Supplementary material

Table 1S Scores given by each expert on the three KP for each strategy in bakery sector

		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5
KP1	Use asparaginase	3	2.5	3	3	2
	Avoid cereal cultivation in sulphur-deprived soils	2	2	3	3	3
	Baking at a lower temperature for a longer time	3	2	4	4	3
	Replace ammonium bicarbonate with other raising agents	2	2.5	3	3	3
	Avoid wholemeal flour	3	2	2	3	2
	Replace fructose with glucose	1	2	2	2	2
KP2	Use asparaginase	4	2.5	3	4	3
	Avoid cereal cultivation in sulphur-deprived soils	3	2	3	3	4
	Baking at a lower temperature for a longer time	3	2	2	3	2
	Replace ammonium bicarbonate with other raising agents	2	2.5	2	2	3
	Avoid wholemeal flour	2	1	2	2	4
	Replace fructose with glucose	2	3	2	2	4
KP3	Use asparaginase	2	2	3	3	2
	Avoid cereal cultivation in sulphur-deprived soils	2	2	3	4	2
	Baking at a lower temperature for a longer time	3	2	4	2	2
	Replace ammonium bicarbonate with other raising agents	2	2.5	4	4	3
	Avoid wholemeal flour	2	2	4	3	4
	Replace fructose with glucose	2	2	4	3	4

Table 2S Scores given by each expert on the three KP for each strategy in potato sector

		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5
KP1	Select low sugar varieties	3	2.5	3	3	2
	Blanching	3	1	4	3	3
	Store potatoes in controlled conditions	3	2.5	3	3	2
	Fry at max 175°C	3	2.5	3	3	2
	Cut thicker	2	2	2	3	2
	Suppress sprouting	2	3	2	2	2
	Add disodium diphosphate	3	3	3	2	2
KP2	Select low sugar varieties	4	3	2	3	4
	Blanching	2	2.5	2	3	3
	Store potatoes in controlled conditions	2	3	4	3	4
	Fry at max 175°C	2	2.5	2	2	2
	Cut thicker	3	2	3	3	2
	Suppress sprouting	3	3	3	3	3
	Add disodium diphosphate	3	3	1	1	3
KP3	Select low sugar varieties	3	3	4	3	3
	Blanching	3	4	3	3	4
	Store potatoes in controlled conditions	2	3	2	4	3
	Fry at max 175°C	3	3	4	4	4
	Cut thicker	3	2	4	4	4
	Suppress sprouting	3	4	2	2	2
	Add disodium diphosphate	3	4	2	2	3

Table 3S Literature review about relevant papers supporting each mitigation strategy in bakery sector

Mitigation strategy	Mitigation effect	Experimental parameters	Reference	Side effect
Add calcium salt	Up to **60%** reduction	Biscuits with calcium chloride 1.0%	1	
	1.5 time reduction (from 110 to 70 µg/kg)	Dough model system with $CaCl_2$ 0.2M	2	
	30% reduction	Calcium salt in wheat bread	3	
	64% reduction	Calcium salt in unsweetened biscuits	3	
	Prevent acrylamide formation **completely**	Model system asparagines and sugar with Ca^{2+}	4	
	1.5 times reduction (from 200 to 130 µg/kg)	Calcium salt in biscuits	5	
	5 times reduction (from 128 ng/g to 24 ng/g)	Addition of 1.0% of Puracal Act 100 (calcium derivate) in biscuits	6	
	1 time reduction (from 2200 to 1950 µg/kg)	Increase NaCl concentration from 1% to 2% in bread rolls	7	
Avoid cereal cultivation in sulphur-deprived soils	Reduction up to **33 times** (from 3124 to 94 µg/kg)	Increasing sulphur fertilization from 30 to 90 mg in pot cultivation Wheat heating heated (30 min at 170°C)	8	Negative impact on flavour [9] Difficult to control the whole production chain and agronomic factors
	Increasing up to **6 times** in flour from sulfur-deficient cultivation	Wheat heating heated (20 min at 180°C)	9	
Avoid wholemeal flour	103.98 µg/kg in whole-wheat flours samples and 12.69 µg/kg in white flours samples (**1.1 time** reduction)	Bread crisp	10	
	188 ug/kg in white wheat bread crust comparing to 390 ug/kg in wheat-wholemeal oat bread crust (**2 times** reduction)	Wheat-wholemeal oat bread	11	
	361.88 µg/kg in white flours samples and 540 µg/kg in cookies replacing 7.5% of flour with fiber (**1.5 time**	Biscuits (cooking at 200°C for 14 min)	12	

	increase)			
Baking at a lower temperature for a longer time	**More than 7 times** reduction (from 690 to less than 100 mg/kg) lowering cooking temperature from 220 at 260°C	Bread rolls cooked for 80 min	7	
	Cooking at 160°C (26 min) prevents acrylamide formation **completely**	Bread crisp	13	
	2 times reduction (from 200 to less than 100 µg/kg) lowering cooking temperature from 200 at 180°C	Biscuits	5	
	Combining partial baking at 220 °C for 2-4 min under conventional conditions with vacuum post-baking at 180 °C and 500 mbar for 4-6 min until the desired final moisture content attained produce **no acrylamide**	Biscuits	14	
Replace ammonium bicarbonate with other raising agents	Reduction from 1200 µg/kg to 70 µg/kg (~ **17 times**)	Substitution of NH_4HCO_3 for $NaHCO_3$ in gingerbread (cooking 5 min a 250°C)	15	Possible alkaline taste [11] Increase in sodium intake Negative but acceptable impact on colour, texture, softness, delicacy [15]
	4 times reduction (from 250 to 60 µg/kg) in cookies with $Na_4P_2O_7$ **6 times** reduction (from 250 to 40 µg/kg) in cookies with Na_4HCO_3	Cookies baked at 205° for 15 min	16	
	4 times reduction (from 180 to 45µg/kg)	Complete replacement of NH_4HCO_3 by $NaHCO_3$ in biscuits (cooking for 5 min a 230°C)	12	
Replace fructose with glucose	Minimal effect	Model dough system	17	
	8 times reduction (from 103.98 to 12.69 µg/kg)	Model dough systems (20 min at 180°C)	3	
	Ambiguous effect	Model sugars/Asn system	18	
Use asparaginase	Range reduction **from 23 to 75 %** depending mainly on pH value of	Cookies baked at 205° for 15 min	16	

	dough and time of enzyme incubation			
	84% reduction up to 58 µg/kg in treated biscuits	Asparaginase from *Aspergillus oryzae* in semisweet biscuits (cooking for 5.5 min at 260°C)	19	
	85% reduction	Asparaginase from *E.coli* in crakers	20	
	Up to **70%** (depending on enzyme concentration and incubation time and temperature)	Biscuits	21	
	Up to **97%** reduction (depending on enzyme concentration and incubation time)	Ginger bread (cooking 5 min at 250°C)	15	
	40% decrease (from 357 to 210 µg/kg)	Wheat-wholemeal oat fermented bread (500 U asparaginase per loaf)	22	
	Up to **88%** reduction	Whole-wheat bread crisp (2000U asparaginase/ kg of flour)	10	
	2 times reduction with 210 ASNU asparaginase/kg flour **2 times** reduction with 525 ASNU asparaginase/kg flour **11 times** reduction with 1050 ASNU asparaginase/kg flour	Semisweet biscuit	23	

Table 4S Literature review about relevant papers supporting each mitigation strategy in potato products

Mitigation strategy	Mitigation effect	Experimental parameters	Reference	Side effect
Add disodium diphosphate	**7 times** reduction (from 452 to 58 ng/g)	Fried sweet potatoes (5 min a 165°C) after soaking in 0.5% acid pyrophosphate	19	Possible sensory defects occurring as a result of acrylamide-lowering additives such as citric acid, could in some cases be covered up using flavourings [26]
Blanching	**5 times** reduction (from 750 to 150 µg/kg) in potatoes fried at 150°C **2 times** reduction (from 1700 to 800 µg/kg) in potatoes fried at 200°C	Blanching in hot water at 85°C for 3.5 min	25	Blanching reduces the integrity of the potato [34] The use of $CaCl_2$ may improve product texture, but oppositely can cause a bitter aftertaste [45] Continuous replacement of the blanching water with fresh water is however not feasible, both from environmental and economical point of view [46] Loss of starch and consequent increased oil absorption, shrinkage of raw product leading to decreased recovery in finished product and higher input costs, and changes in finished product texture and taste [26]
	15 times reduction (from 589 to 40 µg/kg)	Potatoes fried at 150°C after blanching in 0.1M $CaCl_2$ solution	4	
	65% reduction	French fries after blanching (70°C, 10–15 min)	26	
	Up to **73%** reduction (depending on patato cultivar and storing time)	French fries after blanching at 80°C for 3 min	27	
	1,4 times reduction (from 3220 to 2220 µg/kg)	Domestic frying after 4.5 min soaking	28	
	54% reduction	Potato chips after 17 min blanching at 64°C	29	
	1.3 times reduction (from 2.1 to 1.6 µg/kg)	French fries after 30 min blanching	30	
	Up to **4 times** (from 600 to 150 µg/kg) depending on treatment time	Microwave-blanching	31	
Cut thicker	**1.5 time** reduction (from 1500 to 1000 ppb) increasing cut size from 8.5x8.5 mm to 10x10 mm	French fries	32	Leading to slower heating [32]
	1.5 time reduction (from 1500 to 1000 ppb) increasing cut size from 8.5x8.5 mm to 10x10 mm	French fries	33	
	5 time reduction (from 12000 to 2500 ppb) increasing slide size	Fried potato slices	33	

	from 3 mm to 15 mm			
Frying at max 175°C	**2 times** reduction (from 750 to 1700 µg/Kg) lowering temperature from 200°C to 150°C **5 times** reduction (from 12000 to 2500 µg/Kg) lowering temperature from 167°C (500 sec) to 119°C (2500 sec) **42 times** reduction (from 147 to 3.46 µg/Kg) lowering temperature from 185°C (10 sec) to 125°C (60 sec) **2 times** reduction (from 2500 to 1250 µg/Kg) lowering temperature from 220°C (8 min) to 160°C (20 min) **2 times** reduction (from 4439 to 1544 µg/Kg) lowering temperature from 185°C to 175°C **1.8 times** reduction (from 761 to 401 µg/Kg) lowering temperature from 190°C to 170°C **3.1 times** reduction (from 761 to 243 µg/Kg) lowering temperature from 190°C to 150°C	French fries Fried potato power until colour development is still good Model system: potato power in hot oil Fried potato slices Potato crisps French fries	25 35 36 37 38 39	Increasing frying time causes enhancing fat uptake [47] Potato will become soft [48]
Select low sugar varieties	Variability from 104 to 296 µg/kg (**2.8 times**) Variability from 1660 to 7110 µg/kg (**4.3 times**) Variability from to 40 to 880 µg/kg (**22 times**) Variability from 230 to 650 µg/kg (**2.8 times**)	Fried potatoes from 16 different varieties (5 min at 180°C) Fried potatoes from 10 different varieties (7.5 min at 140°C) Fried potatoes (at 175°C for 150 s) from 10 different varieties Fried potatoes from 4 different varieties (5 min at 180°C)	40 41 42 43	Only a few of selected cultivar have acceptable sensory and nutritional quality [39] Difficult to control the whole production chain and agronomic factors

Store potatoes in controlled conditions	**10 times** reduction (from 2000 to 200 µg/kg) storing potatoes at 8°C and not at 4°C	Fried potatoes from 22 weeks old tubers	40	At lower preservation temperatures, sprouting can be inhibited without the use of chemicals and the potatoes are less susceptible to diseases
	6 times reduction (from 5000 to 800 µg/kg) storing potatoes at 8°C and not at 4°C	Fried potatoes from 24 weeks old tubers	38	
	2 times reduction (from 4000 to 1900 µg/kg) storing potatoes at 8°C and not at 4°C	Crisp from 18 weeks old tubers	38	
	2.5 times reduction (from 12500 to 5000 µg/kg) controlling atmosphere composition (9% O_2 - 12% CO_2 vs 18%O_2 3% CO_2)	Fried potatoes from 24 weeks old tubers	44	
Suppress sprouting	**1.7 time** reduction (from 415 to 242 µg/kg) using CIPC	Fried potatoes (2 min at 180°C)	40	Chemical sprout suppressing is not always an option due to customer demand [46]

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