APPENDIX 1

SUMMARY TABLES OF GENETIC AND RELATED EFFECTS

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| fe |
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| 7 |
| E |
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| ×. |
| F 7 |
| لاستنبا |

Summary table of genetic and related effects of caffeic acid

| Nor | man | nmal | lian s | syster | ns | | | | | | | | Mam | malia | n syst | ems | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-------|------------|-------------|--------|----|-----|-----|---|-----|------|---|---|-------|---------|--------|-----|---|---|---|----|-----|-------|---|---|---|---|---|-----|------|---|---|---|----|---|----|------|---|---|---|
| Proi ryot | 83 ES | Lov euk | wer aryo | tes | | Pla | nts | | Ins | ects | | | In vi | ro | | | | | | | | | | | | | | Inv | rivo | | | | | | | | | | |
| | | | | | | | | | | Γ | | | Anin | nal cel | s | | | | | Hu | nan | cells | | | | | | Ani | mals | | | | | | Hu | mans | | | |
| D | G | D | R | G | A | D | G | с | R | G | с | Α | D | G S | М | c | A | Т | 1 | D | G | s | м | С | A | Т | I | D | G | s | М | С | DL | A | D | s | М | С | Α |
| | - | | _1 | | | | | | | | | | | +1 | | + | | | | | | | | | | | | | | | - | | | | | | | | |

A, an euploidy; C, chromosomal aberrations; D, DNA damage; DL, dominant lethal mutation; G, gene mutation; I, inhibition of intercellular communication; M, micronuclei; R, mitotic recombination and gene conversion; S, sister chromatid exchange; T, cell transformation

In completing the tables, the following symbols indicate the consensus of the Working Group with regard to the results for each endpoint:

- + considered to be positive for the specific endpoint and level of biological complexity
- $+^{1}$ considered to be positive, but only one valid study was available to the Working Group
- considered to be negative
- -1 considered to be negative, but only one valid study was available to the Working Group

Summary table of genetic and related effects of *d*-limonene and related compounds *d*-Limonene

| Nor | ıman | nmal | ian s | yster | ns | | | | | | | | Ma | mma | lian | syste | ms | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|------------|------------|-------------|-------|----|-----|-----|---|-----|------|---|---|-----|-------|-------|-------|----|---|----|-------|----------|-----|-------|---|-------------------|---|---|---|----|------|---|---|---|----|---|----|-----|---|---|---|
| Proi ryot | ka- ies | Lov euk | wer aryo | tes | | Pla | nts | | Ins | ects | | | Inv | vitro | | | | | | | <u> </u> | | | | | | | | In | vivo | | | | | | | | | | |
| | | | | | | | | | | | | | Ani | imal | cells | | | | | ····· | Hu | man | cells | ; | · · · · · · · · · | | | | An | imal | s | | | | | Hu | man | 5 | | |
| D | G | D | R | G | A | D | G | С | R | G | С | Α | D | G | s | М | С | A | Т | I | D | G | s | М | С | A | Т | I | D | G | s | М | С | DL | A | D | s | м | с | A |
| | - | | | | | | | | | | | | | _1 | _1 | | ~1 | | _1 | | | | | | | | | | | | | | | | | | | | | |

d-Limonene-1,2-oxide

| Nonma | Nonmammalian systems Proka- Lower Pyotes Plants Insects Insect | | | | | | | | | | | | | lian | syste | ms | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------|--|--------------|------|--------------|-----|-----|--|-----|-------|----------|--|------|-------|-------|-------|----|---|---|---|----|-----|-------|---|---|---|---|---|-----|-------|---|---|---|----|---|----|---------|---|---|---|
| Proka- ryotes | Lo eu | wer karyo | otes | , | Pla | nts | | Ins | sects | - | | In v | ritro | | | | | | | | | | | | | | | Inv | vivo | | | | | | | | | | |
| | | | | | | | | | | | | | mal | cells | | | | | | Hu | man | cells | 6 | | | | | Ani | imals | 3 | | | | | Hu | man | ; | | |
| D G D R G A D G C R G C A T | | | | | | | | | | | | D | G | S | М | С | A | Т | I | D | G | s | м | С | A | Т | I | D | G | s | М | с | DL | A | D | s | М | С | A |
| | | | | | | | | | | | | | | | | | | | | | | | | | | - | | • | • | | | 4 | | | L | | A | · | L |

Essential oils containing *d*-limonene

| Nor | man | nmal | ian s | ysten | 15 | | | | | | | | Mai | mma | lian | syste | ms | | • | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----------|------------|--------------|-------|----|-----|-----|---|------|------|---|---|------|------|-------|-------|----|---|---|---|----|-----|-------|----------|----------|----------|---|---|----|-----------|----|---|----|----|---|------------|-----|---|---|---|
| Prol ryot | ca- es | Lov euk | ver aryoi | tes | | Pla | nts | | Inse | ects | | | In v | itro | | | | | | | | | | | | | | | In | vivo | | | | | | | | | | |
| | | | | | | | | | | | | | Ani | mal | cells | | | | | | Hu | man | cells | | | | | | An | nima | ls | | | | | Hu | man | 5 | | |
| D | G | D | R | G | Α | D | G | С | R | G | C | A | D | G | S | м | С | Α | Т | I | D | G | s | м | С | A | Т | I | D | G | s | М | С | DL | A | D | s | М | С | A |
| -1 | - | | | | | | | | | | | | | | | | | | | | | • | • | * | . | . | | 1 | | - | | | -1 | | | - I | L | | I | I |

A, aneuploidy; C, chromosomal aberrations; D, DNA damage; DL, dominant lethal mutation; G, gene mutation; I, inhibition of intercellular communication; M, micronuclei; R, mitotic recombination and gene conversion; S, sister chromatid exchange; T, cell transformation

In completing the tables, the following symbols indicate the consensus of the Working Group with regard to the results for each end-point:

- considered to be negative
- $-^1$ considered to be negative, but only one valid study was available to the Working Group

| Nor | man | ımal | ian s | syster | ns | | | | | | | <u></u> | Ma | mma | lian | syste | ms | | | <u>,</u> | | | | | | | | | | | | | | | | | | , | | | |
|--|-----|------|-------|--------|----|---|---|---|---|---|---|---------|-------|-----|-------|-------|----|---|---|----------|----|------------|-------|----|---|---|---|----|------|------|---|-----------|----|----|-----|------|------|-----|---|---|---|
| Proka- ryotes eukaryotes Plants Insects | | | | | | | | | | | | In v | vitro | | | | | | | | | | | | | | | In | vivo | | | | | | | | | | | | |
| | | | | | | | Γ | Ι | | | | | Ani | mal | cells | | | | | | Hu | man | cells | | | | | | An | imal | 6 | | | | | F | luma | ans | | | |
| D | G | D | R | G | A | D | G | с | R | G | с | A | D | G | S | М | С | A | T | I | D | G | s | М | с | A | Т | I | D | G | s | м | С | DL | , A | . [r | s | ;] | М | С | Α |
| + | + | | : | | | | _ | | | + | | | + | + | + | | ? | | | | | - 1 | +1 | +1 | ? | | | | +1 | +; | + | 1 | +' | | | | | | | | |

Summary table of genetic and related effects of 2-amino-3-methylimidazo[4,5-f]quinoline (IQ)

A, aneuploidy; C, chromosomal aberrations; D, DNA damage; DL, dominant lethal mutation; G, gene mutation; I, inhibition of intercellular communication; M, micronuclei; R, mitotic recombination and gene conversion; S, sister chromatid exchange; T, cell transformation

In completing the tables, the following symbols indicate the consensus of the Working Group with regard to the results for each end-point:

- + considered to be positive for the specific endpoint and level of biological complexity
- $+^{1}$ considered to be positive, but only one valid study was available to the Working Group
- -1 considered to be negative, but only one valid study was available to the Working Group

Summary table of genetic and related effects of 2-amino-3,4-dimethylimidazo[4,5-f]quinoline (MeIQ)

| Nor | nmar | nmal | lian s | syster | ns | | | | | | | | Mai | mma | lian s | yste | ms | | | | | | | | | | | | | | | ••••••• | | | • | | | | ********** | ****** |
|--------------|-----------|------------|-------------|--------|----|-----|-----|---|------|------|---|---|------|-------|--------|------|----|---|---|---|---|------|-------|---|---|---|---|---|----------------|------|----|---------|---|----|---|---|------|-------|------------|--------|
| Proi ryot | ka- es | Lov euk | wer aryo | otes | | Pia | nts | | Inse | ects | | | In v | itro | | | | | | | | | | | | | | | In | vivo | | | | | | | | | | |
| | | | | | | | | | | | | | Ani | mal c | ælls | | | | | | H | uman | cells | | | | | | An | imal | s | | | | | н | ıman | S | | |
| D | G | D | R | G | Α | D | G | с | R | G | с | A | D | G | s | М | С | A | Т | I | D | G | s | м | С | A | Т | I | D | G | s | м | С | DL | A | D | s | М | С | A |
| + | + | | | | | | | | | +1 | | | + | + | ? | +1 | | | | | | | | | | | | | + ¹ | | +1 | | | | | | | | | |

A, aneuploidy; C, chromosomal aberrations; D, DNA damage; DL, dominant lethal mutation; G, gene mutation; I, inhibition of intercellular communication; M, micronuclei; R, mitotic recombination and gene conversion; S, sister chromatid exchange; T, cell transformation

In completing the tables, the following symbols indicate the consensus of the Working Group with regard to the results for each end-point:

+ considered to be positive for the specific endpoint and level of biological complexity

+¹ considered to be positive, but only one valid study was available to the Working Group

| Nor | nman | nmal | lian s | syster | ns | | | | | | Ma | nmali | an sy | sten | ns | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------|----------------------------|------|--------|--------|----|---|---|---|---|----|----|-------|-------|-------|------------|---|----|---|---|---|----|-----|------|---|---|---|---|----|------|------|-----|---|----|----|---|----|-----|---|---|---|
| Pro ryot | Proka-Lower Plants Insects | | | | | | | | | | | In v | itro | | | | | | | | | | | | | | | In | vivo | | | | | | | | | | | |
| | yotes eukaryotes | | | | | | | | | | | | Ani | mal c | ells | | | | | | Hu | man | œlls | | | | | | An | imal | s | | | | | Hu | man | 5 | | |
| D | G | D | R | G | A | D | G | с | R | G | с | A | D | G | S 1 | м | с | Α | Т | I | D | G | s | м | С | A | Т | I | D | G | s | м | С | DL | A | D | s | м | С | A |
| + | + | | | | | | | | | +1 | | | + | + | +1 | | _1 | | | | | | +, | | - | | | | + | _1 | +14 | 1 | +1 | | | | | | | |

Summary table of genetic and related effects of 2-amino-3,8-dimethylimidazo[4,5-f]quinoxaline (MeIQx)

A, aneuploidy; C, chromosomal aberrations; D, DNA damage; DL, dominant lethal mutation; G, gene mutation; I, inhibition of intercellular communication; M, micronuclei; R, mitotic recombination and gene conversion; S, sister chromatid exchange; T, cell transformation

In completing the tables, the following symbols indicate the consensus of the Working Group with regard to the results for each end-point:

+ considered to be positive for the specific endpoint and level of biological complexity

+¹ considered to be positive, but only one valid study was available to the Working Group

- considered to be negative

-¹ considered to be negative, but only one valid study was available to the Working Group

"Positive in rat liver; negative in mouse bone marrow

:

Humans D S M C A

In vivo

Animals

DG

+

S

MC

?!??.

DL A

Summary table of genetic and related effects of 2-amino-1-methyl-6-phenylimidazo[4,5-b]pyridine (PhIP)

Mammalian systems

S M

C

+1

Α

TI

A, aneuploidy; C, chromosomal aberrations; D, DNA damage; DL, dominant lethal mutation; G, gene mutation; I, inhibition of intercellular communication; M, micronuclei; R, mitotic recombination and gene conversion; S, sister chromatid exchange; T, cell transformation

Human cells

S

мС

ATI

DG

In completing the tables, the following symbols indicate the consensus of the Working Group with regard to the results for each end-point:

In vitro

DG

+ +1 +

Α

Animal cells

+ considered to be positive for the specific endpoint and level of biological complexity

Insects

Nonmammalian systems

Lower

eukaryotes

Proka-

ryotes

D G D R G

+1 +

Plants

GCRGC

A D

- +¹ considered to be positive, but only one valid study was available to the Working Group
- ? considered to be equivocal or inconclusive (e.g., there were contradictory results from different laboratories; there were confounding exposures; the results were equivocal)

Summary table of genetic and related effects of aflatoxins

÷

Aflatoxin B₁

| Nor | nmammalian systems ka- tes Lower eukaryotes Plants Insects | | | | | | | | | | | | | mma | ilian | syste | ms | | | | | | | | | | | | | | | | | | | | | umataratim | | |
|-------------|---|--|---|---|---|---|---|---|----|---|---|----|-------|------|-------|-------|----|---|---|---|----|-----|------|----|---|---|---|----|------|------|---|---|---|----|-------|----|-----|------------|-----|---|
| Pro ryot | roka-Lower Plants Insects yotes eukaryotes | | | | | | | | | | | In | vitro | | | | | | | | | | | | | | | In | vivo | | | | | | | | | | | |
| | | a- s Lower eukaryotes Plants Insects G D R G A D G C R G C | | | | | | | | | | | An | imal | cells | | | | | | Hu | man | œlls | | | | | | An | imal | 5 | | | | ***** | Hu | mar | ns | | |
| D | G | D | R | G | A | D | G | C | R | G | С | A | D | G | s | м | С | A | Т | Ι | D | G | s | м | С | Α | Т | I | D | G | s | м | С | DL | A | D | s | M | ı c | A |
| + | + | | + | + | | | | | +1 | + | | | + | + | + | | + | | + | 1 | + | + | + | +1 | + | | | | + | | + | + | + | + | | +• | | | | |

Sperm morphology, mice, -*See Table 13 (pp. 329-334) for listing and references

Aflatoxin B₂

| Nor | man | ımal | ian s | ysten | ns | | | | | | | | Mai | mma | ılian | syste | ms | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|--|------|------------|-----------|----|---|---|---|---|---|---|------|-------|-------|-------|-------|----|---|----|----|-----|------|---|---|---|---|---------|----|------|---|---|---|---|----|----|-----|---|---------|----------|---|---|
| Prol ryot | oka- otes eukaryotes Plants Insects | | | | | | | | | | | In v | ritro | | | | | | | | | | | | | | | In | vivo | | | | | | | | | | | | |
| | ca- es Lower eukaryotes Plants Insects G D R G A D G C R G C | | | | | | | | | | | Ani | mal | cells | | | | | | Hu | man | œlls | | | | | · i . i | An | imal | 5 | | | | | Hu | man | s | | | - | |
| D | G | D | R | G | A | D | G | с | R | G | С | Α | D | G | s | м | С | A | T | I | D | G | S | м | С | A | Т | I | D | G | s | м | С | DL | A | D | s | м | С | A | - |
| ? | + | | <u>_</u> 1 | _1 | | | | | | | | | + | _1 | +1 | | | | +1 | | 1 | | | | | | | | + | | • | | | | • | | | ******* | . | | |

Aflatoxin G₁

| Nonma | ımm | alian s | system | ns | | | | | | | | Ma | mma | lian | syste | ms | | | | | | | | | | | | | | | | | · | | | | | | |
|------------------|--|---------|--------|----|---|---|---|---|---|---|---|------|-------|-------|-------|----|---|---|---|----|-----|-------|---|----|---|---|---|----|-------|---|---|---|----|---|----|------|---|---|---|
| Proka- ryotes | roka- yotes eukaryotes Plants Insects | | | | | | | | | | | In v | ritro | | | | | | | | | | | | | | | In | vivo | | | | | | | | | | |
| | | | | | | | | | | | | Ani | mal | cells | | | | | | Hu | man | cells | | | | | | An | imals | | | | | | Hu | mans | | | |
| DG | D | R | G | Α | D | G | С | R | G | с | A | D | G | s | м | С | Α | Т | I | D | G | s | м | С | Α | Т | I | D | G | s | М | С | DL | A | D | s | м | с | Α |
| + + | | _1 | + | | | | | | | | | + | | +1 | | +1 | | | | + | | +1 | | +1 | | | | + | | | | + | | | | | | | |

Summary table of genetic and related effects of aflatoxins (contd)

Aflatoxin G₂

| No | nman | nmal | lian s | yster | ns | | | | | | | | Ма | mma | ian | syste | ms | | | | | | | | | • | | *** | | | | | | | | | | | | |
|------------|------------|------------|-------------|-------|----|-----|------|---|-----|------|---|---|----|--------|------|-------|----|---|---|---|----|------|---------|---|---|---|---|-----|----|------|---|---|---------|-------|---|----------|---------|-------|---|----------|
| Pro ryo | ka- tes | Lov euk | wer aryo | tes | | Pla | ints | | Ins | ects | | | In | vitro | | | | | | | | | | | | | | | In | vivo | | | | | | | | | | |
| | | | | | | | | | | | | | An | imal c | ells | | | | | | H | umai | n cells | 6 | | | | | Ar | imal | 5 | | | ***** | | Hu | man | 5 | | |
| D | G | D | R | G | Α | D | G | c | R | G | С | A | D | G | S | М | с | A | Т | I | D | G | s | м | c | A | Т | I | D | G | s | м | С | DL | A | D | s | М | С | A |
| - | ? | | | _1 | | | | | | | | | + | - | + | | | | | | _1 | | | | | | | | | | | | | A | | . | A | L | Å | L |

Aflatoxin M₁

| Nor | man | ımal | ian s | yster | ns | | | | | | | | Ma | amm | alian | syste | ms | | | | | | | | | | | | | | | | | ••••• | | | | | | |
|--------------|-----------|------------|-------------|-------|----|-----|-----|---|------|------|---|---|----|-------|-------|-------|----|---|----|---|----|------|-------|---|---|---|---|---|----|----------|---|---|----------|----------|----------|----|-----|----------|----------|---|
| Prol ryot | ca- es | Lov euk | ver aryo | tes | | Pla | nts | | Inse | ects | | | In | vitro | , | | | | #J | | | | | | | | | | In | vivo | | | | | | | | | | |
| | | | | | | | | | | | | | An | imal | cells | | | | | | Hı | ıman | cells | 6 | | | | | An | imal | 5 | | | | | Hu | man | 5 | | |
| D | G | D | R | G | A | D | G | c | R | G | С | A | D | G | s | м | С | A | T | 1 | D | G | s | м | С | A | Т | I | D | Ģ | s | м | С | DL | A | D | s | М | с | A |
| | + | | | | | | | | | | | | + | | | | | | | | | | | | | | | | | Å | | | <u> </u> | . | L | | | . | . | |

A, aneuploidy; C, chromosomal aberrations; D, DNA damage; DL, dominant lethal mutation; G, gene mutation; I, inhibition of intercellular communication; M, micronuclei; R, mitotic recombination and gene conversion; S, sister chromatid exchange; T, cell transformation

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considered to be negative

considered to be negative, but only one valid study was available to the Working Group
 considered to be equivocal or inconclusive (e.g., there were contradictory results from di

Summary table of genetic and related effects of toxins derived from Fusarium graminearum, F. culmorum and F. crookwellense

Zearalenone

| No | nmar | nmal | lian s | syster | ns | | | | | | | | Mar | nmalia | in sy | stems | i | | | | | | | | | | | | | | | | | ******* | | ····· | | | |
|------------|------------|------------|-------------|--------|----|-----|------|---|-----|------|---|---|------|--------|-------|-------|-----|---|---|----|-----|------------|---|---|----|---|---|----|------|--------|---|---|----|---------|----|-------|---|---------|----------|
| Pro ryo | ka- tes | Lov euk | wer aryo | tes | | Pla | ints | | Ins | ects | | | In v | itro | | | | | | | | | | | | | | In | vivo | -** | | | | ******* | | | | | |
| | | | | | | | | | | | | | Ani | mal ce | lls | | | | | Hu | man | cells | | | à- | | | An | imak | ; | | | | | Hu | man | 5 | | |
| D | G | D | R | G | A | D | G | С | R | G | c | A | D | GS | | мС | : A | Т | I | D | G | s | м | С | A | Т | 1 | D | G | s | м | С | DL | A | D | s | м | с | A |
| - | - | | - 1 | | | | | | | | | | | + | 1 | + | 1 | | | | | ? 1 | | | | | | | Ave | •••••• | * | | • | <u></u> | | • | * | | . |

Deoxynivalenol

| Nor | ıman | ımal | ian s | ysten | ns | | | | | | | | Ma | mm | alian | syste | ms | | | | | | | | | | | | | | | | | | | ····· | | <u></u> | | |
|------------|------------|------------|-------------|-------|----|-----|-----|---|-----|------|---|-----|------|------------|-------|-------|----|---|----|----|-----|-------|---|---|---|---|---|----|-------|-----------|---|---|---|----|----------|-------|----------|---------|---|---|
| Pro ryo | ka- ies | Lov euk | wer aryo | tes | | Pla | nts | | Ins | ects | | | In v | vitro | | | | | | | · | | | | | | | | Inv | rivo | | | | | <u> </u> | | <u> </u> | | | |
| | | | | | | | | | | | | Ani | mal | cells | | | | | | Hu | man | cells | | | | | | An | imals | · · · · · | | | | | Hu | mans | | | | |
| D | G | D | R | G | Α | D | G | С | R | G | С | A | D | G | s | м | с | A | Т | I | D | G | s | М | С | A | Т | I | D | G | s | М | С | DL | A | D | s | М | С | A |
| | - | | | | | | | | | | | | -1 | _ 1 | | | +1 | | +1 | +1 | | | | | | | | | | | | | | | | har | | | | |

Nivalenol

| Non | man | nma | lian s | syster | ns | | | | | | | | Ma | mma | lian | syste | ms | | | | | | | | | | | | | | | | | | | | | | | <u></u> |
|--------------|-----------|------------------------|-------------|--------|----|-----|-----|---|------|------|---|---|------|-------|-------|-------|----|---|---|---|----|-----|-------|---|---|---|---|---|----|------|---|---|---|----|---|----|-----|---|---|---------|
| Prol ryot | ca- es | Lo [.] euk | wer aryo | tes | | Pla | nts | | Inse | ects | | | In v | /itro | | | | | | | | - | | | | | | | In | vivo | | | | | | | | | | |
| | | | | | | | | | | | | | Ani | imal | cells | ····· | | , | | | Hu | man | cells | | + | | | | An | imal | s | | | | | Hu | man | s | | |
| D | G | D | R | G | A | D | G | С | R | G | С | A | D | G | s | М | С | A | Т | I | D | G | s | М | С | A | Т | I | D | G | s | М | С | DL | A | D | s | м | С | A |
| | | | | | | | | | | | | | | | ?1 | | + | | | | | | | | | | | | | | | | | | | | | - | | |

Summary table of genetic and related effects of toxins derived from Fusarium graminearum, F. culmorum and F. crookwellense (contd)

Fusarenone X

| Nor | man | nmal | lian s | syster | ns | | | | | | | | Mar | nmal | ian s | syster | ns | | | | | | | | | | | • | <u> </u> | • | | | | | | | | | | |
|--------------|-----------|------------|-------------|--------|----|-----|-----|---|-----|------|---|---|------|-------|-------|--------|----|---|---|---|----|-----|-------|---|----------|---|---|---|----------|------|----------|------------|------------|-------------|----|----|------|---|---|----|
| Prol ryot | ca- es | Lov euk | wer aryo | tes | | Pla | nts | | Ins | ects | | | In v | itro | | | | | | | | | | | | | | | In | vivo | | | | | | | | | | |
| | | | | | | | | Τ | | I | | | Anii | mal c | ells | | · | | | | Hu | man | cells | | | | | | An | imal | 3 | | | | | Hu | ıman | s | | |
| D | G | D | R | G | A | D | G | С | R | G | С | A | D | G | s | м | С | A | Т | I | D | G | s | М | С | A | Т | 1 | D | G | s | М | С | DL | A | D | s | М | С | A |
| - | 1 | | | +1 | | | | | | | | | | _1 | ?1 | | +1 | | | | ?ı | | | - | . | | | | . | | . | - I | - k | 1 | .L | | | | | .1 |

A, aneuploidy; C, chromosomal aberrations; D, DNA damage; DL, dominant lethal mutation; G, gene mutation; I, inhibition of intercellular communication; M, micronuclei; R, mitotic recombination and gene conversion; S, sister chromatid exchange; T, cell transformation

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Summary table of genetic and related effects of toxins derived from Fusarium moniliforme

Fumonisin B₁

| No | nmai | nma | lian s | syster | ns | | | | | | | | Ma | mma | lian | systems | | | | | | | | | | | | | | | | | | | | | | | |
|------------|------------|------------|--------------|--------|----|-----|-----|---|-----|------|---|---|------|-------|-------|---------|---|---|---|----|------|------|--------|---|---|---|---|----|----------|------------|---|----------|-------|----|---------|-----|------------|------------|----------|
| Pro ryo | ka- tes | Lov euk | wer karyo | tes | | Pla | nts | | Ins | ects | | | In v | vitro | | | | | | | | | | | | | | In | vivo | | | | | | | | | | |
| | | | | | | | | | | | | | Ani | mal | cells | | | | | Hu | ıman | cell | 5 5 | | | | | An | imal | s | | | • • • | | Hu | man | 5 | | |
| D | G | D | R | G | Α | D | G | С | R | G | С | A | D | G | s | мС | A | T | I | D | G | s | М | С | A | Т | I | D | G | s | М | С | DL | Α | D | s | м | С | A |
| | - | | | | | | | | | | | | -1 | | | | | | | | · | • | | | • | | | _1 | L | - A | | <u> </u> | · | ·• | | 1 | . I | . 4 | A |

Fumonisin B₂

| Nor | man | ımal | ian s | ysten | 15 | | | | | | | | Mam | maliar | syste | ms | | | | | | | | | | | | | | | | | | 1 | | | | |
|--------------|----------|------------|--------------|-------|----|-----|-----|---|------|------|---|---|-------|----------|-------|----|---|---|---|----|-----|------|---|---|---|---------|---|------|------|---|---|----------|----|---|-----|-----|------------|------|
| Prol ryot | a- es | Lov euk | ver aryoi | tes | | Pla | nts | | Inse | ects | | | In vi | tro | | | | | | | | | | | | <u></u> | | In v | ivo | | | | | | | | | |
| | | | | | | | | | | | | | Anin | nal cell | S | | | | | Hu | nan | ælls | | | | | | Ani | mals | | | <u> </u> | | | Hum | ans | | |
| D | G | D | R | G | A | D | G | С | R | G | С | A | D | GS | М | С | Α | Т | I | D | G | S | М | с | A | Т | Ι | D | G | S | М | С | DL | A | DS | S N | 1 C | × |
| | - | | | | | | | | | | | | _1 | | | | | | | | | | | | | | | _1 | | | | | | | | | | |

Summary table of genetic and related effects of toxins derived from Fusarium moniliforme (contd)

Fusarin C

| No | nmar | nma | lian s | syster | ns | | | | | | | | Mammalian | systems | | | | | | | | | | | | | | | | | | | | | | |
|------------|------------|------------|--------------|--------|----|-----|-----|---|------|------|---|---|---------------------------------|---------|---|----|---|-------|-------|---|---|---|---------|---|------|------|---|---|---|----|---|----|------|---|---------------------------------------|---|
| Pro ryo | ka- tes | Lov euk | wer karyo | tes | | Pla | nts | | Inse | ects | | | In vitro | | | | | | | | | | <u></u> | | In v | vivo | | | | | | | | | | |
| | | | | | | | | | | | Ι | | Animal cells | | | | I | Human | cells | | | | | | Ani | mals | | | | | | Hu | mans | | · · · · · · · · · · · · · · · · · · · | |
| D | G | D | R | G | A | D | G | С | R | G | С | A | D G S | мС | A | TI | I | D G | s | М | С | A | Т | I | D | G | s | М | С | DL | A | D | s | М | С | Α |
| ? | + | | | | | | | | | | | | + + ¹ + ¹ | +1 +1 | | | | | | | | | | | | | | | | | | | | | | |

A, aneuploidy; C, chromosomal aberrations; D, DNA damage; DL, dominant lethal mutation; G, gene mutation; I, inhibition of intercellular communication; M, micronuclei; R, mitotic recombination and gene conversion; S, sister chromatid exchange; T, cell transformation

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| No | nman | ammalian systems - Lower Plants Insects - eukaryotes | | | | | | | | | | Mai | nmal | ian sy | ster | ns | | | | | | | | | | | | | | | | | | | ·i | | | | | |
|------------|------------|--|-------------|--------------|---|-----|-----|---|-----|------|----|-----|------|--------|------|------------|---|---|---|----|----|-----|-------|---|---------|---|---|---|----|-------|---|----|------------------|----|----|---|------|---|---|---|
| Pro ryo | ka- tes | Lov euk | wer aryo | tes | | Pla | nts | | Ins | ects | | | In v | itro | | | | | | | | | | | #****** | | | | In | vivo | | | | | | | | | | |
| | | | | | | | | | | | | | Ani | mal c | ells | | | | | | Hu | man | cells | | | | | | An | imals | | | | | | Н | ıman | s | | |
| D | G | D | R | G | Α | D | G | С | R | G | С | A | D | G. | s M | ท | С | A | Т | I | D | G | s | М | С | A | Т | I | D | G | s | М | с | DL | A | D | s | М | С | A |
| | - | | _1 | ¹ | | | | | : | ? | +, | | + | +1 | ? + | - 1 | + | | | +' | +1 | | _1 | | +1 | | | | +1 | | | _1 | (+) ¹ | | | | | | | |

Summary table of genetic and related effects of toxins derived from Fusarium sporotrichioides: T-2 toxin

A, an euploidy; C, chromosomal aberrations; D, DNA damage; DL, dominant lethal mutation; G, gene mutation; I, inhibition of intercellular communication; M, micronuclei; R, mitotic recombination and gene conversion; S, sister chromatid exchange; T, cell transformation

In completing the tables, the following symbols indicate the consensus of the Working Group with regard to the results for each end-point:

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- considered to be negative

< 1 1

-1 considered to be negative, but only one valid study was available to the Working Group

| | | | | Ma | mma | ilian s | syster | ns | | _ | | | | | | | | | | | | | | | | |
|-----|------|---|---|----|-------|---------|--------|----|---|---|---|----|-----|-------|---|---|---|---|---|----|-------|---|---|---|----|---|
| Ins | ects | | | In | vitro | | | | | | | | | | | | | | | In | vivo | | | | | |
| | | | | An | imal | cells | | | | | | Hu | man | cells | | | | | | An | imals | ; | | | | |
| R | G | С | A | D | G | S | М | С | A | Т | I | D | G | s | м | С | A | Т | I | D | G | s | М | С | DL | A |
| | | | | | | (1) | | | | | | | - | | | | | | | | | | | | • | • |

Summary table of genetic and related effects of ochratoxin A

С

Plants

D G

Α

A, aneuploidy; C, chromosomal aberrations; D, DNA damage; DL, dominant lethal mutation; G, gene mutation; I, inhibition of intercellular communication; M, micronuclei; R, mitotic recombination and gene conversion; S, sister chromatid exchange; T, cell transformation

In completing the tables, the following symbols indicate the consensus of the Working Group with regard to the results for each end-point:

- considered to be positive for the specific endpoint and level of biological complexity +
- considered to be positive, but only one valid study was available to the Working Group $+^1$
- considered to be negative ---

Nonmammalian systems Lower

DR

_1

G

eukaryotes

Prokaryotes

D G

? ?

_1 considered to be negative, but only one valid study was available to the Working Group

? considered to be equivocal or inconclusive (e.g., there were contradictory results from different laboratories; there were confounding exposures; the results were equivocal)

Humans

D S М С Α