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Soybean DNA extraction from blended refined vegetable oils

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The major genetically modified (GM) crop species is soybean (*Glycine max*), accounting for 53% of the total world's GM planted area and 70% of the soybean annual production in 2008 [1]. Since the approval of Roundup Ready[®] (RR) soybean in EU, the production of soybean oil using GM seeds has been increasing. In EU, the doubts raised by the use of genetically modified organisms (GMO) lead to the mandatory labelling for food products containing more than 0.9% of authorised GMO. In blended edible oils prepared with mixtures of two or more different oils, it is important to verify the labelling statements concerning their constituents and the presence of GM material, since soybean oil is frequently used. The analysis of DNA coupled with polymerase chain reaction (PCR) has been the technique of choice to monitor the presence of GMO in food. However, it is very difficult to obtain amplifiable DNA from oil since most vegetable oils, like crude soybean oil, must be refined prior to its consumption.

In the present work, four methods were tested for their ability to extract DNA from 200 g of blended refined vegetable oils: the in-house prepared Wizard and CTAB methods and the commercial kits Wizard[®] Magnetic DNA purification system for food and Nucleospin[®], based on previous work testing several soybean food matrices [2]. The DNA extracts were evaluated for their amplifiability by PCR targeting the lectin gene as a marker for soybean and the RR event for the detection of GM material.

Results revealed that the Wizard[®] Magnetic kit and the Wizard method (the former after the pre-concentration step by centrifuging) did not allow amplifiable DNA. The CTAB method using the same pre-concentration step allowed the detection of DNA traces in some of the samples tested. The same amount of oil extracted with the Nucleospin[®] kit, enabled to obtain amplifiable soybean DNA from all tested samples labelled as containing soybean oil. These results were confirmed by real-time PCR allowing an estimation of the DNA content in these samples [3]. The results highlight the importance of the DNA extraction protocol and that the Nucleospin[®] food kit can be successfully used to produce amplifiable DNA from refined vegetable oils.

References:

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