

IN VITRO STARCH DIGESTIBILITY OF MILLED RICE WITH DIFFERENT AMYLOSE CONTENT

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THE RESEARCH

The research has investigated the hydrolysis of starch from five rice genotypes developed in Brazil with different amylose levels: low (BRS 358 and Empasc 104, lowland), intermediate (BRS Querência, lowland), and high (BRS Pampa, lowland and upland lineage, AB162641). The milled grains were cooked according to the optimum cooking time of each material and then analyzed for the *in vitro* starch digestibility (SD). Gastric enzymes activities were simulated at pH 1.2 for 30 minutes and intestinal amylaceous enzymes, at pH 6.8 for 90 minutes at 37 °C. The X-ray diffraction pattern and the relative crystallinity were also evaluated.

OUTSTANDING RESULTS

The low amylose cultivars, BRS 358 and Empasc 104, presented the highest *in vitro* starch digestibility with 97.07% and 99.81%, respectively, after 90 minutes of intestinal digestion (table 1). The intermediate and high amylose cultivars, BRS Querência and BRS Pampa, presented the lowest digestibility values of 80.64% and 80.79%, respectively. However, the rice lineage AB162641 showed 92.73% of starch digestibility, an atypical value for a high amylose rice. In addition to the amylose content, other factors influence the hydrolysis of the starch. Type A starch polymorphs were found for all genotypes, suggesting less resistance of the starch granules to the enzymatic hydrolysis. Furthermore, the lower relative crystallinity of the AB162641 lineage corroborates with its higher digestibility, indicating less stability of the double helices of amylopectin. Therefore, for a better understanding of the *in vitro* digestibility of rice starch, a set of factors should be analyzed, since only the amylose content should not be evaluated as a limiting factor.

Table 1: Amylose content, starch relative crystallinity and *in vitro* digestibility from milled rice genotypes.

Genotypes	Amylose content (%)	Relative crystallinity (%)	<i>In vitro</i> starch digestibility (%)
BRS 358	14.56 ± 0.56	33.32	97.07ab ± 3.99
Empasc 104	19.53 ± 0.34	30.42	99.81a ± 3.71
BRS Querência	20.42 ± 0.66	29.29	80.64c ± 2.92
BRS Pampa	25.62 ± 1.32	30.93	80.79c ± 1.93
AB162641	25.05 ± 0.51	28.53	92.73b ± 1.52

Means ± standard deviation followed by the sample letter in the column do not differ by the Tukey test ($p \leq 0.05$).

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