

## Enzyme Treatment of Sorghum Dough: Modifications of Rheological Properties and Product Characteristics

**Authors :** G. K. Sruthi, Sila Bhattacharya

**Abstract :** Sorghum is an important food crop in the dry tropical areas of the world, and possesses significant levels of phytochemicals and dietary fiber to offer health benefits. However, the absence of gluten is a limitation for converting the sorghum dough into sheeted/flattened/rolled products. Chapathi/roti (flat unleavened bread prepared conventionally from whole wheat flour dough) was attempted from sorghum as wheat gluten causes allergic reactions leading to celiac disease. Dynamic oscillatory rheology of sorghum flour dough (control sample) and enzyme treated sorghum doughs were studied and linked to the attributes of the finished ready-to-eat product. Enzymes like amylase, xylanase, and a mix of amylase and xylanase treated dough affected drastically the rheological behaviour causing a lowering of dough consistency. In the case of amylase treated dough, marked decrease of the storage modulus ( $G'$ ) values from 85513 Pa to 23041 Pa and loss modulus ( $G''$ ) values from 8304 Pa to 7370 Pa was noticed while the phase angle ( $\delta$ ) increased from 5.6 to 10.1o for treated doughs. There was a 2 and 3 fold increase in the total sugar content after  $\alpha$ -amylase and xylanase treatment, respectively, with simultaneous changes in the structure of the dough and finished product. Scanning electron microscopy exhibited enhanced extent of changes in starch granules. Amylase and mixed enzyme treatment produced a sticky dough which was difficult to roll/flatten. The dough handling properties were improved by the use of xylanase and quality attributes of the chapath/roti. It is concluded that enzyme treatment can offer improved rheological status of gluten free doughs and products.

**Keywords :** sorghum dough, amylase, xylanase, dynamic oscillatory rheology, sensory assessment

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