

GlutenTox® Sticks Plus | KIT3005

Background

A large variety of samples from different matrices and nature (food, drinks, oral hygiene products, heat-processed foods, species, additives, medicines) were tested with GlutenTox® Sticks Plus according to kit insert and compared with ELISA Sandwich method.

Results were divided according to the type of sample (Tables 1-6), spiked samples (Table 7), samples containing polyphenols (Table 8), surface (Table 9), and medicine (Table 10).

Samples containing polyphenols (Table 8), were analyzed with GlutenTox® Sticks Plus in combination with the Polyphenol Pack (KIT3008) to maximize gluten extraction. The results were compared to those obtained with GlutenTox® ELISA Sandwich Rapid G12.

Results

Table 1. Results in ppm of gluten of beverages or liquid food

Sample	Brand	GlutenTox® Sticks Plus	ELISA Sandwich R5
Oat drink	Oatly	> 20 ppm	20.3 ppm
Spelt drink	Soria Natural	> 20 ppm	91.4 ppm
Orange juice	Zumosol Pascual	< 3 ppm	< 3 ppm
Soy sauce	Kikkoman	< 3 ppm	< 3 ppm
Beer	Daura	< 3 ppm	< 3 ppm
Beer with lemon	Shandy Cruzcampo	< 3 ppm	< 3 ppm
Vegetable cream	Ligeresa Knorr	< 3 ppm	< 3 ppm

Table 2. Results in ppm of gluten of solid and creamy foods

Sample	Brand	GlutenTox® Sticks Plus	ELISA Sandwich R5
Soy cheese (Quefu)	Soria Natural	< 3 ppm	< 3 ppm
Pre-cooked corn semolina	Santiveri	< 3 ppm	< 3 ppm
Spelt crackers with onions	Soria Natural	> 20 ppm	64.0 ppm
Mashed tomato	Apis	< 3 ppm	< 3 ppm
Peanut butter	Capitán Maní	< 3 ppm	< 3 ppm
Toast	Special Line	< 3 ppm	< 3 ppm
Rice macaroni	Beiker	< 3 ppm	< 3 ppm
Meatballs with sauce and peas	Hero	> 20 ppm	78.8 ppm
Ravioli with eggs and meat	Hero	> 20 ppm	77.0 ppm

Table 2. Results in ppm of gluten of solid and creamy foods (continued)

Sample	Brand	GlutenTox® Sticks Plus	ELISA Sandwich R5
Maria cookies	n/a	< 3 ppm	< 3 ppm
Flavored yogurts	Hacendado	< 3 ppm	< 3 ppm
Brown rice pasta	n/a	> 20ppm	40.0 ppm
Chicken nuggets	n/a	> 20 ppm	151.7 ppm
Rolled oats	n/a	> 20 ppm	111.9 ppm
Honey pops (corn with honey)	Kellogg's	> 20 ppm	27 ppm
Rice krispies (rice flakes)	Kellogg's	< 3 ppm	< 3 ppm
Corn flakes	Kellogg's	> 20 ppm	141 ppm
Corn snack	Matarile (RISI)	> 20 ppm	64.7 ppm
Sautéed vegetables	n/a	< 20 ppm	9.6 ppm

Table 3. Results in ppm of gluten of powdered foods/flours

Sample	Brand	GlutenTox® Sticks Plus	ELISA Sandwich R5
Soluble cocoa powder	Cola-Cao	> 20 ppm	> 100 ppm
Cocoa powder	n/a	< 3 ppm	< 3 ppm
Garlic powder	n/a	< 3 ppm	< 3 ppm
Rice flour	Kalizea	> 10 ppm; < 20 ppm	12.5 ppm
Gluten-free flour with up to 50% content in chocolate	n/a	> 20 ppm	n/a
FAPAS Material 27240B-Infant soy formula	FAPAS	> 20 ppm	37.1 ppm (assigned value)
FAPAS Material 27247B- Cake Mix	FAPAS	> 3 ppm < 20 ppm	19.3 ppm (assigned value)

Table 4. Results in ppm of gluten of other kind of foods-additives and ingredients

Sample	Brand	GlutenTox® Sticks Plus	ELISA Sandwich R5
Glucose	Chamtor	> 20 ppm	24.3 ppm
Glucose	Chamtor	> 20 ppm	31 ppm
Food dye - additive/ flavoring	n/a	> 20 ppm	95.7 ppm
Sodium caseinate	Vegenat	< 3 ppm	< 3 ppm

Table 5. Results in ppm of gluten of oral hygiene products

Sample	Brand	GlutenTox® Sticks Plus	ELISA Sandwich R5
Toothpaste	Deliplus	<3 ppm	< 3 ppm
Mouthwash	Deliplus	<3 ppm	< 3 ppm
Creams (face, body and hand cream)	Deliplus	<3 ppm	< 3 ppm

Table 6. Results in ppm of gluten of pet food

Sample	Brand	GlutenTox® Sticks Plus	ELISA Sandwich R5	GlutenTox® ELISA G12
Dog food	Orijen 6	> 30 ppm	42 ppm	36 ppm
	Forza 10	> 100 ppm	1538 ppm	1943 ppm
	Advance hypoallergenic	> 10 ppm; <20 ppm	14 ppm	15 ppm
	Affinity Advance, Sensitive Lot 1	> 100 ppm	1470 ppm	1030 ppm
	Affinity Advance, Sensitive Lot 2	> 100 ppm	1314 ppm	1142 ppm

Table 7. Results in ppm of gluten of spiked samples

Sample	Brand	GlutenTox® Sticks Plus	ELISA Sandwich R5
Semi-skimmed milk (10 ppm)	Carrefour	> 10 ppm; < 20 ppm	8.9 ppm
Flavored yogurts (5 ppm)	Hacendado	> 3 ppm; < 10 ppm	4.4 ppm
Potato chips (20 ppm)	n/a	> 20 ppm	n/a

Table 8. Results in ppm of gluten of complex food samples. Samples were extracted using the Polyphenol Pack for an increased gluten extraction.

Sample	Brand	GlutenTox® Sticks Plus	ELISA Sandwich R5
Chickpea pasta	n/a	>20 ppm; <100 ppm	33.5 ppm
Chickpea (extruded, cooked) (2 samples)	n/a	> 20 ppm	60.3 ppm
		> 20 ppm	26.9 ppm
Hemp seeds (Cannabis sativa)	n/a	< 3 ppm	<0.6 ppm
Lentils, raw	n/a	> 20 ppm	32.58

Table 9. Spiked Surface Testing of 5 x 1 cm² or 1 x 5 cm² spiked with 40 ng/cm²

Sample	Clean	Spiked with 40 ng/cm ²
Stainless steel	negative	positive
Rubber	negative	positive
Food-grade painted wood	negative	positive
Plastic	negative	positive
Sealed Ceramic	negative	positive

Table 10. Results in ppm of gluten of medicines

Sample	Spiked level of gluten (ppm)	LOD	GlutenTox® Sticks Plus
Pediatric Nurofen (syrup)	0	3	negative
	2.5	3	negative
	5	3	positive
	5	10	negative
	15	10	positive
	15	20	weak positive
Antalgin 550 mk	0	3	negative
	2,5	3	negative
	5	3	weak positive
	5	10	negative
	15	10	positive
	15	20	negative

Table 10. Results in ppm of gluten of medicines (continued)

Sample	Spiked level of gluten (ppm)	LOD	GlutenTox® Sticks Plus
Glufan 625 mg	0	3	negative
	2,5	3	negative
	5	3	positive
	5	10	negative
	15	10	positive
	15	20	weak positive
Nolotil 575 mg	0	3	negative
	2,5	3	negative
	5	3	positive
	5	10	negative
	15	10	positive
	15	20	weak positive
Diclofenaco Normon 50 mg	0	3	negative
	2,5	3	negative
	5	3	weak positive
	5	10	negative
	15	10	positive
	15	20	negative
Metamizol Aristo 575 mg	0	3	negative
	2,5	3	negative
	5	3	weak positive
	5	10	negative
	15	10	positive
	15	20	weak positive
Enantyum 25 mg	0	3	negative
	2,5	3	negative
	5	3	weak positive
	5	10	negative
	15	10	positive
	15	20	negative
Nolotil (capsule)	0	3	invalid
Metamizol (capsule)	0	3	invalid
Enantyum (capsule)	0	3	negative

Conclusions

- GlutenTox Sticks Plus detects and allows semi-quantification of gluten in a large variety of foods, drinks, consumer products, drugs and surfaces.
- If the samples contain polyphenols (including tannins), GlutenTox Sticks Plus needs to be used in combination with the Polyphenol Pack to maximize gluten extraction from the matrix.
- Results obtained with GlutenTox Sticks Plus show a correlation with ELISA methods, both based in R5 and G12/A1 antibodies.
- When capsules of medicines are analyzed separately, the capsule pigments can dye the strip, and the coloring of the strip can impede the reading and result in an invalid result. In this case we recommend testing the medicine separately.