AllerSnap® High-Sensitivity Allergen Prevention Test

Claim Support Summary

REF ALS-100

Introduction

AllerSnap® devices are rapid protein residue swab tests used to verify the cleanliness of food and other equipment surfaces. Any protein residue on the swab will reduce copper in the activated device, which forms a purple complex upon reacting with the chromogenic reagent bicinchoninic acid (BCA), turning the solution purple. The more contamination present on the swab, the quicker the color change and the darker the solution becomes. The test sensitivity of AllerSnap devices is as low as 3 µg of protein.

Food detection performance testing aims to observe whether the detection mechanism of a device can work successfully in a range of food matrices and if any problems occur. We investigated the performance of the AllerSnap devices in a range of 24 different food matrices at 37 °C, the temperature specified in AllerSnap instruction manual.

Equipment, Supplies and Reagents

- AllerSnap Devices (Product No. ALS-100)
- Filtered Stomacher Bags and Homogenizer
- Sterile Water
- Device Incubator (37 °C) (Product No. INCUBATOR or INCUBATOR2)
- The following food types: Banana, Beef Steak, Cheddar Cheese (medium), Chocolate, Coke, Cooked Chicken, Cottage Cheese, Cranberry Juice, Double Cream (40%), Margarine, Minced Beef, Orange Juice Fresh with Bits, Orange Juice UHT Smooth, Pineapple Juice, Processed Ham, Processed Pork Raw Sausages, Raw Chicken, Raw Eggs, Raw Fish, Shrimp, Soured Cream, UHT Whole Milk, Whole Milk and Yogurt.

Sample Preparation and Enrichment

Each food matrix (10 g) was placed into a filtered Stomacher bag with sterile water to make a 1:10 dilution and homogenized for up to 2 minutes, depending on the matrix's solidity. A dilution series of each food matrix was prepared in sterile water to give 10%, 1%, 0.1% and 0.01% suspensions.

Method

- Each matrix dilution and the sterile water negative control (10 µL each) were pipetted onto swabs of AllerSnap devices in triplicate, activated and then incubated at 37 °C.
- Device color changes were observed and graded at 10, 20, 30 and 60 minutes post-activation according to Table 1 and the colored label on the device (Figure 1).

Table 1. AllerSnap Results Interpretation.

Value	Color	PASS/FAIL
1	Light Green	PASS
2	Grey/Light Purple	FAIL
3	Light Purple	FAIL
4	Dark Purple	FAIL

Figure 1. AllerSnap Device with Example Colors for the Results Interpretation on the Label.

Results and Discussion

The fastest time-to-detection across the 24 food matrices occurred at the 10% matrix level, with most devices turning positive within the allocated timeframe (30 minutes at 37°C) (Table 2). The two matrices that never turned positive were Coke and Margarine, both of which have estimated protein compositions at or below 0.5%.

At the 1% matrix dilution level, 10 of 24 matrices did not turn positive, and most matrices that did not turn positive had estimated protein compositions at or below 5%.

Table 2. A Summary of the Average Time-to-Detection Results Observed for AllerSnap Devices Loaded with 24 Different Food Matrices at 0.1%, 1% and 10% Dilutions.

Matrix	Estimated Protein Composition (%)	Detection Time in Minutes at 37 °C*		
		0.1% Matrix	1% Matrix	10% Matrix
Banana	1.1	—	10	10
Beef Steak	25	—	—	10
Cheddar Cheese (Medium)	25	—	10	10
Chocolate	4.9	—	60	10
Coke	0.5	—	—	—
Cooked Chicken	31	30	10	10
Cottage Cheese	11	—	10	10
Cranberry Juice	0.4	—	—	10
Double Cream (40%)	1.5	—	60	10
Margarine	0.2	—	—	—
Minced Beef	14	—	10	10
Orange Juice Fresh with Bits	2	—	60	10
Orange Juice UHT Smooth	0.6	—	60	10
Pineapple Juice	0.5	—	30	10
Processed Ham	18.7	—	20	10
Processed Pork Raw Sausages	27	20	10	10
Raw Chicken	22.5	—	20	10
Raw Eggs	13	—	10	10
Raw Fish	23	—	10	10
Shrimp	24	—	20	10
Soured Cream	2.1	—	60	10
UHT Whole Milk	3	—	20	10
Whole Milk	8	—	20	10
Yogurt	5.1	—	10	10

* The estimated protein content for each matrix is displayed. Negative results are highlighted in green cells as either — (never turned positive) or a time-to-detection outside the allocated timeframe (30 minutes at 37 °C). Gray cells represent devices that turned positive just after the allocated incubation timeframe. Purple cells represent devices that turned positive within the allocated timeframe. The numbers in the colored cells are the time-to-detection values.

At the 0.1% matrix dilution level, most devices never turned positive or did so outside the allocated timeframe. The notable exceptions were Beef Steak, Minced Beef and Processed Pork Raw Sausages, which all have relatively high estimated protein compositions (over 14%).

As no positive results were observed at the 0.01% dilution level for any food matrices or for any negative controls, these results were not included in Table 2.

Conclusions

As expected, time-to-detection was consistently faster when the matrix percentage was higher and when the matrix protein composition was higher. At the 1% and 10% matrix levels, positive results were observed for most matrices within the allocated timeframe. However, the devices struggled to detect matrices at dilutions below 1%.

Some variability is expected when differentiating between matrices with low and high protein compositions, as protein accessibility and the specific amino acid residues present can influence the AllerSnap detection mechanism; however, no significant problems were observed. The matrices that were not detected at any dilution level had very low estimated protein content, whereas those detected at the 0.1% matrix level had high estimated protein content, demonstrating that AllerSnap devices successfully differentiated between matrix types based on their protein composition.

Overall, as most of the tested food matrices were detected by devices at the 1% and 10% dilution levels, users can be assured that protein residue detection is accurate and reliable with AllerSnap devices.