

Production of artisan bakery and viennoiserie



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1. 0 Introduction

This assignment comprises of an investigation into the production of artisan bakery products in a small-scale artisan bakery by identifying the functionality of raw materials and how they can have an effect on a bakery product, such as water, sugar, salt, yeast and fats. According to one author in the field, (Figoni, 2011) While whole wheat flour contains all three parts of the kernel, white flour is milled from the endosperm.

Additionally, most bakery and patisserie products start with the wheat grain. This includes the different types of wheat, the milling process, yeast and wheat content.

Due to having the ideal climate, the country that produces the highest quantities of wheat is China.

It is believed that wheat originated in Southern-western Asia, dating back 10 000 years.

The analysis of wheat is measured by the ash content, which involved burning a certain quantity of flour in a controlled environment and measuring the residue.

This report also includes, the chemical and physical changes in sourdoughs and fermented dough products, as this is the spontaneous fermentation of starch.

(Breadmaking 101: All About Proofing and Fermentation, 2014) states that fermentation is what happens when yeast cells consume sugars and produce ethanol and other derivative chemicals.

The alcohol produced by the yeast during fermentation – along with a

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multitude of other reactions – are what give bread its characteristic flavours and aroma.

Finally, this assignment includes an overview of production planning, including the use of small-scale mechanical production methods, to ensure that stock will be ready and produced to schedule.

2. 0 Main Body

2. 1 Functionality and properties of raw materials used in the production of artisan bread and viennoiserie

Artisan bread and viennoiserie all start with the wheat grain. The wheat grain is a cereal containing numerous layers called pericarp, this includes the Bran, Endosperm and Germ. A wheat germ is rich in omega 3 oils, vitamin B and numerous minerals.

There are two dominant types of domestic wheat; Emmer and Einkorn. An Einkorn is a wild wheat, where the rachis shatters so that seeds can disperse themselves. Furthermore, an Emmer is a cultivated wheat, which has larger seeds and non-shattering rachis as this keeps the wheat shafts together.

There are different wheat varieties, including winter and spring wheat.

Spring wheat is usually grown in Spring and sown two to three weeks later. It is typically used for bread making and has a higher protein content. In contrast to this, winter wheat is sown in autumn and is left to germinate and lie dormant, before resuming growth in the spring. Winter wheat is usually used for cakes and biscuits due to the lower protein content.

In addition to this, weak and strong wheat is determined by the quantity and quality of proteins, which are referred to as hard or soft wheat. Hard wheat

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has a higher water absorption and protein level; however, soft wheat has a lower protein level and lower water absorption.

There are numerous raw materials used in the production of artisan bread and viennoiserie. Some of which include the following:

Salt, which aids the gluten to develop by also enhancing the flavour.

However, the addition of too much can retard the yeast.

Water usage is vital to creating gluten and capturing gases. It is also a good vehicle for distributing small quantities of ingredients, such as milk powder, salt and yeast. The temperature of the water is essential to the fermentation process as it can allow the yeast to grow and feed.

Sugar can affect the absorption of water into the dough, for example sugar rich doughs absorb less water.

Yeast action can also be affected by sugar content as the yeast tries to convert sugar into carbon dioxide and alcohol. However, it provides good crust colour due to the Maillard reaction, which is a chemical reaction between a reducing sugar and an amino acid, usually requiring the addition of heat.

Fats are essential in the production of bread and viennoiserie, as butter is the most used fat by inducing layers in pastries such as, Croissant, Pain au Chocolat and numerous Danish pastries. However, it needs to be handled quickly as it has a low melting point. Also, a longer mixing time is required for doughs using salted butter or shortening, due to the fats taking more

time to incorporate into the other ingredients. Fats can improve touch handling properties and extend shelf life.

Yeast is a major factor in the production of many bakery products. It produces carbon dioxide, adding volume to the dough as it expands gluten structure and produces flavour from byproducts, such as ethanol and carbon dioxide. (Struyf, et al., 2017) discovered that the fermentative performance of yeast cells during fermentation is of critical importance for final bread quality, since yeast cells produce CO₂ and other metabolites that have an influence on dough rheology and bread texture, volume, and taste.

2. 2 The chemical and physical changes involved in sourdoughs and other fermented dough products

Sourdoughs include the spontaneous fermentation of starch and contain the same bacteria that is found in milk. The yeast and bacteria used in sourdough making, are microorganisms that are naturally found in flour. Lactobacilli genus are the type of bacteria that are responsible for souring the taste of the dough. Due to this, lactic acid is produced by the lactobacillus bacteria via their lactic acid fermentation metabolic pathway. In addition to this, ethanol is produced by yeast via their alcoholic fermentation metabolic pathway.

The Metabolic pathways are a linked series of chemical reactions occurring within a cell. They start with chemicals, proceed through a series of steps and finally end up with products giving a distinctive feature. In this instance, they start with sugar and finish with various end-products. However, there are several intermediate compounds formed during the process, as one

product is converted to the next.

The metabolic process of Lactic Acid fermentation is the conversion of glucose and other six-carbon sugars into cellular energy and metabolite lactate. This is an anaerobic fermentation reaction that occurs in some bacteria.

Sourdough preparation begins with a starter made from water and flour. The flour involved in this process naturally contains yeast and bacteria. This mixture develops a symbiotic culture, as the yeast provides the lactobacilli with alcohol for nourishment, whilst the bacteria provide the yeast with an acidic pH. The sugars that the yeast can't metabolise are fermented by bacteria. The metabolised by-products from bacteria produce carbon dioxide gas, which leavens the bread.

The sour taste in sourdough bread is contributed to by the lactic acid produced by the lactobacilli. This is the acid that makes the pH of the dough acidic.

Furthermore, yeast thrives in a slightly acidic environment, resulting in the ethanol produced by the yeast to be used by the bacteria as nourishment.

The yeast and bacteria work to establish a symbiotic relationship and perform glycolysis of glucose to produce pyruvate. Following this, the pyruvate undergoes further reactions to either produce lactic acid or ethanol and carbon dioxide.

The fermentation process which occurs in the early stages of sourdough production, is a catabolic process that makes a limited amount of ATP from glucose and produces a characteristic product, such as lactic acid or ethanol.

There are different types of sourdough, some of which include, Levain, Levain de Pate, Biga and Rye Sour.

. 3 The importance of production planning in artisan bakery production

Production planning is essential to any business as it ensures that stock will be ready and produced to a schedule. This usually takes place before the actual production process occurs. When considering a production plan, there are some main points to consider. Some of these include;

Sales forecast, which is an estimate of the demand that will happen in the future, this will help maintain a stable and reliable production process.

(Production Planning in 5 Steps, n. d.) states that a production plan serves as a guide for your company's production activities. It establishes and sequences activities which must be carried out to achieve a production target, so that all staff involved are aware of who needs to do what, when, where and how.

Stock Control management is essential to ensure that all the materials needed for the production process are readily available. However, all the materials and ingredients must be present in the correct proportions and quantities, else the production would be adversely affected, and the desired level of production won't be achieved.

Equipment usage concerns the process to determine the amount of work that a piece of machinery or equipment can handle. Overloading or over working a machine can lead to a breakdown resulting in the level of production being affected.

Dispatch ensures that the work and plans are implemented properly. This could also include the physical dispatch or handling of products and goods.

It is essential to reduce waste as much as possible, to aid in preventing any loss of profits. By including this in a production plan, it will exert control over materials in stock to help minimize the wastage.

Having a contingency plan is important in every aspect, as it can be great to prevent risks, or when an issue does occur there would be a suitable back up plan to minimise any following disruptions that may occur.

Planning premises are the conditions under which the planning activities will be undertaken. These are usually external and internal. External premise could include factors such as, technological, political, social and government policies. Internal premise could include factors such as, the organisations policies, various resource types and the ability to withstand environmental pressure.

Finally, the employment of staff will help maintain a stable and consistent production.

Process planning involves finding the best way possible to carry out production. This could mean finding the most cost effective and efficient by which production can be carried out. It is also essential to avoiding wasting materials such as flour, sugar, salt, butter, ect... This would reduce the cost of production to a minimum.

Production planning can provide proper scheduling, which will help deliver better services to the customer or consumer, either in terms of prices, higher quality of goods and meet or exceed expectations.

3. 0 Conclusion

There are many different sectors involved in the production of artisan bakery and patisserie, including the functionality and properties of raw materials used in the production of artisan bread and viennoiserie. This entails extensive detail on ingredients such as salt, sugar, yeast, water and fats. In addition to this, the different parts and processes of a wheat grain are essential to the understanding of any bakery product, as this is one of the fundamental ingredients involved.

Another important component is the chemical and physical changes involved in sourdoughs and other fermented dough products, as this included the scientific process behind the process, such as how the yeast and bacteria work together to give the dough its unique sour taste.

Finally, highlighting the importance of production planning to ensure that the business can run as smoothly as possible, by emphasising on components such as sales forecast, stock control, equipment usage, scheduling, and employment.

4. 0 References

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