UPTOSPEED Express Updates

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Tomato Quality Control:

Determination of pesticides present in tomatoes intended for consumption and processing using the QuEChERS procedure.

India is the second largest producer of Tomatoes with over 20 million tonnes per annum. A well known Indian saying is "No tomato, no cooking", however 99% of the tomatoes are currently consumed fresh as it is currently estimated that only about 150'000 Mt of tomatoes are processed annually. The Tomato ***(Solanum Lycopersicum)*** is a vital source of Vitamins A and C as well as carotenoids, lutein and lycopene, its consumption being linked among other things to, a lower risk of developing cancer and cardiovascular disease. Due to these positive properties, the tomato is consumed regularly in the Indian diet, which means, it must be produced on a large scale in the agriculture industry. To ensure this production, the plants must be treated with certain pesticides, since the tomato plant is very susceptible to the development of certain disease caused by fungi and bacteria such as Damping off, Septoria leafspot, Bacterial stem and fruit-canker, Early blight, Bacterial wilt, Leaf curl, Mosaic, Fusarium wilt, and tomato spotted with disease; that if occurred would damage and invalidate the harvest.

In most cases, the pesticides used during cultivation disappear due to the effect of external agents, such wind and rain. However, sometimes pesticides can be absorbed by the surface of the plant, remaining retained in the leaves and fruit, to later be ingested by the consumer. It is known that long-term exposure to pesticides has been linked to various acute and chronic human health problems, hence it is important to ensure that pesticides do not exceed the optimal limits in the final product of the production chain; process known as quality control.

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First step - Extraction by the "QuEChERS" method

The analysis of pesticide for tomato quality control consists of two steps: extraction of pesticides and detection. For the extraction, the most used method is the"QuEChERS" method, while for the detection method, GC-MS (Gas chromatography-mass spectrometry or LC-MS (Liquid chromatography-mass spectrometry) is used. This process requires a centrifuge that allows working with 15ml and 50ml samples, reaching an RCF of more than 3000xg such as the **ROTA 4R V/FM** (Refrigerated centrifuge). For this process, approximately 8-15g of homogenized sample is resuspended in 10-15ml of water in a 50ml conical centrifuge tube. Then 10-15ml of **ACN** (Acetonitrile) is added in which the organic solvent is used for the extraction. After shaking the tube, the "**QuEChERS''salts** which are composed of MgSO4, NaCI and citrate buffer, are added. The tube is shaken again and then centrifuged for 5 minutes at > 3000xg.

Second step - GC-MS or LC-MS analysis

As a result of this centrifugation, the components of the sample are separated into phases based on their density and their affinity to the different solutions of the mixture. Pesticides are concentrated in the upper phase, made up of ACN. Thus the next step consists of washing the sample, taking the ACN phase and transferring it to a 15ml tube containing dSPE (dispersive solid phase extraction).

The tube is centrifuged for 5 minutes at >3000xg, after which two phases form in the tube: a dSPE pellet containing the proteins, lipids and chlorophyll; and an ACN supernatant containing the pesticides. Finally, the supernatant is transferred to an appropriate vial for analysis by GC-MS or LC-MS.

Recommended Centrifuge:



Product – Rota 4R V/FM

ROTA 4R V/FM (Refrigerated Centrifuge)
PART NO : 100114

ROTOR : 6 X 50mL
(Fixed Angle Rotor including adapters)
PART NO : 200151

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Since the 1980's Scientiquipp (formerly known as Plasto Crafts) has been synonymous with customer-oriented processes and innovative products, such as laboratory devices. Today, we serve as experts and advisors, using our unique knowledge and experience to support laboratories and research institutions around India. The foundation of the company's expertise is its focus on its customers. Scientiquipp's exchange of ideas with its customers results in comprehensive solutions that in turn become industry standards. Scientiquipp will continue this path in the future, to the standard set by the company's founders: that of *enabling the future of medicine.*

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