Heat Treated Flour
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Abstract

Technology of heat treated whole wheat flour production is presented here that discusses:

- science behind it
- the technology
- factors affecting the process
- product quality
- benefits
Introduction

- Starch damage enhance the water absorption capacity of the starch, along with the taste and aroma
- This can be achieved by means of an additional operation called Roasting, due to that the bulk density decreases (*Bulk density is a measure of mass per unit volume*)
- Starch damaged flour addition makes the breads softer and sweet since starch damage results in aqueous extractability and rapid susceptibility to enzymatic digestion
Science

• Starch is composed of two major components:

1. **Amylase**
2. **Amylopectin**
Science

- **Amylase** has linear chain of all glucose linkages
Science

- Where as **Amylopectin** has bush like branched structure
Science

• Upon heating the wheat, amylase activates & fractionates, the branches make **Amylopectin** a linear chain starch such as **Amylase**

• **Amylase** enzymes find use in bread making & to break down complex sugars or starch that is present in flour into simple sugars

• Yeast then feeds on these simple sugars resulting in imparting flavour & causes the bread to rise
Technology

- Raw wheat is soaked in water in HDPE bags for 4-5 hours to raise moisture level to 32%.
- After draining water, wheat is dumped in cavity from where it is elevated through bucket elevator with final moisture of 26-27%.
Technology

Soaked Wheat Draining
Technology

- Wet wheat is then dried in a process by passing it through a roaster with sodium sulfate (at a ratio of 1:20) at 200°C for 45 seconds.
- Sodium sulfate is separated & recycled back in the roaster whereas the roasted wheat is collected.

Note:
Sodium sulfate is widely used as an inert drying agent in laboratories in order to remove traces of water from organic solutions & the same concept is applied in this process.
Roasted Wheat Coming out from the Roaster
Factors that affect the Process

- Feed rate of wheat
- Moisture of wheat before roasting
- RPM of rotating shaft of drum roaster
- Temperature of roasting
Expected Product Quality

- **Grain colour:** yellow to light brown
- **Grain harness:** bite quality
- **Moisture:** 7%
- **Starch damage:** 68% min
Benefits

- “Starch damaged roasted wheat” is then milled (in a pin, hammer or stone mill) & resultant flour is blended with whole ground flour from a commercial mill at different ratios to achieve premium quality product that will produce softer breads with higher water absorption & better aroma.
Availability

- A roster like this with an output of half TPH can be fabricated within $150,000

Recommendation

- Recommended to use only white wheat as the colour becomes slightly dark during roasting process