19FTT304 BAKING AND CONFECTIONEY TECHNOLOGY

UNIT III BAKERY PRODUCTS TECHNOLOGY

TOPIC 1: Bread making, methods - Straight dough - Sponge and dough- Activated dough development- Chorley wood bread process - Dough retarding and freezing - emergency No time process.

I.STRAIGHT DOUGH BULK FERMENTATION PROCESS

In this method all ingredients are mixed together and the dough is fermented for a predetermined time. The fermentation time is depending on the strength of the flour. This is the most traditional and most 'natural' of the bread making process. Essential features of bulk fermentation processes are summarized as follows:

1. Mixing of all the ingredients to form homogeneous dough.

2. Fermentation of the dough so formed in bulk for a prescribed time (floortime), depending on flour quality, yeast level, dough temperature and the bread variety being produced.

3. Dough formation for bulk fermentation is usually achieved by low speed mixers or may be carried out by hand.

In general, the stronger flour will require longer fermentation to achieve optimum dough development. So higher protein flours require longer bulk fermentation times than lower protein flours. The dough is normally required 2 to 3 hours to mature. The supplementation of flours with dried, vital wheat gluten to increase the protein content of weaker base flours also performed but this is less successful in bread making processes. During bulk fermentation the dough develops by enzymatic action. Since enzymatic actions are time and temperature dependent, therefore, adjustment of added water levels will have to be made to compensate for these changes. . Weigh all ingredients Develop dough by mixing & ferment (2½ hr) Punching & ferment for 55 min Dividing & intermediate proofing (25 min) Moulding and putting in bread tins & final proofing (55 min) Baking Straight dough bulk fermentation bread process

II. SPONGE AND DOUGH BULK FERMENTATION PROCESS

The strong flour takes too long time for conditioning and should not be used for making bread by straight dough method. Normally ratio of 60/40 or 70/30 of sponge and dough is used. The primary role of the sponge is to modify the flavour and to contribute to the development of the final dough through the modification of its rheological properties. During the sponge fermentation period, the pH decreases with increasing fermentation time. As standing time increases, the condition of the sponge quality wise decreases and called over fermented dough. The sponge and dough process produces soft bread with uniform crumb grain structure. The sponge and dough process has tolerance to time and other conditions. The key features are:

1. In this process a part flour (generally two-thirds), part of water and yeast are mixed just to form loose batter or dough (sponge).

2. Sponge is allowed to ferment for up to 5hr.

3. Mixing of the sponge with the remainder of the ingredients to develop the dough optimally. 4. Immediate processing of the developed dough with a short period of bulk fermentation period .

The advantages of straight dough and sponge & dough bulk fermentation processes are as follows:

1. These processes are traditional processes where fermentation time is longer and hence, flavour development in such processes is considered better.
2. Taste of bread is superior.
3. Cell structure of breadcrumb is more preferred.
4. Lesser requirement of chemicals and yeast as time available is sufficient for dough ripening. 5. Less cost of plant & machinery as simpler & less sophisticated equipments such as low speed mixers are used.

Limitations

1. More space requirement for processing.
2. These processes take longer overall time to convert flour and other formula ingredients into bread.
3. More expenses on labour hiring.
4. Product quality may vary from batch to batch due to poor process control.

RAPID PROCESSING

In these methods a very short or no period of bulk fermentation is given to the dough after mixing and before dividing. No time dough, Dutch green dough process and activated dough development process comes under type of method In this process different combinations of active ingredients are used to develop the dough and to reduce fermentation period.

III.ACTIVATED DOUGH DEVELOPMENT (ADD)

This process was developed in the USA during the early 1960s and became popular in smaller bakeries in the USA and the UK thereafter. Its essential features are:

1. The use of a reducing agent generally L-cysteine Hydrochloride, proteolytic anzymes and ascorbic acid to reduce mixing time of flour.
2. The use of oxidizing agents other than added at the flourmill.
3. The use of a fat or an emulsifier.
4. Extra water in the dough to compensate for the lack of natural softening.
5. Extra yeast (1-2%) to maintain normal proving times.

There are number of changes seen in ADD process. In starting, potassium bromate was commonly used together with ascorbic acid and L-cysteine hydrochloride. L-cysteine works very fast in the mixer and can reduce the mixing requirement of flour as much as 50% or more. Proteolytic enzymes can also be used to reduce the dough development time. They give only 15 to 20 per cent reductions in mixing time. But they keep working after the dough is mixed. Sponges could be added to change bread flavour, if required. Final dough temperatures are kept in the region of 25-27°C.

IV.NO-TIME DOUGHS WITH SPIRAL MIXERS-

No-time doughs process is also known as short-time dough process. In smaller bakeries the spiral mixer has taken over as the main type of mixer being used. Spiral mixers have a number of advantages for no time bread making processes. The advantages of this method are the elimination of long fermentation time, savings in expensive equipment, labour and energy cost. The process involves developing dough chemically or

mechanically by employing improvers and malts. The compositions of improvers, which are used, vary widely, although the most common ingredients are ascorbic acid, enzyme-active materials and emulsifiers. Most no-time dough processes use flours of the stronger type with protein contents of 12% or higher. Water additions will be higher in short dough processes than in bulk fermentation. The mixer type also influences the amount of water level used, with some doughs being softer and stickier when taken out of one machine compared with another.

V.THE DUTCH GREEN DOUGH PROCESS-

This process was developed in the Netherlands. It is included under this process group as the dough after mixing passes without delay to dividing, although some resting of dough is involved in the total process. The essential features of the process are:

1. Mixing in a spiral-type mixer or extra mixing in a speeded-up conventional low-speed mixer.

2. Dividing of dough immediately after mixing.

3. The dough is then rounded and given a resting period of 35-40 min.

4. The dough is re-rounded and given a further resting period before final moulding.

The name 'green' dough refers to the fact that after mixing the dough is considered as underdeveloped or 'green' in bakery units.

VI.CHORLEYWOOD BREAD PROCESS (CBP)-

The principle involved in the production of fermented foods by the CBP remain the same as those first published by the Chorleywood team in 1961, although the practices have changed with changes in ingredients and mixing equipment. The essential features of the CBP are:

1. Mixing and dough development takes place in a single operation lasting between 2 and 5 minute at a fixed energy input of 11Wh/kg of dough.

2. A combination of fast and slow acting oxidizing agents such as potassium bromate and potassium iodate.

3. Addition of a high melting point fat, emulsifier or fat and emulsifier combination.

4. Use of extra water to adjust dough consistency to be comparable with that from bulk fermentation;

5. Use of extra yeast to maintain final proof times comparable with those obtained with bulk fermentation;

6. Control of mixer headspace atmosphere to achieve given bread cell structures.

The main difference between the CBP and bulk fermentation processes lies in the rapid development of the dough in the mixer rather than through a prolonged resting period. The aim of both processes is to modify the protein network in the dough to improve its ability to retain gas from yeast fermentation in the prover. In the case of the CBP this is achieved within 5 min of starting the mixing process.

VII.FROZEN DOUGH PROCESS-

This process is generally used for retail or household baking for fresh bread, rolls and Danish pastries. The end product cost could be maintained at par with the method of production by saving on labour and other overheads. The frozen doughs require longer proof time due to decreased yeast cells during freezing cycle. The doughs are made usually from strong flour or by using additional vital dry gluten. The presence of emulsifiers and oxidants overcome the deleterious effect during freezing.