



TECHNICAL NOTE

Fatty acids composition and distribution in the free lipid fraction of major types of wheat flour and bread consumed in Kuwait

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Fatty acids (FA) distribution in the free lipid (FL) fraction, the concentrations of major FA in FL and the total FL contents of the major types of wheat flour (*Triticum aestivum*) and bread consumed in the State of Kuwait were determined. The distribution of FA and FL (as % of total FA) showed that polyunsaturated FA (PUFA) were predominant to saturated FA (SFA) and monounsaturated FA (MUSFA) in all types of flour and bread. The concentrations of major FA in FL of flour were (mg/g); palmitic acid, 1.7–2.1; oleic acid, 1.6–2.1; linoleic, 5.5–6.7 and in FL of bread were (mg/g); palmitic, 0.7–1.1, oleic, 0.7–1.1; linoleic, 1.8–3.2. The percent content per total FA of linoleic acid was significantly lower in bread relative to flour ($P=0.002$).

INTRODUCTION

Bread is a major staple component of the diet in the Middle Eastern countries. It was estimated that bread consumption in Kuwait averages to 3.8 g/capita/day for groups consuming bread in principal meals (Eid & Boursly, 1986). This level provides over 35% of the total daily energy requirement. Two types of flat bread, pita and tanouri, represent more than 80% of the bread consumption in Kuwait (Eid & Boursly, 1986). These types of bread are based on flour, yeast and salt formulation with water added to form a dough. The dough is separated in small portions (100/200g), flattened after initial fermentation and allowed to ferment again. Portions are baked at a high temperature for a short time. This cause steam formation which results in puffing of the dough to produce a two layered flat bread.

Due to interest in fatty acid content of foods, the recent editions of *Food Composition Tables* have included data on fatty acid composition of different foods including bread (Paul *et al.*, 1980; Richardson *et al.*,

1980; FAO/USDA, 1982). Although lipid is a minor component of flour and bread, the high consumption of bread in the Middle East, especially among low income families, may imply a dietary significance of bread lipid. The major fatty acid present in bread, linoleic acid (C18:2), has an important role in preventing deficiency symptoms of essential fatty acids (FAO/USDA, 1980; Brisson, 1982). Composition of flour FL is also important to the baking industry. The detrimental effect of fatty acids to baking quality is well documented (Tait & Galliard, 1988; Panozzo *et al.* 1990).

In this report we present data of fatty acids (FA) composition of ether-extracted free lipid (FL) of major types of wheat flour (*Triticum aestivum*) and bread consumed in the State of Kuwait.

MATERIALS AND METHODS

Samples

Samples ($n=6$) of each of F40, F30 and F20 types of flour (Table 1) were collected from different local shops. Bread samples ($n=6$) of each of WPB, BPB and EBPB (Table 1), produced by Kuwait Bakeries Co. were collected over a month from different distribution shops. Six samples of TF and six samples of TB (Table 1) were collected from six different Tanouri Bakeries at six different localities. Soon after collection, samples

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