Aflatoxin test: how to homogenize the sample for testing

Tested with

OV 625 Digital (Code F20900475) and **D20-S40C-P-R25C Dispersing tool** (Code A00000472)

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APPLICATION NOTE

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Introduction

Aflotoxins are microtoxins; they are produced by different types of molds typical of areas characterized by hot and humid climates. Aflotoxins have genotoxic and carcinogenic properties and for this reason their content in foods must be as low as possible. Typically, these toxins are found in food products such as peanuts, tree nuts, corn, rice, candied fruit, etc. as a result of contamination that can occur at different times during the collection cycle. Given the high toxicity of these toxins, the tolerable levels are extremely low, generally below 5ppb.

Aflatoxin B1, one of the most toxic of the aflatoxin family. It is extracted from the matrix by homogenizing the sample with a solution hydroalcoholic; a dilution of the extract is then carried out by adding a buffer solution a based-on phosphate salt (PBS). The purification is carried out by passage on a column immunoaffinity (IAC) containing specific antibodies for AFB1; the mycotoxin is then eluted with methanol and quantified by reversed-phase HPLC with spectrofluorimetric detection preceded by post-column derivatization. In this context, each sample must be very thoroughly ground and mixed thoroughly using a process that demonstrates complete homogenization is achieved.

Rotor/Stator working principle

The high-speed rotation of the rotor within the stator exerts a suction force, drawing liquid and solid materials towards the centre of the dispersing tool. The centrifugal force of the rotor allows larger particles to come into contact with the stator, resulting in a decrease in their size. The motion is continuous and constant throughout the mixing cycle and the new, smaller particles are ejected from the dispersing tool and new material is reintroduced maintaining the mixing cycle. The sample is thus subjected to a mechanical shear force which allows it to be homogenised, emulsified, suspended or rapidly disintegrated.

Experimental settings and analysis procedure

The procedure is to completely and efficiently homogenize the sample for analysis with the OV 625 Digital, for 5 minutes at 25,000 rpm.

For this application 300 gr of shell pistachios were used.

Image A

Image B

The images show:

A. The swirl created by the dispersing tool before adding the shelled pistachios.
B. The vortex after the addition of pistachio, which remains vigorous and it is possible to obtain a perfectly homogeneous final mixture

Conclusion

The OV 625 Digital enables to achieve excellent results in an extremely short time, avoiding the formation of phase agglomerates, and reducing current consumption and environmental noise, whilst ensuring high product quality, repeatability and ease of use.

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