Available online at www.sciencedirect.com
SCIENCE DIRECT
Food Chemistry 100 (2007) 1243–1248
Food Chemistry
www.elsevier.com/locate/foodchem

Spaghetti making potential of Indian durum wheat varieties in relation to their protein, yellow pigment and enzyme contents

Mehran Aalami [a,*], K. Leelavathi [a], U.J.S. Prasada Rao [b]

[a] Department of Flour Milling, Baking and Confectionery Technology, Central Food Technological Research Institute, Mysore 570013, India
[b] Department of Biochemistry and Nutrition, Central Food Technological Research Institute, Mysore 570013, India

Received 26 July 2005; received in revised form 22 November 2005; accepted 2 December 2005

Abstract

The research was carried out to evaluate spaghetti making potential of 12 Indian durum wheat varieties in relation to their protein and yellow pigment content and peroxidase, polyphenol oxidase, lipoxygenase, and protease activities. The protein content of the durum wheat varieties varied from 12.1% to 15.9% and their yellow pigments content ranged from 3.8 to 7.2 ppm. The peroxidase activity in these wheat varieties varied from 269 to 1010 U/g and polyphenol oxidase activity from 58.8 to 78.3 U/g. The lipoxygenase activity of durum wheats ranged between 1.44 and 6.88 U/g. Protease activity was in the range of 1.1–5.1 U/ g. The data for varieties MACS-1967, MACS-3125, MACS-2846, DWR-2006, HI-8498 and N-59 were indicative of their potential for the preparation of pasta products.

Keywords: Durum wheat; Yellow pigment; Peroxidase; Polyphenol oxidase; Lipoxygenase; Protease

1. Introduction

Durum wheat (*Triticum durum*) is the most suitable raw material for the production of pasta products such as spaghetti, macaroni, and vermicelli. This is mainly because of their relatively high yellow pigments content, low lipoxygenase activity and high protein content. Durum wheat represents about 6–8% of the total wheat production in the world (Troccoli, Borreli, De Vita, Fares, & Di Fonzo, 2000). India produces about 2.5 MMT of durum wheat, which is mostly used for the preparation of Indian traditional dishes.

The bright yellow color of pasta products, rather than cooking behavior and taste, is reported to be one of the most important considerations in assessing durum wheat quality (Borrelli, Troccoli, Di Fonzo, & Fares, 1999). A high level of yellow pigments in durum wheat does not, however, guarantee a high color of pasta itself because pasta yellowness and pigment loss during processing are affected mainly by lipoxygenase (LOX), and also by peroxidase (POD), and polyphenol oxidase (PPO) activities (Borrelli et al., 1999; Irvine & Winkler, 1950; Kobrehel, Laignelet, & Feillet, 1974; Taha & Sagi, 1987). It is generally well accepted that pigment loss on making pasta and subsequent yellowness of pasta are significantly correlated with lipoxygenase activities (McDonald, 1979). Pasta products made from cultivars with a high POD activity is known to develop an undesirable brownish color during processing (Fraignier, Michaux-Ferriere, & Kobrehel, 2000). In wheat based products, PPO activity has been implicated in darkening reactions that limit the acceptability of certain pasta products (Singh & Sheoran, 1972).

Another aspect of interest in pasta making is its cooking quality. Petruzzelli, Gatta, De Leo, and Colapric (1981) found a significant negative correlation between proteolytic activity and pasta cooking quality. Several reports indicate that high protein content is favorable for good cooking quality of pasta product (Dexter & Matsuo, 1977; Feillet, 1988; Matsuo, Bradley, & Irvine, 1972).

* Corresponding author. Permanent address: Faculty of Food Science and Technology, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, I. R. Iran. Tel.: +98 (171) 4423221; fax: +98 (171) 4426432.
E-mail address: mehranalami@yahoo.com (M. Aalami).

0308-8146/$ - see front matter © 2005 Elsevier Ltd. All rights reserved.
doi:10.1016/j.foodchem.2005.12.007