

Development of high-quality gluten-free breads for the European market

Valentina Stojceska & Paul Ainsworth

The Manchester Metropolitan University¹, Department of Food and Tourism Management, Hollings Faculty, Old Hall Lane, Manchester, M14 6HR, UK.

**corresponding email: V.Stojceska@mmu.ac.uk*

Introduction. Village Bakery Nutrition (VBN) is the largest gluten-free bread factory in Europe, established 2007. Currently, it has been involved in 27 months Knowledge Transfer Partnership (KTP) programme with the Manchester Metropolitan University. KTP is a part of government-funded activity to encourage collaboration between businesses and universities in the United Kingdom. The main aim of this KTP programme was to achieve the successful operation of gluten-free production, optimise the physical and sensory characteristics of gluten-free bakery products and initiate a programme of new products development. Today, VBN factory uses a £3m facility to produce over 2,500 loaves every hour, which is equivalent to 4 million loaves a year. The gluten-free range includes white, high-fibre and low-protein breads. These are marketed and distributed in the UK and Ireland under the brand Juvela, Sweden and Finland under the brand Semper, and Italy, Spain, France and Portugal under the brand Nutricia.

The nutritional characteristics of twelve different types of gluten-free breads and challenges and experiences during development and production in order to meet customer needs will be discussed. An example of Trio rolls production will be presented.

Methodology. 1. The following nutritional analyses of twelve VBN's gluten-free breads were carried out: iron content (AOAC, 1990), the total antioxidant capacity (TAC) (Re et al., 1999), total dietary fibre content (TDC) (AOAC, 1997), crude proteins (AOAC, 1984) and fat content (Gertz & Fiebig, 2000)

2. The ingredients used for baking Trio rolls were: wheat starch, water, vegetable oil, (palm and rapeseed), bakery syrup, yeast, sunflower seeds, pumpkin seeds, crushed linseed, sugar, salt, apple fibre, sugar-beet fibre, raising agents, preservatives, mineral (iron) and vitamins. Mixing of the ingredients were carried out in industrial mixer (Spiral mixer SPI280, Aquamix, VMI, France) for 6 minutes, divided in a hopper (Vemag, HP10, Germany), shape through roll plant (Konig, Austria) and proved for 30 min. at 30C and humidity of 80% (MVS prover, Gouet, France), baked in double action oven (Gouet, France) for 12 min at 185C at the beginning and 205C at the end of the oven, kept in multi level dynamic cooler for 1 hour, packed in Sudpack film using a Mutivac R530 (Multivac, Germany).

Results. 1. Table 1 presents some nutritional properties such as CP, TDF, fat, iron and TAC of twelve gluten-free breads produced by VBN. The range of CP varied between 1-4.1%,

TDF 1.7-7%, fat 0.3-3.8%, iron 3-4.5% and TAC 0.2-1.6. The variation of nutritional properties depends mainly on the ingredients used for the production of breads.

2. An example of gluten-free bread Trio rolls is presented in Figure 1.

Table 1. Some nutritional characteristics of gluten-free breads

	Min	Max
CP(%)	1	4.1
TDF(%)	1.7	7
Fat(%)	0.3	3.8
Iron(mg/100)	3	4.5
TAC (%)	0.2	1.6



Figure 1. Gluten-free Trio rolls

Conclusion. Through the KTP the VBN has been able to launch a range of breaded gluten-free breads with desirable nutritional and sensory quality, which has opened up the opportunities to meet the customer needs and strengthen the company's competitive offering.

References. AOAC (1990). International Method 977.30 (16th Ed.). Washington DC: Association of Official Analytical Chemists.

AOAC (1997). International Method 985.29 (16th Ed.). Washington DC: Association of Official Analytical Chemists.

AOAC (1984). Official methods of analysis. (S. Williams Ed.). Washington DC: Association of Official Analytical Chemists.

Gertz, C. & Fiebig, H.J. (2000). Determination of fat content by the caviezel method (rapid method). *European Journal of Lipid Science and Technology* 102, 2, 154-158.

Re, R., Pellegrini, N., Proteggente, A., Pannala, A., Yang, M., & Rice-Evans, C. (1999). Antioxidant activity applying an improved ABTS radical cation decolorization assay. *Free Radical Biology and Medicine*, 26(9-10), 1231-1237.