TECHNOFUNCTIONAL AND NUTRITIONAL CHARACTERIZATION OF GLUTEN-FREE CAKES PREPARED FROM WATER CHESTNUT FLOURS AND HYDROCOLLOIDS

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ABSTRACT

Gluten-free cakes were prepared from two different varieties of water chestnut (Kashmir [WCF K] and Punjab [WCF P]) flours. Hydrocolloids (sodium alginate, guar gum and carboxy methyl cellulose) were added to obtain desired body and texture. Proximate analysis and characterization of cakes was carried out. Cakes prepared from WCF (K) with carboxymethyl cellulose (CMC) (1%) had lower moisture, whereas WCF (K) with sodium alginate (1%) had higher ash content. Protein content was found higher in control sample followed by cake prepared from WCF (K) with sodium alginate (1%). Calorific value was higher in WCF (P) sodium alginate (1%). Firmness was higher in case of WCF (K) with guar gum (1%). Firmness was higher in cake prepared from WCF (K) with guar gum (1%), and cakes prepared from WCF (P) with guar gum (1%), were more acceptable in terms of physical appearance, crust, crumb color, flavor and mouthfeel.

PRACTICAL APPLICATIONS

Higher incidence of celiac diseases in Northern India is necessitating the need for development of gluten-free products. Water chestnut flour is abundantly and cheaply available and can serve as a low-cost alternative to combat this disease. This study, i.e., development of gluten-free cake, is a prelude to this step and will open new horizons for utilization of water chestnuts in the food industry.

INTRODUCTION

Bakery industry in India is considered as one of the major food processing industries, with an annual demand of over 2,758 metric tons (MOFPI 2013). Bakery products are the most popular food consumed by all age groups and are gaining popularity as processed foods because of their availability, ready-to-eat convenience and, comparatively, good shelf life.

Because of changes in consumer behavior and eating habits, ready-to-eat convenience foods that are frequently available as small products intended for mobile consumption are of increasing importance. Cakes are particularly popular and are associated in the consumers mind with a delicious product and better sensory characteristics. Cakes are examples of macroporous materials generated *in situ* by raising the temperature of highly aerated emulsions (cake batters) (Levent and Bilgicli 2011).

Celiac disease, an autoimmune disease caused by the interaction of gluten in genetically predisposed individuals (Marsh 1992), is common in the areas of North India where wheat is a staple food. A strict gluten-free diet can fully restore health and improve quality of life in patients with celiac disease and is therefore the basic line of treatment (Stern 2008). There is a need for development of a range of gluten-free products as the demand for these products is increasing worldwide, with the increase in the number of individuals diagnosed with celiac disease (Arendt and Dal Bello 2008).

Water chestnut is an important commodity in food industry because of its unique taste (Singh *et al.* 2010) and is mostly eaten like nuts, dried or roasted. The fruit is used as a substitute for cereals in Indian subcontinent during fasting days and compares well with other foods as it is a good source of carbohydrates, proteins and essential minerals (Gul *et al.* 2014). This remarkable nutritional