Design And Development of Khari Sheeter Machine

Mr. Shivam Mallappa Bagewadi[1], Mr. Rutvik Rajendra Shinde[2], Mr. Aditya Pravin Mangave[3], Mr. Shashikant BalasoAduke[4], Mr. A.D. Patil[5]

[1, 2, 3, 4] Dept of Mechanical Engineering

[5]Assistant Professor, Dept of Mechanical Engineering

[1, 2, 3, 4, 5] Sharad Institute Of Polytechnic, Yadrav,Maharashtra, India

Abstract- *Bakery products, due to high nutrient value and affordability, are an item of huge consumption. Due to the rapid population rise, the rising foreign influence, the emergence of a female working population and the fluctuating eating habits of people, they have gained popularity among people, contributing significantly to the growth trajectory of the bakery industry. A number of healthy products have been launched in the bakery segment and are gaining popularity at a high rate. The Indian bakery industry is one of the biggest sections in the country's processed food industry. Bakery products, which include bread and biscuits, form the major baked foods accounting for over 82 per cent of the total bakery products produced in the country. It enjoys a comparative advantage in manufacturing, with an abundant supply of primary ingredients required by the industry, and is the third-largest biscuit manufacturing country (after the United States and China).*

I. INTRODUCTION

The bakery sector comprises the largest segment of the food processing sector in India and offers huge potential for growth. In India there are more than 2,000 organised or semiorganized bakeries producing around 1.3 million tonnes of the bakery products and 1,000,000 unorganised small-scale bakeries producing 1.7 million tonnes. A Khari, Bread and Biscuits are the most popular bakery items and account for 80% of the total market. Not surprisingly, India is the world's second-largest producer of Khari after the USA. The bakery industry has achieved third position in generating revenue in the processed food sector. [2]

Sheeting of dough pieces is an important operation of the bakery process, through which dough thins and turns on the dough sheet. Sheeting is usually carried out by a pair of sheeting rolls with rotation motion. Among other, the characteristics of the finished product depend on the way the operation is performed. [1]

Here we focus on the design of 'Khari dough sheeter machine' which is used to produce the "Khari" in a semi-automated way. The preparation of 'Khari sheet' in a manual method is complex and tedious and for making the 'Khari sheet' in the desired manner the parameters such as dough consistency, fermentation period and frying temperature should be carefully maintained. By implementing such machines, we ensure the proper shape, size and taste of Khari considering food safety and uniformity in the process.

Need of Khari dough sheeter machine

The food industry comprises of food processing, packaging and preservation by integrating the field of mechanical, material science and bio technology. The most important factor to be considered on the food industry is safety and quality of the food so produced by the machine. In food industry the raw material (agricultural products) are processed and converted into desired foods by undergoing specified techniques. In design of "Khari sheeter machine" we take care about food norms and safety in use. Hence it is necessary to use a Special purpose automatic "Khari Sheeter Machine" in food processing to eliminate the various problems and increase productivity.

This Machine gives uncompromising quality in automatic production, resulting in higher production and low labour costs. It is equipped to provide more hygiene and a wide range of shapes and size for producing Khari. Also, this machine gives you total flexibility for both large and small production requirements. Apart from being compact in size, it offers varying output capacities, which are not manually possible.

The Special Purpose Machines (SPM) And Automatic Machines are designed to Operate Continuously for 24 hours a day, with Minimum Supervision. The Special Purpose Machines are Generally Product Specific & they are required to be Designed & Developed for each Specific Requirement.

Construction Technique for Column Jacketing

Referring to the above scope following objectives of work were outlined,

- To study actual concept and mechanism of machine.

- To study different existing products related to "Khari dough sheeter" system.
- Design and optimize the product in consideration with cost & reduced weight.
- To design suitable mechanism for converting dough of Khari into thin sheet with the use of Mechanical Rollers with proper position.
- To synchronize or automate production process.
- Testing, Inspection and Validations using practical and computerized techniques like structural and vibration analysis for each component.

Problem Definition.

The Khari Sheet making involves lot of problems during the rolling process like uneven mixing of dough, ingredients, unequal size, improper thickness etc. To overcome such problems with defined customers need we designed and optimized "Khari Sheeter Machine" with better ergonomic design than existing one. The designed product helps to counter various problems in textile manufacturing like reducing dust by over 90% and improve health of worker with good productivity.

Present study focuses on rolling of dough for Khari making in a industrial setup and future work will provide greater insight in scaling up the results to rolling processes.

II. LITERATURE REVIEW

1) Effect of fat types on the structural and textural properties of dough, HasmadiMamatand Sandra E. Hill :- TheFat is an important ingredient in baking products and it plays many roles in providing desirable textural properties of baking products. In this study, the effect of fat types on dough rheological properties and quality of were investigated using various techniques. Texture profile and extensibility analysis were used to study the dough rheology, while three-point bend test and scanning electron microscopy were used to analyse the textural characteristics of final product. TPA results showed that the type of fat significantly influenced dough textural properties. Khari and Biscuit produced with higher solid fat oil showed higher breaking force but this was not significantly different when evaluated by sensory panel. Scanning electron microscopy showed that Khari and biscuits produced with palm mid-fraction had an open internal microstructure and heterogeneous air cells as compared to other samples.

2)WHEAT AND FLOUR TESTING METHODS, Wheat Marketing Center, Inc Portland, Oregon USA :- Determining moisture content is an essential first step in analyzing wheat or flour quality since this data is used for other tests. Flour millers adjust the moisture in wheat to a standard level before milling. Moisture content of 14% is commonly used as a conversion factor for other tests in which the results are affected by moisture content. Moisture is also an indicator of grain storability. Wheat or flour with high moisture content (over 14.5%) attracts mold, bacteria, and insects, all of which cause deterioration during storage. Wheat or flour with low moisture content is more stable during storage. Moisture content can be an indicator of profitability in milling. Flour is sold by weight, grain is bought by weight, and water is added to reach the standard moisture level before milling. The more water added, the more weight and profitability gained from the wheat. Wheat with too low moisture, however, may require special equipment or processes before milling to reach the standard moisture level.

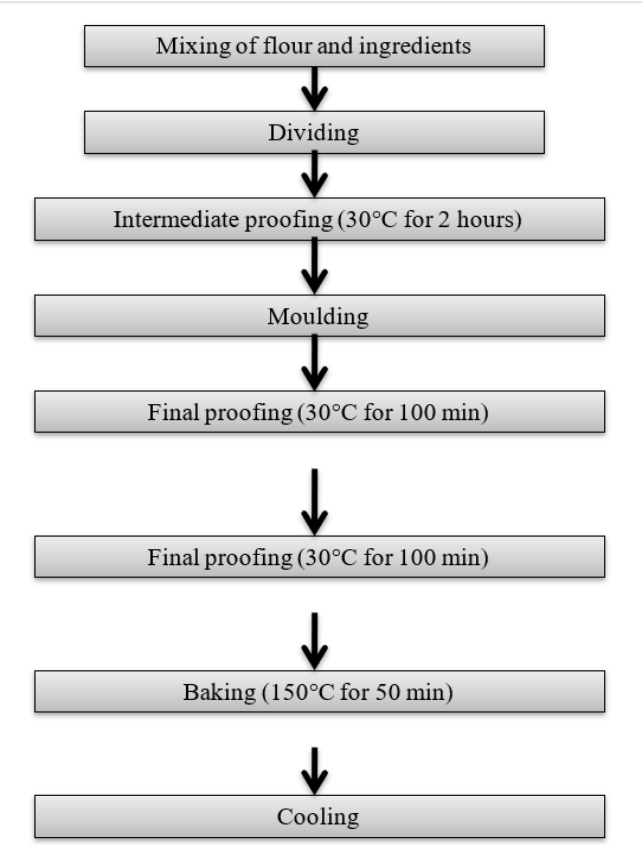
3) **Effects of kneading machine type and total element revolutions on dough rheology and characteristics:A focus on straight dough and indirect (biga) methods**, Manuel Venturi , Alessio Cappelli, Niccolo ` Pini a , Viola Galli b , Lucrezia Lupori , Lisa Granchi , Enrico Cini**:-** Kneading (or mixing) is a fundamental unit operation which must be carefully managed since it significantly influences the development of the gluten network and the final bread quality. Nevertheless, there is a lack of specific researches regarding kneading machine type and total element revolutions, thus motivating this work. This paper assesses differences in dough rheology and bread characteristics as a function of two factors: kneading machine type (spiral and double-arm) and total element revolutions (800, 1600, and 2400). Two breadmaking methods, namely straight dough and biga, were investigated. Results show that kneading machine type and total element revolution have statistically-significant effects on dough rheology and bread characteristics in both the methods. For straight dough method, double-arm mixer seems to be the most suitable for the production of bread with optimal characteristics. On the other hand, for biga method, spiral mixer was able to produce bread with the highest specific volume and loaf height. The results presented here allowed a big step forward in understanding the effects of kneading machine type and total element revolutions. Specifically, our work could guide the improvement of straight dough and biga methods (using double-arm and spiral mixers, respectively), and the development of specific kneading machines.

ADVANTAGES

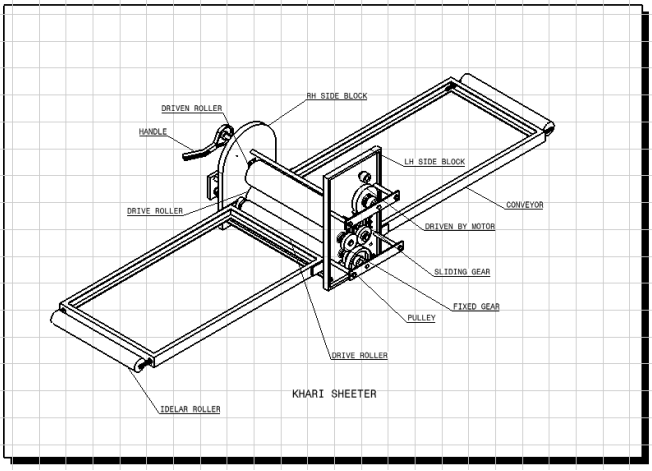
1. Ease of handling.
2. Quick and rapid operation.
3. Aesthetic and ergonomically designed product.
4. Synchronized production process.

5. Reduce administration.
6. Easy to install and less maintenance
7. Economic product.

FLOW CHART



3D Model and drafting of khari sheeter Machine



III. CONCLUSION

We conclude that, this project will helpful for small scale industries as it is easy to operate with less cost and indirectly it will save the labour cost. Savings resulting from the use of this machine will make it pay for itself with in short period of time.

The Khari Sheeter Machine assures the ergonomically comfort to the operator or worker and to reduces time required for manual process. This increases efficiency of productivity and it provide safety of operator while handling of the machine. It gives accurate size of Khari dough Sheet for Khari making.