Image Processing Analysis of Prevention for Mold Growth on Bread using Negative Ion Technology

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ABSTRACT
Recently, molds on bread can cause Diarrhoea, allergic reactions and respiratory problems. The molds like Aspergillus, Fusarium and Penicillium can produce "Mycotoxins" which is a poisonous substance that can damage the health qualities. Thus, the prevention of mold growth on bread by using negative ion technology is the best alternatives to break the disease. The effect of negative ions can be classified as the spatial distribution of charge particles, sheath structure and collaboration of ozone and negative air ions to prevent microorganism. In this paper, image processing has been used to analyse the image obtained from the bread after a week. Two experiments have been compared to keep track the effect of negative ions on prevention of mold growth on bread which are bread placed in boxes with direct current (DC) fan or without it. In set one, the mold percentages of bread that exposed to negative ions is 3.47% while the bread that does not expose to negative ions is 14.60%. Moreover, for the set two, the mold percentages of bread that exposed to negative ions is 1.18% while the bread that does not expose to negative ions is 14.18%. Set two have a lower percentage of mold as compare to set one due to the air ventilation of the experiment set up. Each of experiment has been analysed using color filtering processing and the result shows that negative ions were successfully in the prevention of mold growth on bread.

KEYWORDS:
Bread; Mold; Negative Ion; Colour Image Processing

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REFERENCES

1. W. Daniell, W.J. Camp, J. and S. Horstman.1991. “Trial of a negative ion generator device in remediating problems related to indoor air quality”. Journal of Occupational and Environmental Medicine, 33(6), pp.681-687

2. X. Yan, H. Wang, Z. Hou, S. Wang, D. Zhang, Q. Xu, and T. Tokola. 2015. “Spatial analysis of the ecological effects of negative air ions in urban vegetated areas: A case study in Maiji, China”. Urban Forestry & Urban Greening, 14(3), pp.636-645.

3. E. Campo, L. del Arco, L. Urtasun, R. Oria and A. Ferrer-Mairal. 2016. “Impact of sourdough on sensory properties and consumers' preference of gluten-free breads enriched with teff flour”. Journal of Cereal Science. 67, pp.75-82

4. O. Grillo, V. Rizzo, R. Saccone, B. Fallico, A. Mazzaglia, G. Venora and G. Muratore 2014. “Use of image analysis to evaluate the shelf life of bakery products”. Food research international, 62, pp.514-522.

5. A. Wishkerman, A. Boglino, M.J. Darias, K. B. Andree, A. Estévez and E. Gisbert. 2016. “Image analysis-based classification of pigmentation patterns in fish: A case study of pseudo-albinism in Senegalese sole”. Aquaculture, 464, pp.303-308.