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# Hard Protecting Coverings of Grains of Rice

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**Abstract**

Rice husk contains organic matter such as cellulose, lignin etc. and rest mineral components such as silica, alkalis and trace elements. The content of each of them depends on rice variety, soil chemistry, climatic conditions, and even the geographic localization of the culture. Rice husk is an agricultural residue or the by-product of rice milling industry.

**Keywords:** Milled rice; Organic matter; Capacity range; Silica content; Rice husk; Economic factors

## Introduction

The chemical composition of different rice samples is found to be varying due to difference in climatic conditions, About hundreds of million in rice is produced worldwide of which is obtained as rice husk. The present conditions of world Demands greatly for the use of durable materials which is also strong. Rice husk is a great example of such material. Burning the rice under controlled conditions at temperature below few produced silica in amorphous form [1]. This silica can be utilized for constructional works. In the production of porcelain around silica is required. Suitability of rice husk to be used for different applications depends upon the physical and chemical properties of the husk such as ash content, silica content etc. Direct use of rice husk as fuel has been seen in power plants. Apart from its use as fuel, rice husk finds its use as source raw material for synthesis and development of new phases and compounds. Rice husk is mostly used as fuel in boilers for processing paddy and generation of process steam. Heat energy is produced through direct combustion. Small sector process industries use fixed lo w capacity boilers, which are manually fired using rice husk as a fuel. Partial and uneven fuel combustion leads to smoke emission and decrease the fuel efficiency [2]. As husks are available virtually for free, the boiler efficiency and the degree of combustion were the issues of receiving the latest attention. Plants with capacity range can become commercially viable and this bio mass resource can be utilized to a much greater extent than at present. It has been seen that to produce approximately tons of rice husk is required. So, the technical and economic factors decide the effective use of rice husk as fuel for power generation. Also, rice husk has been used as a useful and alternative fuel for household energy. Rice husk is also used in increasing need for stronger and durable building materials has been to some extent fulfilled by a new concept i.e. blended cement. Blending of reactive rice husk ash in cement has become a common recommendation almost in all the international building codes. Extensive research has been carried out on application of RHA as mineral additive to improve performance of concrete. Reports indicated rice husk ash as a highly reactive pozzolan rice husk ash is mainly used a replacement of silica fume. Rice husk ash is used in the manufacture of refractory bricks because of its insulating properties. It has been used in the manufacture of low-cost, lightweight insulating boards. Rice husk ash has been used as silica source for cordierite production. Replacement of kaolinite with rice husk silica in the mixture composition, yields higher cordierites with a lower crystallize temperature and decrease in activation energy of crystallization [3].

## Discussion

Bricks made using rice husk develop plenty of pores during heat treatment due to burning out of organic material [4]. The more the percentage of rice husk in a brick, the more porous would be the brick and better thermal insulation. Presences of entrapped air in pores have thermal insulating characteristics and thus make the porous fire brick structure suitable for backup insulation. RH is used as a raw material for production of xylitol, furfural, ethanol, acetic acid, lingo sulphuric acids. It is used as cleaning or polishing agent in metal and machine industry, in manufacturing of building materials etc. Rice husk has been used as an industrial raw material e.g. as an insulating board material, fillers in plastics, filling material, building materials, for making panel board, activated carbon etc. Little effort has been made to manufacture composite products based on two surface structure of rice husk. Despite so many well established uses, little portion of rice husk produced is utilized in a meaningful way, remaining part is allowed to burn in open piles or dumped as a solid waste. Rice husk ash has been widely used in various industrial applications such as processing of steel, cement, refractory industry etc [5]. Suitability of rice husk ash mainly depends on the chemical composition of ash, predominantly silica content in it. Rice husk ash is found to be superior to other supplementary materials like slag, silica fume and fly ash. RHA is used during the production of high quality flat steel. The ash also finds application as an excellent insulator, having fine insulating properties including low thermal conductivity, a high melting point, low bulk density and high porosity. It is used as tundish powder to insulate the tundish container, prevent rapid cooling of steel and ensure uniform solidification in casting process. Rice husk ash is also used as a coating over the molten metal in the tundish and in ladle which acts as a very good insulator and does not allow quick cooling of metal. Rice husk ash is used in the manufacture of refractory bricks because of its insulating properties. It has been used in the manufacture of low-cost, lightweight insulating boards. Rice husk ash has been used as silica source for cordierite production [6]. Replacement of kaolinite with rice husk silica in the mixture composition, yields higher cordierites with a lower crystallize temperature and decrease in activation energy of crystallization. Due to presence of large silica content in ash, extraction of silica is economical. Silica is also precipitated in customized forms

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**Received:** 02-Jan-2023, Manuscript No.rroa-23-86907; **Editor assigned:** 04-Jan-2023, PreQC No rroa-23-86907 (PQ); **Reviewed:** 18-Jan-2023, QC No rroa-23-86907; **Revised:** 23-Jan-2023, Manuscript No.rroa-23-86907 (R); **Published:** 30-Jan-2023, DOI: 10.4172/2375-4338.1000345

**Citation:** Genga A (2023) Hard Protecting Coverings of Grains of Rice. J Rice Res 11: 345.

to meet the requirements of various uses. Some of the uses of silica are in rubber industry as reinforcing agent, in cosmetics, in toothpastes as a cleansing agent and in the food industry as an anti-caking agent there is a growing demand for fine amorphous silica in the production of high performance cement and concrete, use in bridges, marine environments. The increasing need for stronger and durable building materials has been to some extent fulfilled by new concept i.e. blended cement. Blending of reactive rice husk ash in cement has become a common recommendation almost in all the international building codes. Extensive research has been carried out on application of rice husk ash as mineral additive to improve performance of concrete [7]. Reports indicated rice husk ash as a highly reactive pozzolana rice husk ash is mainly used a replacement of silica fume or as an admixture in manufacturing of low cost concrete block. Lower values of compressive strength at early ages for up to week except for the mixture where the compressive strength was higher due to the increased reactivity and the filler effect of rice husk ash. Based on that, it can be noticed that the amount of rice husk ash present when replacement used is not adequate to enhance the strength significantly. The available silica from the addition of rice husk ash reacted with only a small portion of C-H released from the hydration process and thus, the C-S-H released from the pozzolanic reaction was relatively limited. However, this was overcome by the age of four week days where the strength achieved higher values than the control [8]. The strength increased with rice husk ash for up to which results in achieving the maximum value. The strength values when rice husk ash as replaced were found to be similar replacement except that at the age of a week, the strength was higher than the control for all rice husk ash mixtures, in this case, the amount of silica available in the hydrated blended cement matrix is probably too high and the amount of the produced C-H is most likely insufficient to react with all the available silica and as a result of that, some amount of silica was left without any chemical reaction. As already described above, rice husk and its ash are suitable materials for a wide range of industrial as well as research applications. In consideration with its low cost and easy availability, application of rice husk and rice husk ash is still limited and there is tremendous potential of this material for use in upcoming industrial processing and technology [9]. Potential future markets include manufacturing of silicon chip, synthesis of activated carbon, production of light weight construction materials and insulation etc. Small markets exist for rice husk ash in the manufacture of refractory bricks and as oil absorbent which can be expanded in to a large volume market. Though rice husk ash finds largest and most commercially viable markets in cement, concrete and steel industries, constraints to the expansion of this market is due to the health issues associated with using crystalline ash and hence there is a great potential for use of amorphous rice husk ash in these area [10]. Rice husk and its ash are suitable materials for a wide range of industrial as well as research applications. In consideration with its low cost and easy availability, application of rice husk and rice husk ash is still limited and there is tremendous potential of this material for use in upcoming industrial processing and technology. Potential future markets include manufacturing of silicon chip, synthesis of activated carbon, production of light weight construction materials and insulation etc. Small markets exist for rice husk ash in the manufacture of refractory bricks and as oil absorbent which can be expanded in to a large volume market.

## Conclusion

Though rice husk ash finds largest and most commercially viable markets in cement, concrete and steel industries, constraints to the expansion of this market is due to the health issues associated with using crystalline ash and hence there is a great potential for use of amorphous rice husk ash in these area.

## Acknowledgement

None

## Conflict of Interest

None

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