



**KERONE**



The University of  
Nottingham

**NSIC - CRISIL**  
Rated Company



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ISO 9001: 2008 COMPANY  
AFFILIATED TO THE UNIVERSITY OF NOTTINGHAM  
MEMBER OF AMICAL

**DATE: 20/07/2017**

**CLIENT:** MTR

**PROCESS:** 1. Conveyorised microwave cooking and drying of steamed semolina and vermicelli.  
2. Conveyorised microwave cooking and drying of soaked basmati rice, four pulses, chickpeas and beans.

**REQUIRED:** Given food material should be cooked and dried completely without change in appearance.

**PROCEDURE:**

1. Both vermicelli and semolina were steamed for about 4-5 minutes and temperature was noted.
2. Basmati rice and four pulses soaked in water for 2 hours before taking trials and after straining from water temperature was noted.
3. Chickpeas and beans soaked overnight before taking trial and after straining from water temperature was noted.
4. Then arranged all material on a tray separately for process of conveyorised microwave heating and thickness of layer of material was noted.
5. Frequency of system was set on lowest value to get more microwave exposure in a single pass.
6. All observations are made with FLIR make thermal imaging camera MODEL-E30 and reports were generated after every pass.
7. Samples were started collected accordingly after achieving good result.

**TRIAL SETUP:**



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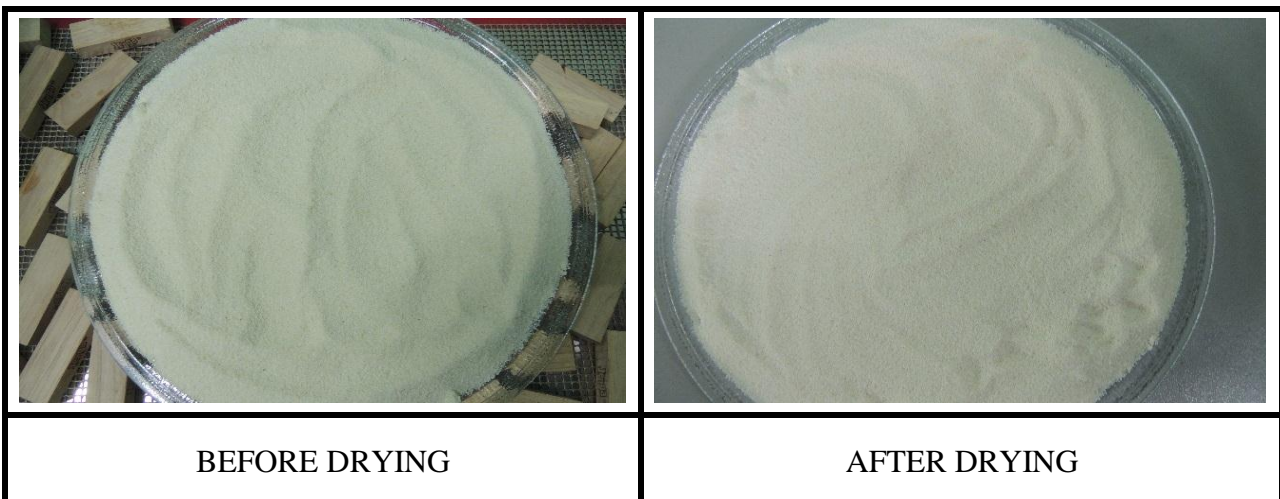
## **REPORTS GENERATED BY FLIR THERMAL IMAGING CAMERA MODEL E30:**



### **TRIAL PARAMETERS:**

1. Intensity: 85%
2. Frequency: 1 Hz
3. Heating cycle time in 1 pass: 11 minutes
4. Thickness of layer: 15 mm for vermicelli and semolina  
10 mm for rice, tour pulses, chickpeas and beans
5. Temperature of vermicelli and semolina after steaming: 75<sup>0</sup>C
6. Temperature of rice and tour pulses after soaking for 2 hours: 25<sup>0</sup>C
7. Temperature of chickpeas and beans after soaking overnight: 25<sup>0</sup>C
8. No. of passes: As per requirement of individual material

### **BEFORE AND AFTER PICTURES:**



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BEFORE DRYING



AFTER DRYING



BEFORE DRYING



AFTER DRYING



BEFORE DRYING



AFTER DRYING

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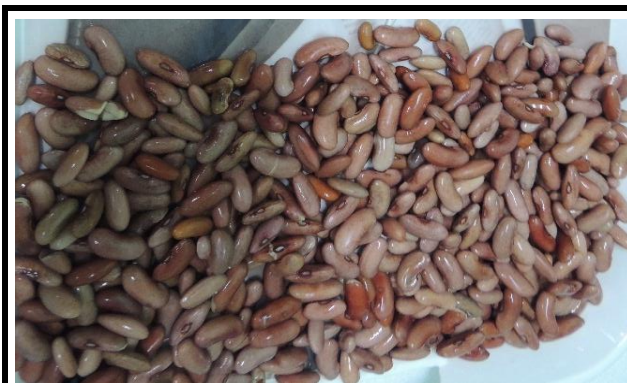
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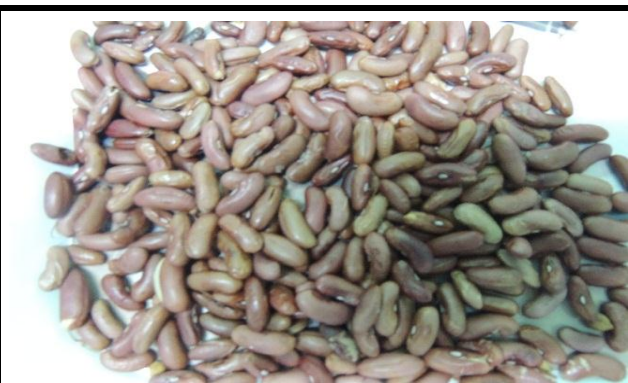
BEFORE DRYING



AFTER DRYING



BEFORE DRYING



AFTER DRYING

**OBSERVATIONS:**

1. Vermicelli and semolina are started drying after 2nd pass, so samples collecting started from 2nd pass and both of them passed in conveyor for 4 times.  
Both vermicelli and semolina are not showing any change in their appearance after drying as seen from above before and after pictures.
2. Rice started drying after 5th pass, so samples collecting started from 5th pass and it was passed in conveyor for 7 times.  
Rice started getting very little yellowish colour after drying.
3. Four pulses started drying after 8th pass, so samples collecting started from 8th pass and it was passed in conveyor for 9 times.  
The colour of four pulses got down to light yellowish from dark yellowish.
4. Chickpeas and beans started drying after 10th pass, so samples collecting started from 10th pass and both of them passed in conveyor for 11 times.  
Shrinking of skin of both beans and chickpeas was observed after drying, but there was no splitting of both the legumes.

**MISS. KOMAL BHOITE**  
**TESTING INCHARGE**

**MR. RAMESH SHINDE**  
**CHECKED BY**

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