Accepted Manuscript

Use of Near-Infrared hyperspectral images to identify moldy peanuts

Jinbao Jiang, Xiaojun Qiao, Ruyan He

PII: S0260-8774(15)00411-2

DOI: 10.1016/j.jfoodeng.2015.09.013

Reference: JFOE 8327

To appear in: *Journal of Food Engineering*

Received Date: 23 April 2015

Revised Date: 9 September 2015

Accepted Date: 11 September 2015

Please cite this article as: Jiang, J., Qiao, X., He, R., Use of Near-Infrared hyperspectral images to identify moldy peanuts, Journal of Food Engineering (2015), doi: 10.1016/j.jfoodeng.2015.09.013.

Use of Near-Infrared hyperspectral images to identify moldy peanuts

Jinbao Jiang *, Xiaojun Qiao, Ruyan He

*：Corresponding Author：ahdsjjb@126.com

(College of Geosciences and Surveying Engineering, China University of Mining and Technology, Beijing, 100083, China)

Abstract：The fungi or moldy peanuts have high possibility containing the potent carcinogen. And the risk of human ingesting toxic carcinogen from the moldy peanuts can be reduced if the moldy peanuts can be efficiently identified and separated from healthy ones before entering the food chain. The object of this study mainly focuses on how to identify the moldy peanuts by using Near-Infrared (NIR) hyperspectral images. NIR hyperspectral images were acquired at the wavelength range between 970-2570 nm. The method of Principle Component Analysis (PCA) was mainly used in the spectral dimension to select sensitive bands, and to project the spectral vector in the direction that is favorable to identify the moldy information. Meanwhile, the marker-controlled watershed algorithm was adopted to segment the images into kernel-scale objects in spatial dimensions. Finally, the results both from PCA and segmentation were combined to judge whether the peanut kernels were moldy or not via the thresholds. The results illustrated the proposed method could be better used to identify the moldy kernels with accuracy of 87.14% in learning image and accuracy of 98.73% in validation image.

Keyword：NIR hyperspectral image; moldy peanut; PCA; image segmentation; identification

1. Introduction

Peanut reached a worldwide production of 41.16 thousand tons in 2013-2014 (USDA, 2015). And it mainly used for peanut oil, peanut butter and so on. It is well-known that during growth and storage, the peanut is prone to become contaminated with aflatoxin, which is a potent carcinogen and toxic chemical produced from