

## NIR - Diode Array

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## Analysis of Potato Chips Using the DA 7250 NIR Analyzer

### Introduction

Potato chips are a widely popular snack. Moisture, fat, seasoning content and colour are important

qualities to measure during processing and on the final products.

The Near Infrared Spectroscopy (NIR) technique is particularly suited for snack product analysis, but past instrument limitations have not allowed users to reap the full benefits of the technology. Filter technology instruments do not offer the required accuracy and are not able to measure complex parameters like seasoning content.

### DA 7250 NIR Analyzer

The DA 7250 is a proven, full-spectrum NIR instrument designed for use in the food industry. Using novel diode array technology, it performs a multi-component analysis in less than ten seconds.

During this time a large number of full spectra are collected and averaged. The analysis of full spectra makes it possible to determine complex parameters and to analyze different potato chips types without recalibration.

The DA 7250 is IP65 rated and available in a sanitary design version, making it suitable for use in the lab as well as in production environments.



## Method

More than 3,000 samples of potato chips from multiple processing plants were measured on the DA 7250 as well as on the on-line version, the DA 7440. Some samples were analyzed ground, whereas others were analyzed whole or lightly crushed.



The samples were also analyzed by reference methods for moisture, fat, seasonings and colour grading. Seasoning was analyzed as salt using the silver nitrate titration method. Calibration models for these parameters were developed using Artificial Neural network (ANN) and Honigs Regression™ (HR) methods. HR is a Perten proprietary algorithm which is ideal for situations where large product variations need to be covered by one calibration model, with maintained accuracy.

## Results and Discussion

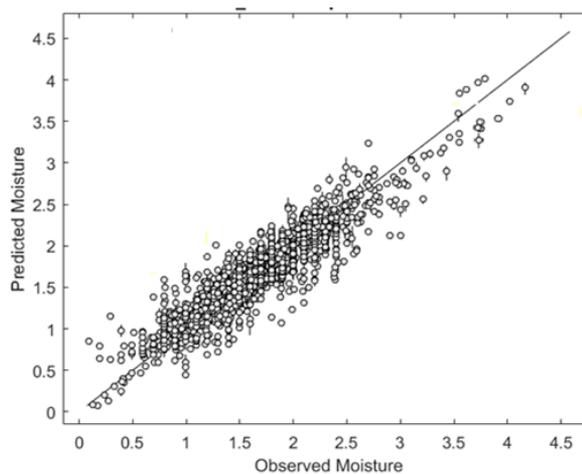
The DA 7250 results are very accurate when compared to the results from the reference methods. Statistics for the respective parameters are presented in the table below and graphs are displayed on the right.

Table 1. Statistics of developed calibrations

Parameter	N	Range	R
Moisture %	3600+	0.1 – 4.5	0.92
Fat % asis	2600+	17.9 – 43.5	0.95
Seasoning (Salt) % asis	1400+	0.7 – 2.88	0.88
Colour L	400+	60.8 – 74.2	0.83

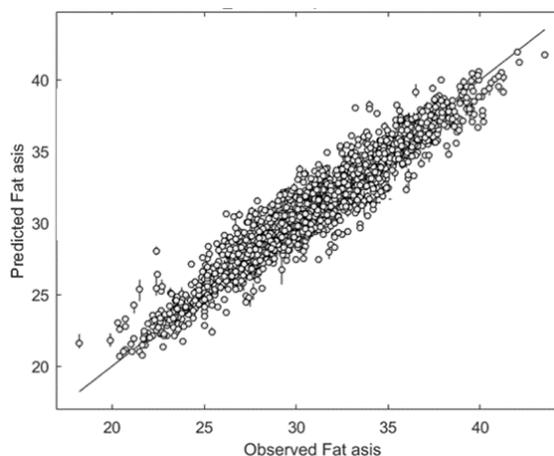
The differences between the DA 7250 and the reference method are of the same magnitude as typical differences between two different reference labs.

In summary it is concluded that the DA 7250 can analyze potato chips for moisture, fat and seasoning content as well as colour in less than ten seconds. The same calibrations can also be used in the DA 7440 Online NIR for continuous process measurements.



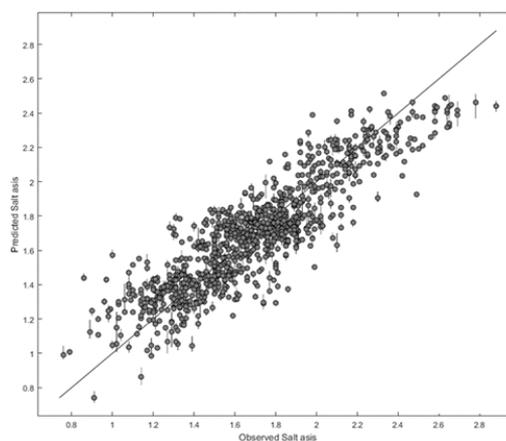
### Moisture

Proper moisture levels affect the profitability of production as well as product characteristics. The DA 7250 can accurately determine moisture using one combined NIR calibration for multiple products, without need for regular product specific adjustments.



### Fat

Fat is accurately and readily measured across a wide range of values. With the DA 7250 the fat content can be monitored in production and ensure produced potato chips is within specification.



### Seasoning (salt)

Amount of salt added as seasoning affect taste and is a common cause of costly product waste. The DA 7250 can determine seasoning added with high accuracy and be used as a control tool to reduce waste and customer claims.

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