

# THE INFLUENCE OF RADIOFREQUENCY TREATMENT ON THE TEXTURE PARAMETERS AND ON THE FUNGI DEVELOPMENT OF WHOLE WHEAT BREAD

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## INTRODUCTION

The conventional processing of products often requires a long heating time and those results in the degradation of food qualities, texture and nutritional values (Bhattacharya and Basak, 2017). The unconventional treatments such as microwave, radiofrequency, ultra high pressure etc., have been found to upgrade the processing by preserving the quality, texture and nutritional values. The efficacy of radiofrequency treatment on inhibition of moulds and the effects on the texture parameters (fermity, coesivity, elasticity and gumosity) in the case of the whole wheat bread were studied.

## MATERIALS & METHODS

### Bread support: Whole Wheat bread



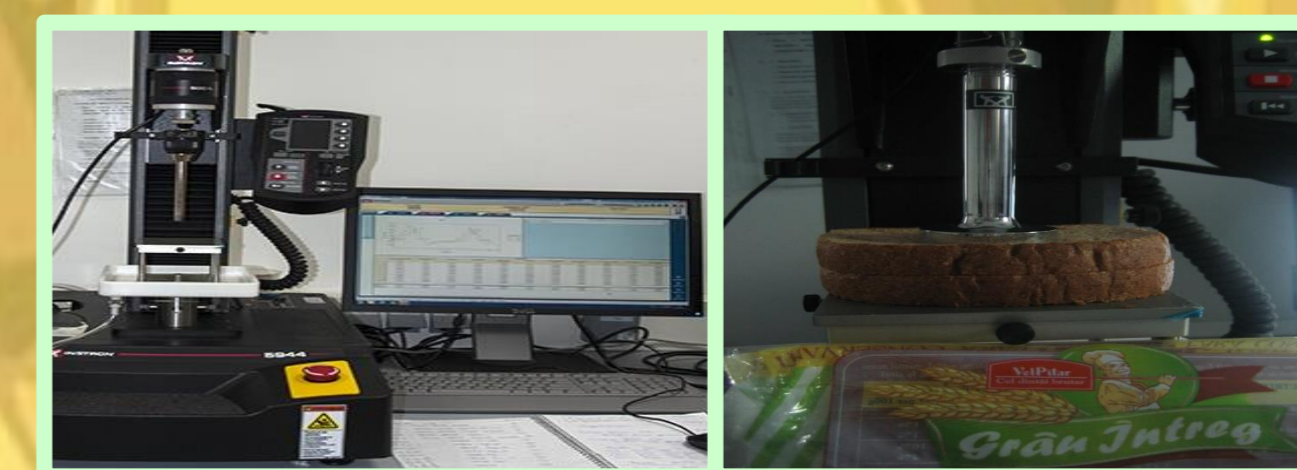
The samples were prepared by S.C. Vel Pitar S.R.L.

### RF treatment conditions



For RF treatment applying was used a 27.12 MHz RF Demonstrative laboratory model. The breads were packaged and heated at same temperature (75°C) applying RF treatment. Samples were incubated at 25°C and monitored for 10 days in order to establish the efficacy on the inhibition of fungi development.

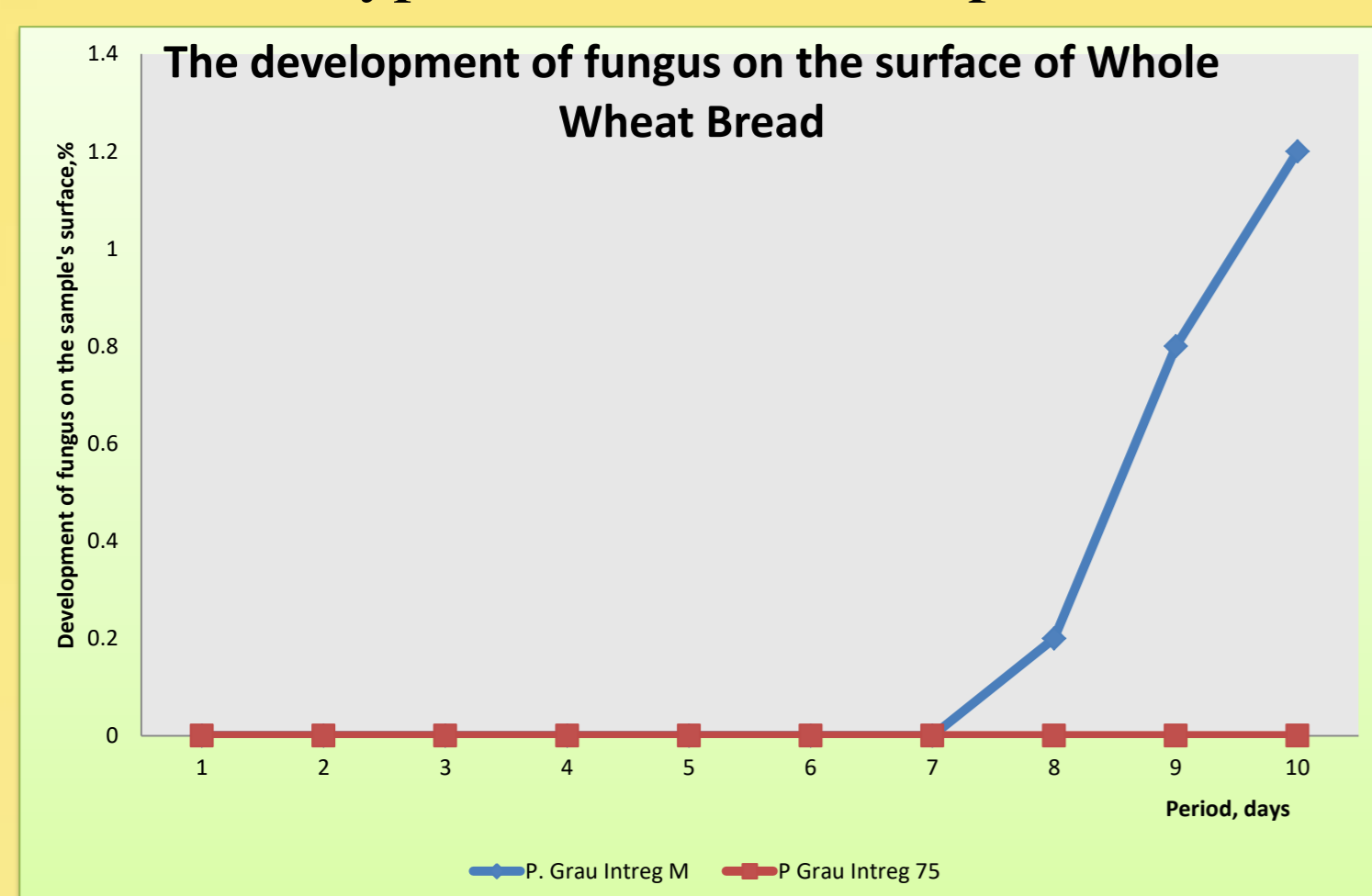
### Texture Analyzer Instron



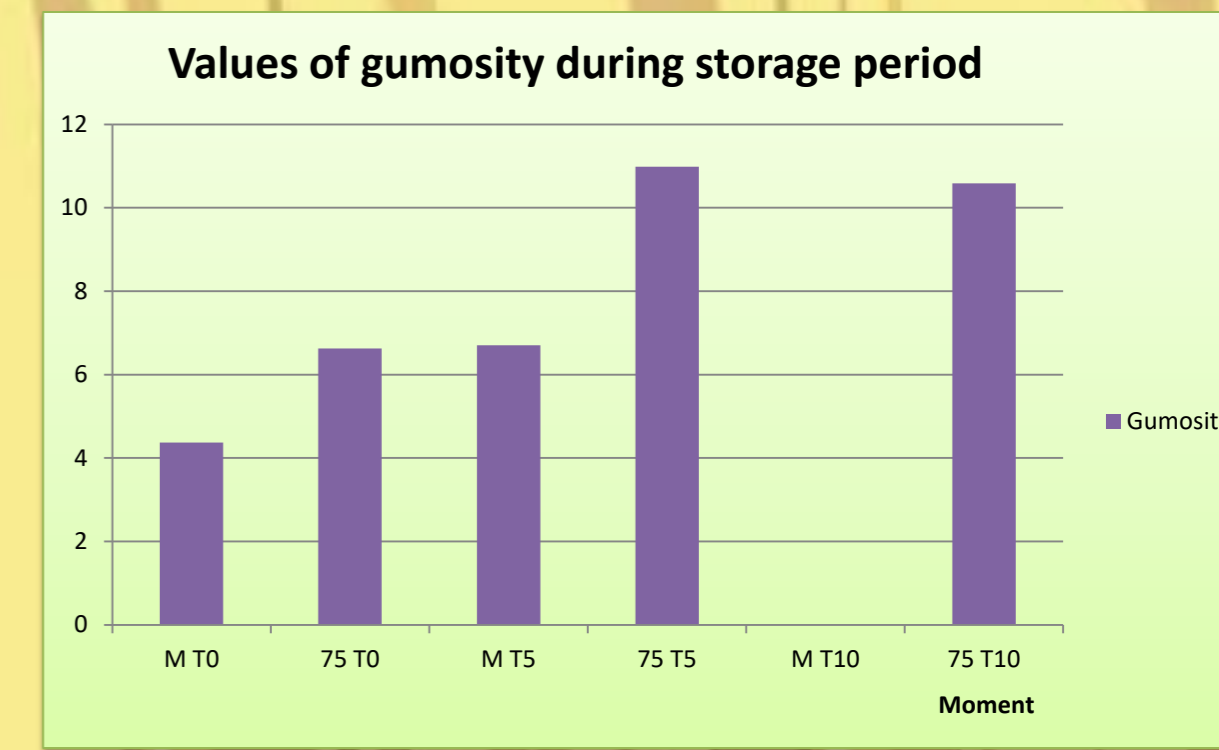
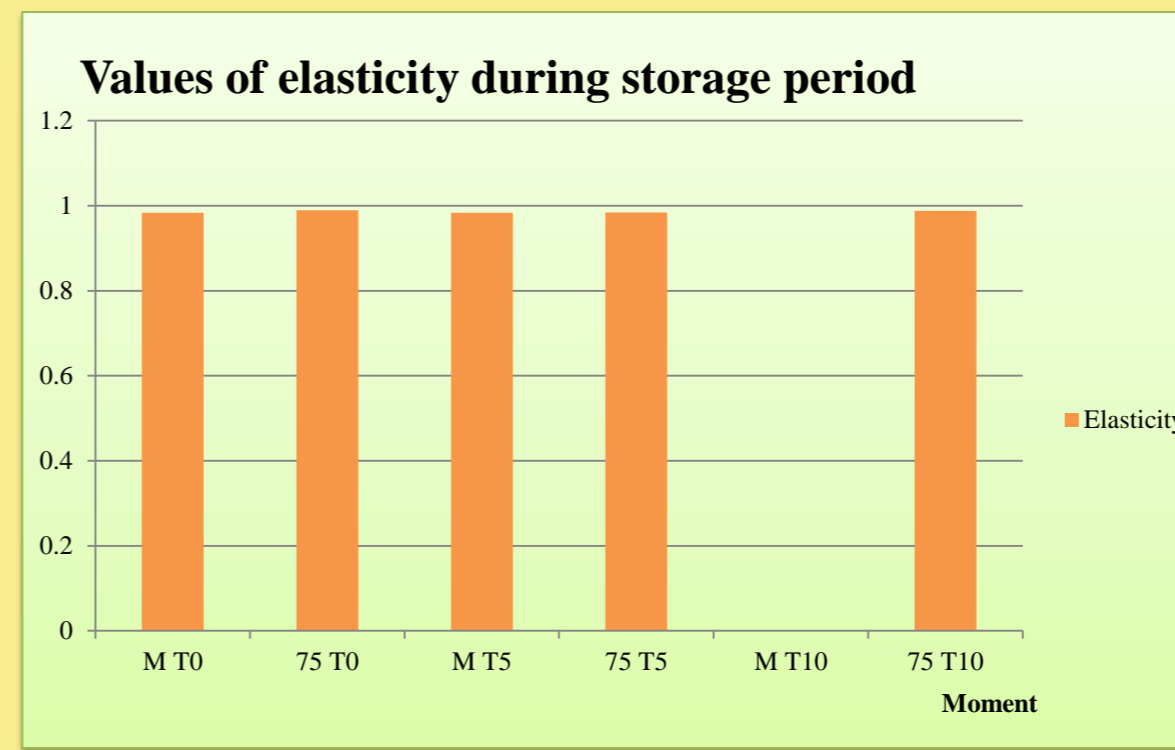
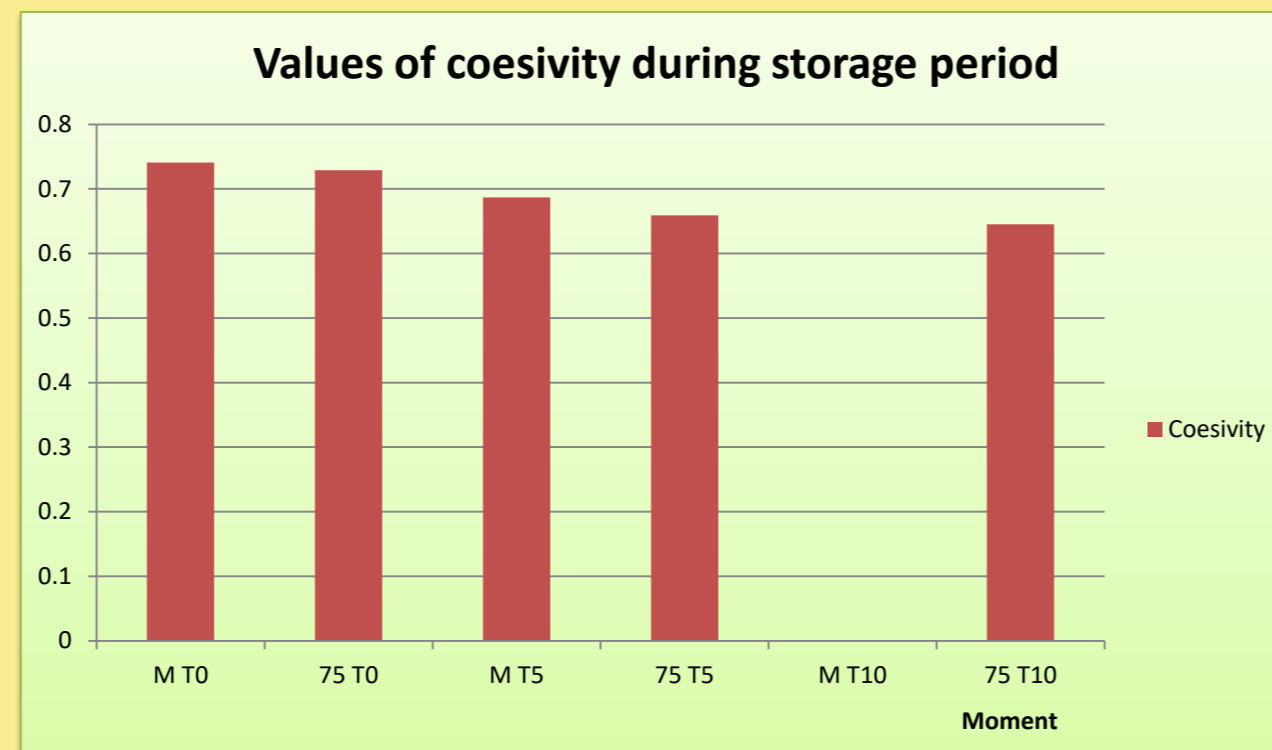
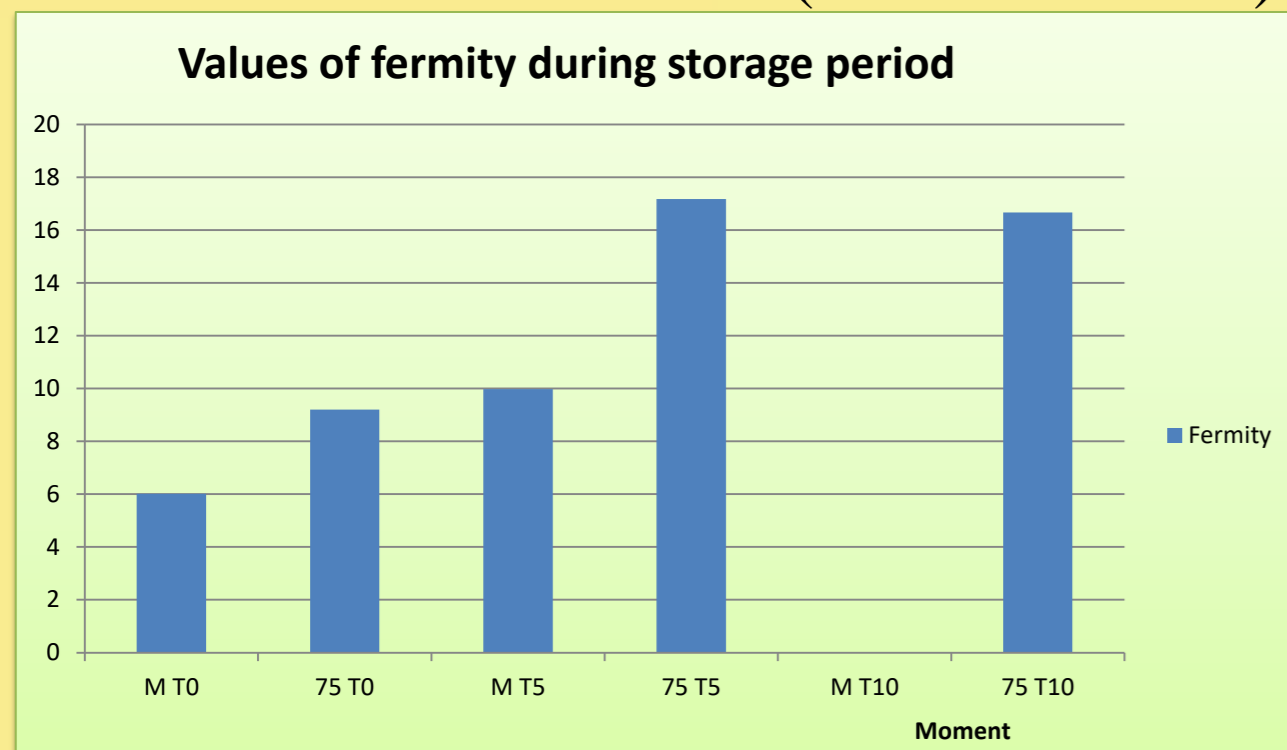
Texture properties of bread samples were measured with texture Analyzer Instron (model 5944, Illinois Tool Works Inc., USA), using a turntable compression diameter 40 mm at room temperature. With Bluehill 3.13, 4 texture parameters were calculated: fermity, elasticity, coesivity, gumosity.

## RESULTS & DISCUSSIONS

After the application of RF treatment on the studied samples, they were incubated at 25°C and monitored 10 days, in order to evaluate the fungi development on the selected type of bread. The samples were evaluated through visual estimation of the degree in which the bread surface is covered by fungal mycelium.



The texture parameters were monitored at three different moments: T0- initial moment (control and the RF treated samples at 75 0C), T5- after five days of storage at controlled conditions (control and the RF treated samples at 75 0C) and at T10- after ten days of storage at controlled conditions (RF treated samples at 75 0C). Texture properties of bread samples were measured with texture Analyzer Instron (model 5944, Illinois Tool Works Inc., USA) at the Institute of Food Bioresources Bucharest (INCDBA-IBA).



## CONCLUSIONS

In terms of preservation, the samples were monitored for 10 days. During this period, the samples were evaluated through visual estimation of the degree the bread slice surface was covered by fungal mycelium. The results represent the average of the fungi development on the bread slice surface (%) of the ten replicates for treatment temperature and type of bread. In the case of the treated samples it was observed that has no fungal development even after 10 days for the same treatment compared to the control samples which has a normal fungi development starting with 7 days.

In terms of the texture parameters it was observed that in the case of treated samples the fermity and the gumosity increased with the increase of the storage period (from the 9.002 at T0 to 18.463 at the moment T10 in the case of fermity and from 4.372 to 11.833 in the case of gumosity). The coesivity and the elasticity suffer minor changes during the storage period.

The results are promising and show that RF heating could be a good perspective for increasing shelf life of bread.

## ACKNOWLEDGEMENTS

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