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## *In-Vitro* carbohydrate and protein digestion of three selected varieties of puffed rice

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**Abstract**

Rice is the staple in the diet for much of the world. Due to its acceptance and versatility, rice has been used to prepare different processed ready to eat food that are easy to consume and tasty. One such processing technique is puffing, where the rice kernels are puffed using high temperature. The *In vitro* digestibilities of the three varieties were carried out, to observe the digestibility of carbohydrate and protein. The *in vitro* carbohydrate digestibility in RNR 2458 (82.21 %) was observed to be highest and lowest in WGL 283 (80.28%). The *in vitro* protein digestibility in WGL 44 (86.30%) was observed to be highest and lowest in RNR 2458 (82.67%). The nutritional analysis also found better results with WGL283 as *in vitro* digestibility content was better than others.

**Keywords:** rice kernels, puffing, *in-vitro* digestibility

**Introduction**

A variety of rice products are produced in order to enhance the storage capability, easy cooking to instant cooking and provide new food with better nutritive value and flavour. Puffed rice becomes bases for many other convenient foods in the markets. Usually puffed rice is made from sundried paddy which has been moistened in hot water for some time. After keeping it in moistened condition it is sundried and parched in hot sand to puff the grain (Bhatia, 2008) [2]. Puffed rice are commonly used as ready to eat breakfast or as a snack. Puffing makes the grain matrix more porous and their puffing characteristic is defined by the composition and morphology of the kernel and includes significant changes in structure and physical properties of starch and water holding capacity (Mariotti *et al.*, 2006) [6]. Processing of food grains is commonly known to alter the bioavailability of both macro and micro nutrients. Damaged starch and resistant starch (RS) are the outcome of such processing treatment. The content of the resistant starch is found to be different in different processed rice products, which accounted for their easy digestibility compared to raw rice. The puffed rice showed reduced amount of amylose content (Mahadevamma and Tharanathan, 2007) [5].

**Materials and Method**

The three rice varieties of Telangana state WGL44, WGL 283 and RNR 2458 was puffed by a traditional method of puffing (Edmund and Lloys, 2002) [3].

The *in vitro* carbohydrate and protein digestibility of three rice puffed products were estimated by the following procedures.

**In- vitro carbohydrate digestibility:** The ability of the sample to inhibit alpha- amylase activity was determined by the method given by Englystetal (1992) [4].

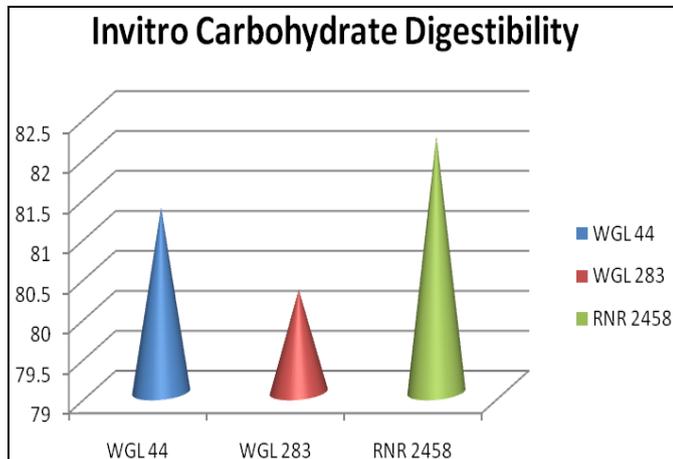
**In- vitro Protein digestibility:** The digestibility of rice puffed products was determined by the method by Aboubacar *et al.*, 2001 [1].

**Result and Discussion**

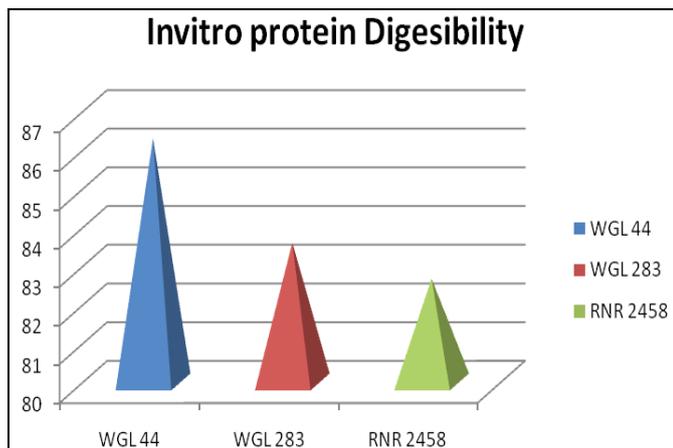
The *in vitro* carbohydrate digestibility of the three rice varieties WGL 44, WGL 283 and RNR 2458 ranges from 80.28 to 82.21%. The highest digestibility of carbohydrate was observed in RNR 2458 and the lowest digestibility was observed in WGL 283. Fig. 1 shows the *in vitro* carbohydrate digestibility of the three varieties of puffed rice. The *in vitro* carbohydrate digestibility in WGL 44 was 81.31 %. There was significant difference ( $\geq 0.05\%$ ) in the *in vitro* carbohydrate value between the three varieties of puffed rice.

The *in vitro* protein digestibility of the three rice varieties of Telangana state WGL 44, WGL 283 and RNR 2458 are 86.30, 83.60 and 82.67% respectively.

The *in vitro* digestibility of protein was observed to be higher in WGL 44 and lowest in RNR 2458. The *in vitro* digestibility means of the three varieties are shown in the Fig 2 There was significant difference ( $\geq 0.05\%$ ) in the *in vitro* protein digestibility value between the three varieties of puffed rice. Lower protein digestibility was reported in wheat based extrudate products ranging from 59.26 to 65.61 % (Swapnil *et al.*, 2016) [7]. The difference in the results might be due to the difference in the content of wheat and rice and also their digestibility after processing.



**Fig 1:** *In-vitro* carbohydrate digestibility of the three varieties of puffed rice



**Fig 2:** *In-vitro* protein digestibility of the three varieties of puffed rice

## Conclusion

Among the many states in India, Telangana state has contributed largely to supply of rice to the country. A variety of rice products are produced in order to enhance the storage capability, easy cooking to instant cooking and provide new food with better nutritive value and flavour. The three selected puffed rice varieties were then subjected to *in vitro* digestibility test to observe the *in vitro* protein and carbohydrate digestibility. The *in vitro* carbohydrate digestibility of varieties WGL 44, WGL 283 and RNR 2458 were 81.31, 80.28 and 82.21% respectively. Then these three varieties were tested for *in vitro* protein digestibility, the digestibility of WGL 44 was 86.30%, the variety WGL 283 was 83.60% and RNR 2458 was 82.67%. The variety that has shown to have the highest level of digestibility on an average was WGL 283.

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