

Session 4.5 – Technology of Bread Making

Introduction

- Four basic ingredients: Wheat flour, water, yeast and salt.
- Processes involved: (i) protein in flour hydrate and forms gluten (ii) CO₂ evolution by yeast enzymes on sugar
- Requirements: (i) formation of gluten network (ii) aeration of the mixture by incorporation of gas and (iii) coagulation of the material by heating it in the oven.

Principle of Bread making

- Conversion of starch
- Mechanical stretching
- Flavour development

Ingredients and Processes

- **Flour** – Flour is obviously the major ingredient in bread making and greatly influences the cost of baked products. The supplementation of low protein bread making flours with gluten is now common practice. A much wider range of brown, wholemeal and mixed grain flours is now available to meet the consumers' desire for a higher fibre intake, as recommended by medical bodies in many countries.
- **Yeast** – Yeast technology has progressed to: (a) produce yeast strains which meet the fermentation requirements of individual countries according to the bread making processes they utilise
- **Dough mixing and development** – Mechanical development processes such as the Chorleywood Bread Process, together with other processes based on chemical dough development, have allowed the omission of the bulk fermentation process.
- **Processing and baking equipment** – The biggest changes in plant bakery bread making are in the scale of the plant, with fewer plant bakeries supplying a wider area, and the degree of automation.

Essential Ingredients

- These are ingredients which are essential in particular breadmaking processes, or to produce particular baked products, or to permit a lower quality flour to be used. Examples of essential ingredients are:
 - a. flour oxidants and a minimum level of fat in no-time bread making processes;
 - b. particular types of wholemeal, brown or mixed grain flours for specialist brown breads;
 - c. sophisticated emulsifiers which allow high volume crusty breads to be produced from standard bread flour.

Improving ingredients

- These ingredients improve the quality of bread products from a recipe which is already balanced to give an acceptable quality product. Examples are:
 - a. soya flour, which improves volume, crumb colour and crumb softness;
 - b. malt flour and fungal α -amylase, to improve volume and crumb softness;
 - c. emulsifiers, to give better dough stability during processing and baking;
 - d. fat, to improve crumb softness and keeping quality;
 - e. milk powder, to provide improved crust colour and nutritional value.

Characterising ingredients

- These are ingredients which help to characterise particular products. Examples are:
 - a. flour types, wholemeal, germ-meal, wheatmeal, rye, mixed grain, etc., together with cracked wheat, soft grains , bran, pea fibre, etc. for the production of a wide range of speciality brown and fibre-enhanced breads;
 - b. fat, sugar, egg, milk powder, dried fruit, etc. in various quantities and ratios to give soft buns and rolls, fruit bread, Danish pastries, hot cross buns, etc.;
 - c. ingredients which are added in quantities which allow their names to be part of their description, i.e. milk in milk breads, malt flour in malt breads;
 - d. flavour products such as spices in hot cross buns, fruit buns and bread; seeds, maw (poppy), sesame and carraway; tomato, cheese, etc.

Bread Manufacturing

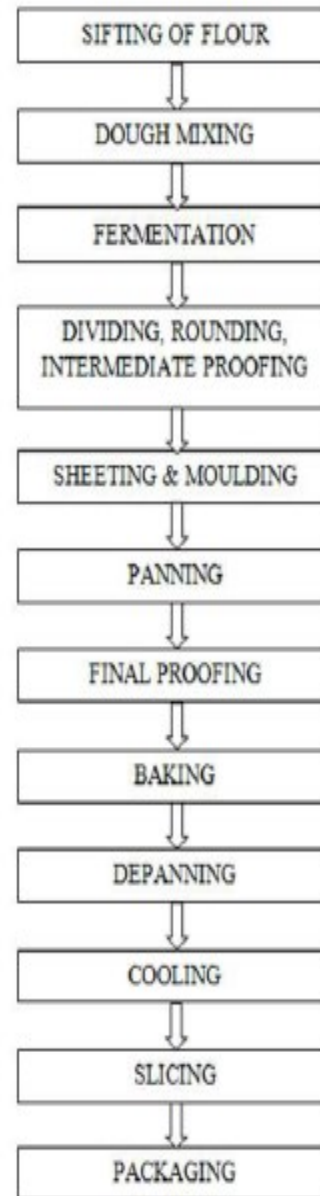


Fig. 11.1 Flow diagram for bread manufacture

Methods of Bread making

Methods of dough preparation

- (i) Conventional (bulk fermentation) dough development methods
- (ii) Mechanical dough development methods
- (iii) Chemical dough development method

The major production methods used in wholesale bread production

- (i) Sponge and dough method
- (ii) Liquid fermentation method
- (iii) Straight dough method
- (iv) no-time dough method
- (v) frozen dough method
- (vi) Continuous bread manufacturing
- (vii) Chorleywood bread process

Staling of bread

- Schoch and French theory
- Zobel and Kulp

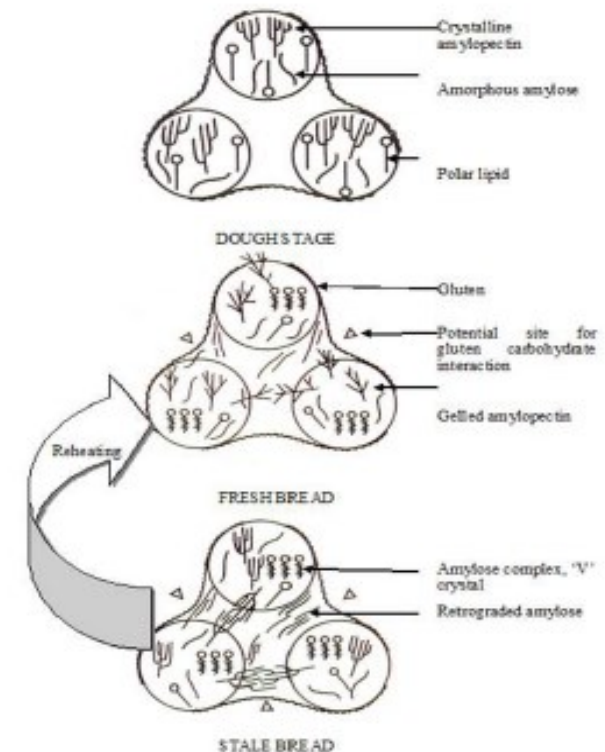


Fig. 11.3 Mechanism of bread staling