ANNEX I. Uncertainty associated with sampling, sample preparation, and analytical steps of the aflatoxin test procedure used to estimate aflatoxin in almonds, hazelnuts, and pistachios.

Table 1. Experimental test conditions and uncertainty results for each treenuts.

Test Procedure	Almonds	Hazelnuts	Pistachios
Sampling	$S^2_s = (10/ns)5.759C^{1.561}$	$S^2_s = (10/ns)4.291C^{1.609}$	$S^2_s = (5/ns)7.913C^{1.475}$
Sample Prep	$S^2_{sp} = (100/nss)0.170C^{1.646}$	$S^2_{sp} = (50/nss)0.021C^{1.545}$	$S^2_{sp} = (25/nss)2.334C^{1.522}$
Analytical	$S^2_a = (1/na)0.0041C^{1.966}$	$S^2_a = (1/na)0.0028C^{1.990}$	$S^2_a = (1/na)0.0368C^{1.598}$
Sample Product	shelled kernels	shelled kernels	In-shell (5 kg shelled kernels)
Sample size ns kg	10	10	10 kg inshell/ 5kg shelled
Sample Prep (mill)	Hobart (dry grind)	Robot Coupe (dry grind)	Marjaan Khatam (dry grind)
Subsample size nss g	100	50	25
Analytical method	HPLC (na = 1 aliquot)	HPLC (na = 1 aliquot)	HPLC (na = 1 aliquot)
Total variance	$S^2_s + S^2_{sp} + S^2_a$	$S^2_s + S^2_{sp} + S^2_a$	$S^2_s + S^2_{sp} + S^2_a$

Note: All sampling variances reflect shelled kernels. Pistachio sampling study was conducted on 10 kg of in-shell nuts. Hull represents about 50% of the total inshell mass. Sampling data for almonds, hazelnuts, and pistachios supplied by the United States, Turkey, and Iran, respectively. S^2 = variance, ns = sample size in kg, nss = subsample size in g, na = number of aliquots quantified, and C = aflatoxin concentration (ng/g).

Table 2. Uncertainty associated with the aflatoxin test procedure to estimate aflatoxin in bulk lots of almonds, hazelnuts, and pistachios at 8 total ng/g using equations in Table 1.

Test Procedure	Size	Variance			Coeff. of Variation (%)			Variance Ratio (Component/Total)		
		Almonds	Hazelnuts	Pistachios	Almonds	Hazelnuts	Pistachios	Almonds	Hazelnuts	Pistachios
Sample (kg)	10	147.93	121.80	84.99	152.04	137.95	115.24	93.27	99.43	74.78
Sample Prep (g)	50	10.42	0.52	27.64	40.35	9.03	65.72	6.57	0.43	24.32
Analysis HPLC	1	0.24	0.18	1.02	6.18	5.24	12.63	0.15	0.14	0.90
Total		158.60	122.49	113.65	157.42	138.35	133.26	100.00	100.00	100.00

Table 3. Uncertainty associated with the aflatoxin test procedure to estimate aflatoxin in bulk lots of almonds, hazelnuts, and pistachios at 15 total ng/g.

Test Procedure	Size	Variance			Coeff. of Variation (%)			Variance Ratio (Component/Total)		
		Almonds	Hazelnuts	Pistachios	Almonds	Hazelnuts	Pistachios	Almonds	Hazelnuts	Pistachios
Sample (kg)	10	394.66	334.88	214.81	132.44	122.00	97.71	92.90	99.41	74.19
Sample Prep (g)	50	29.33	1.38	71.96	36.11	7.83	56.55	6.90	0.41	24.85
Analysis HPLC	1	0.84	0.61	2.79	6.12	5.22	11.13	0.20	0.18	0.96
Total		424.83	336.87	289.55	137.41	122.36	113.44	100.00	100.00	100.00

Size = 1 for analysis indicates that 1 aliquot was quantified by HPLC

ANNEX II. Comparing performance of sampling plans using almond, hazelnut, and pistachios sampling data.

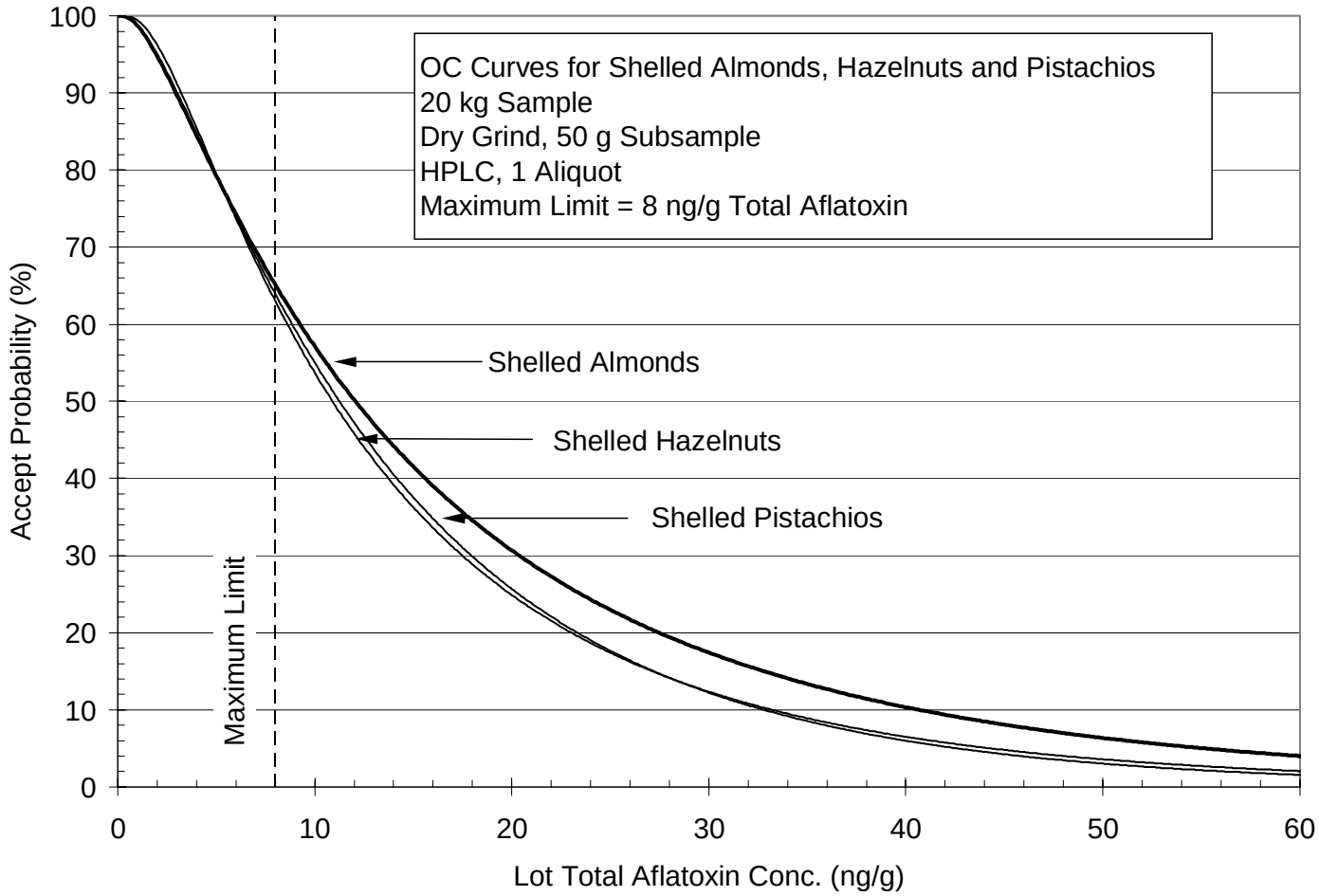

Figure 1. Operating characteristic curves based upon almond, hazelnut, and pistachio uncertainty data for a 20 kg sample, dry grinding, 50 g subsample, using HPLC to quantify aflatoxin in 1 aliquot, and 8 ng/g maximum limit.

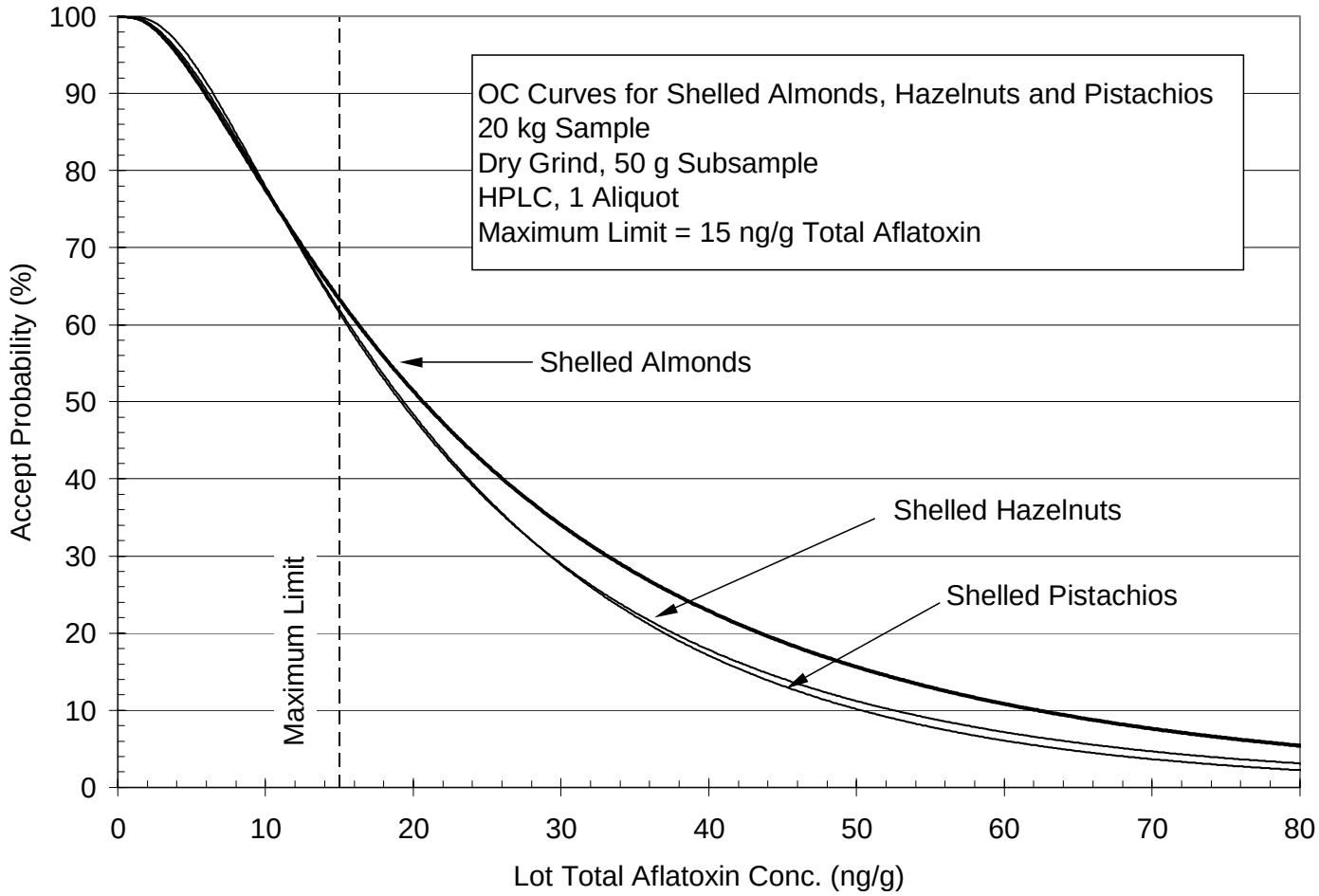

Figure 2. Operating characteristic curves based upon almond, hazelnut, and pistachio uncertainty data for a 20 kg sample, dry grinding, 50 g subsample, using HPLC to quantify aflatoxin in 1 aliquot, and 15 ng/g maximum limit.