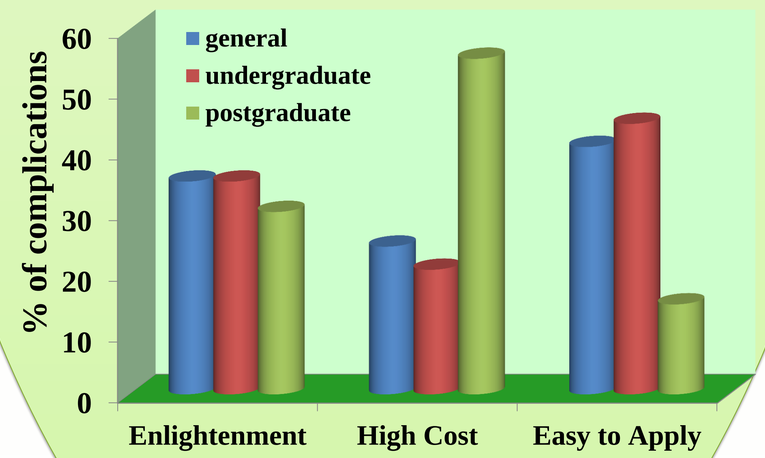


Fig. 4: Percent of complications that are facing the application of the smart container in KSA

5 Conclusion

* Conversion of waste plastic into fuel will reduce dependence on fossil fuels as well as the one of the most critical problem overall the world can be solved.
* The pyrolsis process is 100% eco-friendly as nothing is left in the environment and getting rid of plastic waste. Sulfur content in the fuel generated is less than 0.002%.
* The hydrolytic piston of the smart container compresses the plastic waste. This is an automated process and save landfill in addition to give an immediate indication of the expected producible energy through the sensitive sensor and digital screen.
* The feedback survey about the culture of recycling of plastic waste to a clean fuel revealed that a lack of enlightenment with smart containers. Moreover, the most of undergraduate students are in need to involve them in campaigns about the smart container

* References

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2. Sriningsih W., Saerodji M. G., Trisunaryanti W., Armunanto R., & Falah I. I., 2014. Fuel Production from LDPE Plastic Waste over Natural Zeolite Supported Ni, Ni-Mo, Co and Co-Mo Metals. Procedia Environmental Sciences,20: 215
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