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# Quality parameters of lentil boondhi

**J. VANITHASRI*[1] AND R. KASTHURI THILAGAM[2]**
[1]Training Assistant and [2]Assistant Professor
[1]KVK, TNAU, Thiruvarur (T.N.) India
[2]Department of Food Science, Imayam Institute of Agriculture and Technology, Thuraiyur, Trichy (T.N.) India

## ABSTRACT

Boondhi is consumed either as a fried Snack or as sweet boondhi or bound together in the form of balls called boondhi laddu (Bhat and Bhattacharya 2001). In order to form globules, batter is made to flow through perforations in the tray of boondhi forming unit, under mechanical vibration. As the batter passes through the perforations, it breaks into short globules, fall directly into heating medium of the fryer (Ramesh, 2004). Lentil flour dough (500g) having initial moisture content of 60% was put into a container and 500ml of water was added and the mixture was continuously stirred to form a homogenous batter without lumps. Add salt and mixing, pouring the dough in a perforated ladle and deep fried till golden colour (4 min), addition fried nuts, chilly powder, pepper powder and curry leaves with boondhi and packing into HDPE stand pouch. Frying studies on bhoondhi were carried out to optimize the parameters for boondhi preparation. The quality parameters such as colour, moisture content, water activity, nutrients and sensory score were considered for the optimization. A slightly variation for the bhoondhi formed with frying time of 4.5min, temperature 170$^0$C, batter having 61-64 % of moisture were crispy with acceptable colour and overall quality.

**Key Words :** Lentil, Boondhi, HDPE, Moisture, Oil, Water activity

## INTRODUCTION

Boondhi is a snack prepared from chick pea flour now replaced by lentil flour. Indian sweets and snack food industry are on the threshold of revolution and identified to have good export potential. The traditional foods are gaining momentum due to the migration of people from villages to the urban centres. The increased consumer demand for high quality and safe product at affordable price has resulted in a need for mechanization. The mechanization of traditional of traditional foods is gaining momentum in India.

Boondhi is consumed either as a fried Snack or as sweet boondhi or bound together in the form of balls called boondhi laddu (Bhat and Bhattacharya, 2001). In order to form globules, batter is made to flow through perforations in the tray of boondhi forming unit, under mechanical vibration. As the batter passes through the perforations, it breaks into short globules, fall directly into heating medium of the fryer (Ramesh, 2004). Preparation of boondhi having a perfect spherical shape depends on the water content of the batter, as the batter consistency (which strong depends on the moisture content) plays a very critical role (Blumenthal, 1991). At low levels of water, boondhi is oblong in shape. At higher water levels also, the batter tends to spread in the frying medium again leading to oblong shaped boondhi with a tail like shape (Priya *et al.,* 1996).

Many studies have been reported on the physico chemical characteristics of boondhi. The deep fat frying characteristics of lentil flour suspensions reported that boondhi of a large size absorbs less oil than smaller one (Bhat and Bhattacharya, 2001). Storage studies of fried sweet boondhi have been carried out, by addition of sorbic acid and using different types of packaging to increase and different types of storage condition its shelf life (Semwal *et al.,* 2005). Storage studies of karaboondhi in flexible films have also been carried out (Mahadeviah *et al.,* 1979).

Mechanization and automation of boondhi

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preparation offers a challenge, since product quality is affected by many parameters. It is necessary to understand the complex processes that occur during frying and improvements can be affected by optimizing the formulation (Singh, 1995, Blumenthal and Stier, 1991). Moisture content of the batter plays a very important role. The oil content in the product, frying time, shape of the globule are parameters dependent on the moisture content of batter. From consumer's point of view, the deep fat fried boondhi needs to be crisp, yellowish brown and spherical. In the present study the important quality parameters namely water activity, moisture, oil absorption, frying time, frying temperature, peroxide value and $P^H$ were measured of the lentil boondhi.

A continuous boondhi forming and forming device, which has forming and frying unit has been designed and developed (Venkateshmurthy and Jayaprakashan, 2005), in which frying studies on boondhi were carried out parallely in order to optimize the design of the fryer.

## METHODOLOGY

**Measurement of temperature:**

A hand held non contact type infrared temperature (Model 350 series) indicator having range of 0-300$^0$C with a least count of 170$^0$C was used for recording the temperature of the frying oil and also the fried boondhi.

**Estimation of moisture content of batter:**

Moisture content of batter was estimated based on the amount of water added to the flour during the preparation of lentil batter and further determined by oven method (AOAC, 1995).

**Determination of colour:**

Colour of boondhi was measured using a Labscan XE (C illuminant 2$^0$ view angle). The total colour difference, which represents the change in the sample colour was directly obtained from the system. In all the experiments and analyses, duplicate values were taken and average values are reported.

**Estimation of pH :**

pH meter (Analog model 301 corion research; USA) was used to measure the pH and standardization using buffer of pH 7.

**Determination of peroxide value:**

Peroxide value is a measure of the peroxide contained in the oil. The peroxides presents determined by titration method (Ranganna, 1994).

**Sealing machine:**

A mechanically operated impulse sealing machine was used to HDPE stand pouch packaging.

**Preparation of boondhi:**

Lentil flour dough (500g) having initial moisture content of 60% was put into a container and 500ml of water was added and the mixture was continuously stirred to form a homogenous batter without lumps. Add salt and mixing, pouring the dough in a perforated ladle and deep fried till golden colour (4 min), addition fried nuts, chilly powder, pepper powder and curry leaves with boondhi and packing into HDPE stand pouch.

**Microbial examination:**

The samples were serially diluted. Dilution of $10^{-3}$, $10^{-4}$, $10^{-6}$ and $10^{-7}$ were taken for all the analyses. One ml of serially diluted samples was taken in petridish and appropriate media was added for the specific organism. The plates were incubated at room temperature for 24 hours for bacteria, 72 hours for fungi, yeast colonies were counted (Frazier and Westhoff, 1995).

**Organoleptic evaluation:**

Organoleptic evaluation of the prepared samples was done by 30 untrained judges using a scorecard where the maximum score was 9 (Watts *et al.*, 1989). The acceptability of lentil karaboondhi were assessed during the storage period

**Statistical analysis:**

The data obtained were subjected to statistical analysis to fine out the impact of packaging materials and storage period on the quality of lentil karaboondhi. Randamized block design was applied for the analysis.

## RESULTS AND DISCUSSION

From Table 1, it was noted that the cooking parameters of lentil boondhi and chick pea boondhi, increase in moisture content ranged from chick pea flour bhoondhi 63.40 % compared to lentil flour bhoondhi. Oil absorption decreased 125 ml for chick pea flour bhoondhi a slight reduction was observed oil absorption compared to lentil flour bhoondhi. During the experimental runs oil temperature was maintained at 170$^0$C and frying time

**Table 1 : Cooking parameters of lentil Bhoondhi**

| Parameters | Chick pea | Large lentil | Small lentil |
|---|---|---|---|
| Wt of dough(1:1) (g) | 500 | 500 | 500 |
| Dough moisture content (%) | 63.40 | 61.90 | 62.30 |
| Oil absorption (ml) | 125 | 142 | 146 |
| Frying time (min) | 4.00 | 4.15 | 4.00 |
| Frying temp (0C) | 170 | 170 | 170 |
| Final wt (g) | 410 | 420 | 426 |

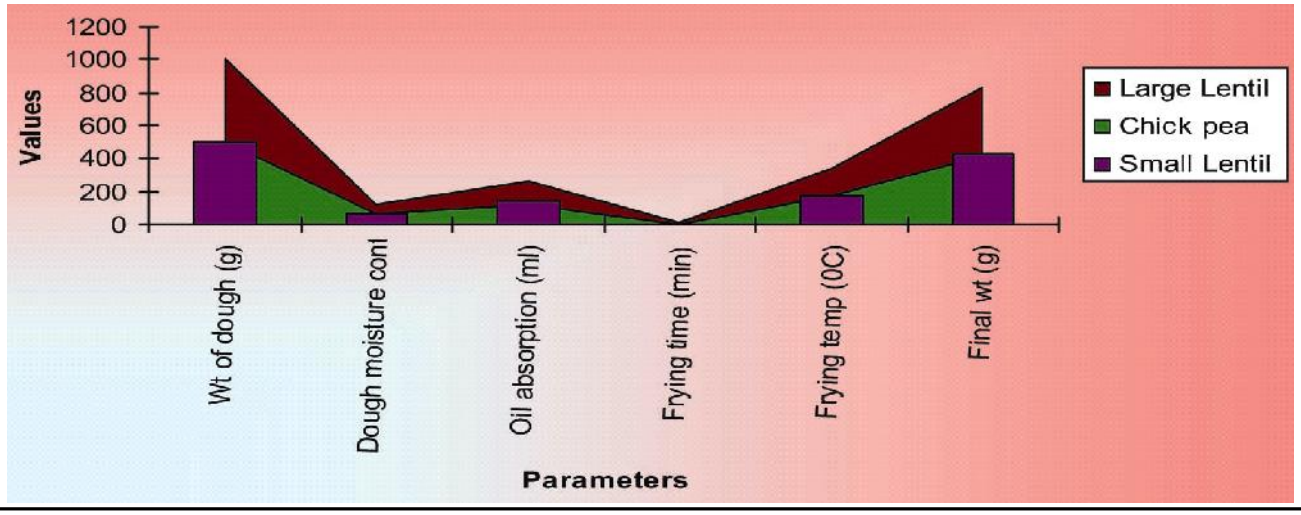


**Fig. 1 : Cooking parameters of lentil bhoondhi**

**Table 2 : Physical and chemical parameters of Lentil Bhoondhi**

| Parameters | Chick pea | Large Lentil | Small Lentil |
|---|---|---|---|
| Water Activity (aw) | 0.59 | 0.52 | 0.57 |
| Moisture content (%) | 5.40 | 5.20 | 5.40 |
| pH | 6.70 | 6.20 | 6.50 |
| Peroxide value (meq) | 1.18 | 1.09 | 1.22 |

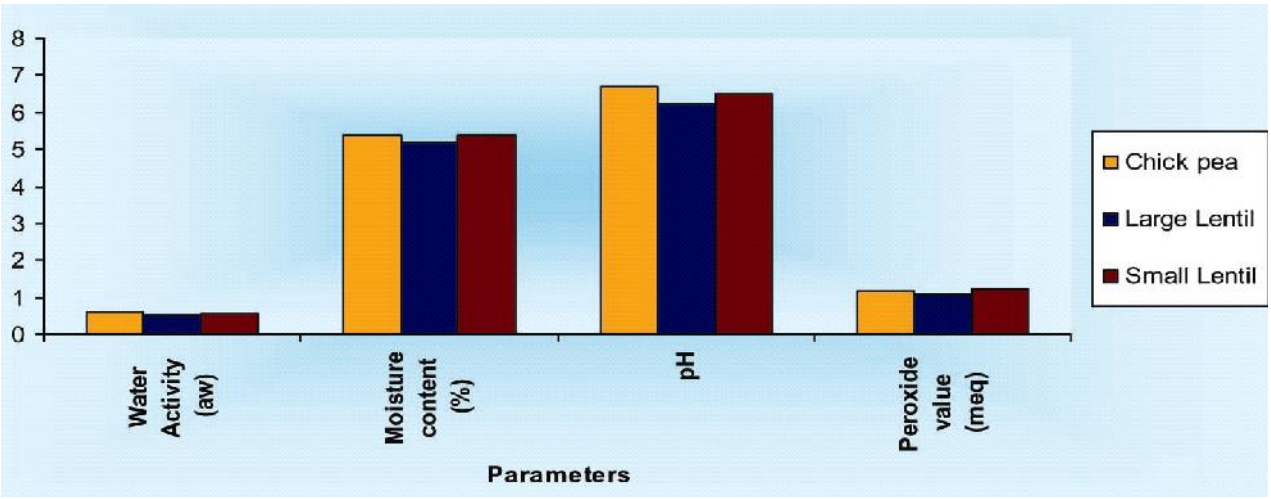


**Fig. 2 : Physical and chemical parameters of bhoondhi**

slightly increasing compared to native pulse bhoondhi.

A similar reduction was observed nutrients in the lentil flour bhoondhi compared to chick pea flour bhoondhi.

The changes noted in the sensory evaluation of bhoondhi prepared from chickpea flour and lentil flour. A slightly increased for chick pea flour bhoondhi. Lower

**Table 3 : Nutrient composition of Lentil Boondhi**

| Parameters | Chick pea | Large Lentil | Small Lentil |
|---|---|---|---|
| Carbohydrate (%) | 24.00 | 23.00 | 23.50 |
| Protein (%) | 9.70 | 10.10 | 9.60 |
| Fat (%) | 50.10 | 48.03 | 50.77 |
| Calcium (mg/100g) | 22.35 | 13.65 | 12.90 |
| Iron (mg/100g) | 4.40 | 3.26 | 2.93 |
| Phosphorus (mg/100g) | 249.60 | 264.47 | 187.34 |

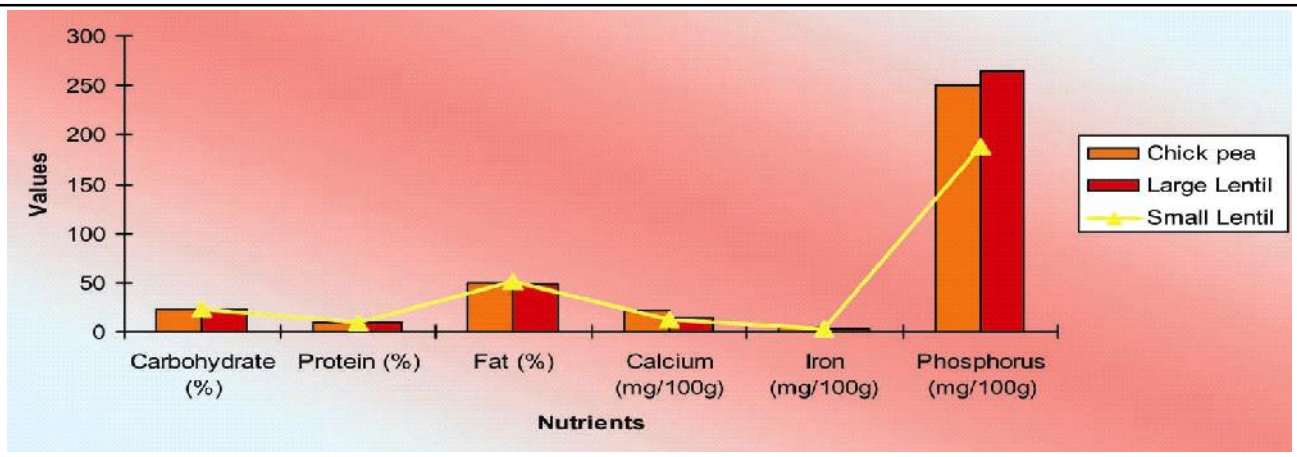


**Fig. 3 : Nutrient composition of bhoondhi**

**Table 4 : Sensory evaluation of Lentil Boondhi**

| Parameters | Chick pea | Large Lentil | Small Lentil |
|---|---|---|---|
| Colour and appearance | 7.90 | 7.80 | 7.60 |
| Flavour | 7.80 | 6.70 | 7.70 |
| Texture | 7.80 | 7.20 | 7.40 |
| Taste | 8.40 | 7.40 | 7.40 |
| Overall acceptability | 8.00 | 7.20 | 7.40 |

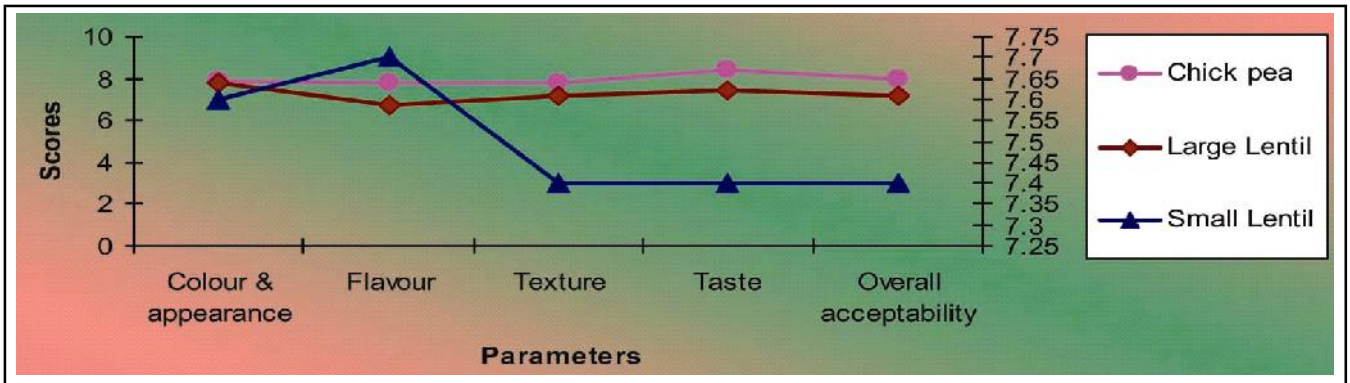


**Fig. 4 : Sensory evaluation of bhoondhi**

score for small lentil bhoondhi for compared to chick pea flour bhoondhi.

**Conclusion:**

Frying studies on bhoondhi were carried out to optimize the parameters for boondhi preparation. The quality parameters such as colour, moisture content, water activity, nutrients and sensory score were considered for the optimization. A slightly variation for the bhoondhi formed with frying time of 4.5min, temperature 170$^0$C, batter having 61-64 % of moisture were crispy with acceptable colour and overall quality.

## REFERENCES

AOAC (1995). Official methods of analysis. 16th edn. Association of Official Analytical Chemist, Washington DC

Bhat, K.K. and Bhattacharya, S. (2001). Deep fat frying characteristics of chick pea flour suspension. *Inernat. J. Food Sci . Technol.,* **36** : 499-507.

Blumenthal, M.M. (1991). A new look at the chemistry and physics of deep fat frying. *Food Technol.,* **45** (2):68-71, 94

Blumenthal, M.M. and Stier, R.F. (1991). Optimizaion of deep fat frying operation. *Tr. Food Sci. Technol.,* **6**: 144-148.

Mahadeviah, B., Kumar, K.R. and Anandaswamy, B. (1979). Storage behaviour of Kharabhoondhi. *Indian Food Packer,* **33** (3): 23-27.

Montogomery, D.C. (1997). Introduction to statsical quality control. 3rd edn. John Wiley and Sons, Newyork. P 512-572

Priya, R., Singhal, R.S. and Kulkarni, P.R. (1996). Carboxymethyl cellulose as additives in reduction of oil content in batter based deep fried boondis. *Carbohyd. Polym.,* **29** : 333-335

Ramesh, A. (2004). Machinery and equipment for traditional fods. *Indian Food Ind.,* **23**(6): 14-16

Semwal, A.D., Sharma, G.K., Khan, M.A., Roopa, N., Srihari, K.A. and Bawa, A.S. (2005). Keeping quality of fried boondhi. *J. Food Sci. Technol.,* **42**:285-287.

Singh, R.P. (1995). Heat and mass transfer in foods during deep far farying. *Food Technol.,* **49**(4): 134-137.

Venkateshmurthy, K. and Jayaprakashan, S.G. (2005). Boondhi forming machine. Patent No NF 139/2007.

Venkatesh Murthy, K., Umesh Hebber, H., Chetan, R. and Raghavarao, K.S.M.S. (2008). Optimization of process parameters for boondhi preparation. J.*Food Sci. Technol.*, **45**(2): 123-126.

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