

Reliable Isolation of DNA from Complex Food Matrices Using Omega Bio-tek's E.Z.N.A.[®] Food DNA Kit

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Introduction

Food DNA testing is essential to assess quality, safety, and authenticity of the food for regulatory compliance, accurate labeling, and public interest. The first crucial step in the food DNA testing workflow is the extraction of high quality DNA. Omega Bio-tek's E.Z.N.A.[®] Food DNA Kit offers a rapid and reliable isolation of high quality DNA from a range of food products including milk, cereals, chocolate, meat, cheese, processed foods, etc. Omega Bio-tek's proprietary lysis buffer system allows for efficient homogenization of samples without foaming, often seen in other lysis buffers containing detergents. The subsequent binding and washing buffers efficiently eliminate PCR-inhibiting compounds within the samples. The Omega protocol involves no organic extractions and the uniquely formulated buffer system creates optimal conditions for DNA to bind to the HiBind[®] silica matrix of the spin columns, resulting in higher yields. Extracted DNA is typically analyzed by quantitative PCR (qPCR) or next-generation sequencing for a variety of testing scenarios, like genetically modified organism (GMO) screening, pathogen detection, microbial contamination detection, species identification in meat products, etc. In this technical article, we validate the use of our food DNA kit with foods like cheese, chocolate, and even processed foods like Doritos and compare its performance against a similar product from Company M. The DNA yields and the results of qPCR testing on the DNA purified from these foods using both the kits are compared and reported.

Materials & Methods

DNA from 200 mg each of Doritos, cheese, and chocolate was extracted in duplicate using the E.Z.N.A.[®] Food DNA Kit (D4616) following the host/GMO DNA protocol and Company M's protocol, following manufacturer's instructions. The purified DNA was eluted in 100 μ L and was quantified using Promega's QuantiFluor[®] dsDNA system. qPCR was performed on 2 μ L of 10X diluted DNA to test the suitability of the extracted DNA for downstream applications. Agilent's Brilliant III 2X SYBR[®] mix and primers specific for food matrices tested (maize-specific primers for Doritos, bovine-specific primers for cheese, and cacao-specific primers for chocolate) were used following a standard amplification protocol on the ABI 7900.

Results & Discussion

The average DNA yield from Doritos, cheese, and chocolate

samples extracted using kits from Omega Bio-tek and Company M are shown in Figure 1. The yields using Omega Bio-tek and Company M's kits were 1.6 μ g and 0.34 μ g for Doritos, and 2.4 μ g and 0.92 μ g for cheese, respectively. Omega Bio-tek's kit yielded significantly more DNA from Doritos and cheese

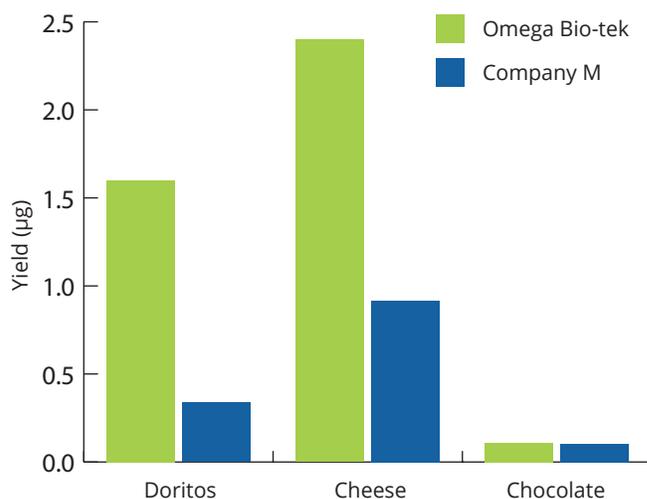


Figure 1. Average yield from 200 mg of samples extracted using manufacturer's recommended protocols. DNA was eluted in 100 μ L and quantified by fluorescent nucleic acid stain-based method.

when compared to Company M. For chocolate, the results were comparable. Figure 2 shows the qPCR analysis with the average C_t values of the 10X dilution of the purified DNA from Doritos, cheese and chocolate using the E.Z.N.A.[®] Food DNA Kit and Company M's kit. The C_t value observed was \sim 2 cycles lower for Doritos and \sim 1 cycle lower for cheese using Omega Bio-tek's kit when compared to Company M's. The C_t values were comparable for chocolate. Expectedly, we see lower C_t s with Omega kits with Doritos and cheese because of their higher yields compared to the Company M kit.

Conclusions

Omega Bio-tek has introduced a new kit into the food DNA realm capable of extracting DNA from complex food matrices with high yields and devoid of PCR inhibitors. The extracted DNA is suitable for a variety of downstream applications like GMO identification, pathogen detection, and spoilage studies. The

higher yields obtained with Omega Bio-tek's kit can potentially increase the sensitivity of downstream applications.

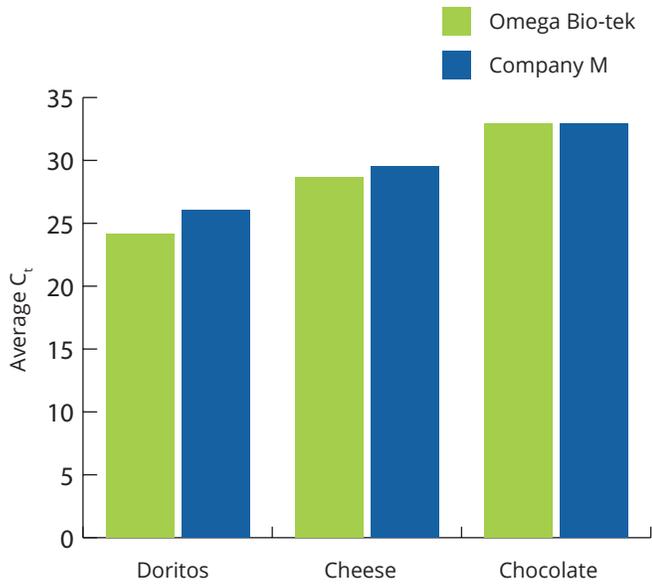


Figure 2. qPCR analysis on 10X diluted DNA extracts from various food matrices using kits from Omega Bio-tek and Company M.



Product Information

Description	Product No.	Preps
E.Z.N.A.® Food DNA Kit	D4616-00	5
	D4616-01	50