

MAXIMUM RESIDUE LIMITS FOR CROP PROTECTION PRODUCTS ON PEANUTS - SOUTH AFRICA, EUROPE & JAPAN – September 2018

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BACKGROUND TO MAXIMUM RESIDUE LIMITS

The data generated from residue trials are used to calculate Maximum Residue Limits (MRL's). The definition of an MRL is: "The maximum concentration of a crop protection product legally permitted in or on food, agricultural commodities or animal foodstuffs." The main purpose of an MRL is to allow crops a legal trading limit. It does not reflect the toxicity of the product; however, it serves as a check that the crop protection product has been used according to Good Agricultural Practice (GAP). MRL's are also known as "Tolerances" in some countries e.g. the USA.

The MRL is expressed as milligram of residue in a kilogram of commodity/crop, or in parts per million (mg/kg or ppm). Residue studies are designed to give a worst case scenario of residue left in the crop. In residue trials, the crop protection product is applied in such a way as to give the maximum benefit to the crop; this will in turn also give the maximum possible residue from the proposed use. This maximum level of residue is produced by applying the highest proposed dose rate, the maximum proposed number of applications and the shortest practicable time between the last application and the crop being harvested. The above conditions are called "Critical Good Agricultural Practice" (cGAP) and will always provide the highest level of residue that could be expected. However, it is important to remember that these conditions are rarely encountered in the field and, depending upon pest, disease or weed pressure, most growers will need to use less than the permitted number of treatments on the crop, at a timing earlier than the last permitted opportunity and often at less than the highest proposed rate. Under these conditions, significantly lower residues will result, as compared to those obtained under cGAP.

This document lists chemicals that are registered for use on groundnuts in South Africa and indicates the MRL's for South Africa, the European Union and Japan. Where possible, PHI's have also been included (a PHI, or Pre-harvest Interval, is the period that should elapse between the final application and harvest). In many cases MRL's do not exist for all the markets and are indicated as NL (Not Listed). In these cases the reader will have to check with local suppliers as to the Agricultural Practice that needs to be followed in order for residues to be below the LOD (Limit of Determination), i.e., undetectable. The reasons for setting an MRL at the LOD are explained in World Trade Organization Document "QUESTIONS AND ANSWERS ON THE PROCEDURE TO OBTAIN IMPORT TOLERANCES AND THE INCLUSION OF ACTIVE SUBSTANCES FOR PLANT PROTECTION USES IN THE EUROPEAN COMMUNITIES LIST" - Ref G/SPS/GEN/557 dated 29 March 2005.

Apart from the active ingredients listed in this document, various other chemicals are mentioned in official and unofficial lists of MRL's in South Africa and elsewhere, but these are not registered for use on groundnuts / peanuts in this country and may therefore not be used on this crop.

Details of MRL's and PHI's appear in the following tables:

- Table 1: Fungicides
- Table 2: Insecticides and nematicides
- Table 3: Herbicides
- Table 4: Post-harvest storage products

Table 1. Fungicide products registered for use on South African Peanuts, plus MRL's for RSA and MRL's (Import Tolerances) for the EU and Japan.

| Active ingredient | Disease | South Africa | | Europe | | Japan | | Limit Of Determination (LOD) |
|--|---|-------------------|------------|-------------------|----------------------|-------------------|----------------------|------------------------------|
| | | MRL (ppm) / mg/kg | PHI (days) | MRL (ppm) / mg/kg | PHI (days) | MRL (ppm) / mg/kg | PHI (days) | |
| azoxystrobin / chlorothalonil | early leaf spot, web/leaf blotch | 0.01/ 0.1 | 28 | 0.2/ 0.1 | 28 | 0.2/ 0.05 | >28 Consult supplier | 0.01/ 0.01 |
| azoxystrobin / difenoconazole | early leaf spot, web/leaf blotch | 0.01/ 0.05 | 28 | 0.2/ 0.05 | 28 | 0.2/ 0.01 | >28 Consult supplier | 0.01/ 0.05 |
| azoxystrobin / epoxiconazole | early leaf spot, rust, web/leaf blotch | 0.01/ NL | 28 | 0.2/ 0.05 | >28 Consult supplier | 0.2/ 0.05 | >28 Consult supplier | 0.01/ 0.05 |
| azoxystrobin / flusilazole | early leaf spot, late leaf spot, rust, web/leaf blotch | 0.01/ 0.05 | 42 | 0.2/ 0.01 | >42 Consult supplier | 0.2/ NL | >42 Consult supplier | 0.01/ 0.01 |
| benomyl (listed under carbendazim) | early leaf spot, web/leaf blotch | 0.1 | 42 | 0.1 | 42 | 0.6 | 42 | 0.1 |
| carbendazim / difenoconazole | early leaf spot, grey mould, late leaf spot, rust, web/leaf blotch | 0.1/ 0.05 | 21 | 0.1/ 0.05 | 21 | 0.6/ 0.01 | >21 Consult supplier | 0.1/ 0.05 |
| carbendazim / epoxiconazole | early leaf spot, rust, web/leaf blotch | 0.1/ NL | 56 | 0.1/ 0.05 | >56 Consult supplier | 0.6/ 0.05 | >56 Consult supplier | 0.1/ 0.05 |
| carbendazim / flusilazole | Botrytis stem rot, early leaf spot, late leaf spot, rust, web/leaf blotch | 0.1/ 0.05 | 42 | 0.1/ 0.01 | >42 Consult supplier | 0.6/ NL | >42 Consult supplier | 0.1/ 0.01 |
| chlorothalonil | Botrytis rot, early leaf spot, late leaf spot, net blotch, peppery leaf spot, rust, web/leaf blotch | 0.1 | 42 | 0.1 | 42 | 0.05 | >42 Consult supplier | 0.01 |
| dichlorophen | early leaf spot, web/leaf blotch | 0.05 | 42 | 0.01 | >42 Consult supplier | NL | >42 Consult supplier | NL |
| difenoconazole | early leaf spot, late leaf spot, rust, web/leaf blotch | 0.05 | 21 | 0.05 | 21 | 0.01 | >21 Consult supplier | 0.05 |
| epoxiconazole / thiophanate-methyl | early leaf spot, late leaf spot, rust, web/leaf blotch | NL/ NL | 56 | 0.05/ 0.1 | >56 Consult supplier | 0.05/ NL | >56 Consult supplier | 0.05/ 0.1 |
| fludioxonil | damping-off, seed decay, seedling blight | NL | Seed tmt | 0.01 | Seed tmt | NL | Seed tmt | 0.01 |
| fludioxonil / mefenoxam (metalaxyl-M) | damping-off, seed decay, seedling blight | NL/ NL | Seed tmt | 0.01/ 0.01 | Seed tmt | NL/ 0.1 | Seed tmt | 0.01/ 0.01 |
| furfural | soil fungi | 0.01 | 28 | 1.0 | 28 | NL | >28 Consult supplier | 0.01 |
| mancozeb (dithio-carbamates) | black hull, crown rot, damping-off, early leaf spot, Phyllosticta leaf spot, seed decay | 0.5 | 21 | 0.1 | >21 Consult supplier | 0.1 | >21 Consult supplier | 0.1 |
| maneb (dithio-carbamates) / zinc oxide | early leaf spot, late leaf spot, rust, web/leaf blotch | 0.5/ NL | 21 | 0.1/ NL | >21 Consult supplier | 0.1/ NL | >21 Consult supplier | 0.1/ NL |
| propineb (dithio-carbamates/propylene-diamine) | early leaf spot | 0.5 | 21 | 0.1 | >21 Consult supplier | 0.1 | >21 Consult supplier | 0.1 |
| tebuconazole | early leaf spot, late leaf spot, rust, web/leaf blotch | 0.05 | 42 | 0.15 | 42 | 0.2 | 42 | 0.02 |

| | | | | | | | | |
|------------------------------|------------------------------|----|------------------|-----------------|------------------|----|------------------|-----|
| thiram (dithio-carbamates) | crown rot, seed decay | NL | Seed tmt | 0.1* | Seed tmt | NL | Seed tmt | 0.1 |
| <i>Trichoderma harzianum</i> | <i>Rhizoctonia, Fusarium</i> | NL | Consult supplier | No MRL required | Consult supplier | NL | Consult supplier | NL |

* **Note:** Thiram has increasingly come under regulatory pressure in the EU and certain end uses for this a.i. have recently been withdrawn. It is possible that the MRL will be cancelled in the future. Consult supplier in the event of any uncertainty.

Table 2. Insecticide and nematicide products registered for use on South African Peanuts, plus MRL's for RSA and MRL's (Import Tolerances) for the EU and Japan.

| Active ingredient | Pest | South Africa | | Europe | | Japan | | Limit Of Determination (LOD) |
|--|--|-------------------|------------------|-------------------|-----------------------|-------------------|----------------------|------------------------------|
| | | MRL (ppm) / mg/kg | PHI (days) | MRL (ppm) / mg/kg | PHI (days) | MRL (ppm) / mg/kg | PHI (days) | |
| alpha-cypermethrin | African bollworm, cutworms | 0.05 | 7 | 0.1 | 7 | 0.05 | 7 | 0.05 |
| <i>Bacillus thuringiensis</i> | army worm, African bollworm, semi-looper | NL | Consult supplier | 0.01 | Consult supplier | NL | Consult supplier | NL |
| beta-cyfluthrin | cutworms | NL | **See below | 0.02 | **See below | 0.5 | **See below | 0.02 |
| beta-cypermethrin | African bollworm, cutworms | 0.05 | 7 | 0.1 | 7 | 0.05 | 7 | 0.05 |
| bollworm nucleopolyhedrovirus | African bollworm | NL | Consult supplier | No MRL required | Consult supplier | NL | Consult supplier | NL |
| chlorantraniliprole / lambda-cyhalothrin | African bollworm, army worm, fall army worm, false army worm | 0.01/ 0.2 | 14 | 0.06/ 0.2 | 14 | 0.06/ 0.2 | 14 | 0.01/ 0.02 |
| cypermethrin | African bollworm, cutworms | 0.05 | 7 | 0.1 | 7 | 0.05 | 7 | 0.05 |
| deltamethrin | African bollworm, cutworms | 0.05 | 7 | 0.02 | >7 Consult supplier | NL | >7 Consult supplier | 0.01 |
| demeton-S-methyl | aphids | 0.1 | 21 | 0.01 | >>21 Consult supplier | 0.05 | >21 Consult supplier | 0.01 |
| dimethoate | aphids | 0.1 | 14 | 0.01 | >>14 Consult supplier | 1.0 | 14 | 0.01 |
| emamectin benzoate | army worm, fall army worm, false army worm | 0.01 | 35 | 0.01 | 35 | NL | >35 Consult supplier | 0.01 |
| esfenvalerate | cutworms | NL | **See below | 0.05 | **See below | NL | **See below | 0.05 |
| fenamiphos | nematodes | 0.05 | 63 | 0.02 | >63 Consult supplier | 0.05 | 63 | 0.02 |
| fenvalerate | cutworms | NL | **See below | 0.05 | **See below | 0.1 | **See below | 0.05 |
| furfural | nematodes | 0.01 | 28 | 1.0 | 28 | NL | >28 Consult supplier | 0.01 |
| gamma-cyhalothrin | African bollworm, cutworms | NL | Consult supplier | 0.01 | Consult supplier | NL | Consult supplier | NL |
| lambda-cyhalothrin | African bollworm, cutworms | 0.2 | Consult supplier | 0.2 | Consult supplier | 0.2 | Consult supplier | 0.02 |
| lufenuron | army worm, fall army worm, false army worm | 0.02 | 35 | 0.01 | >35 Consult supplier | NL | >35 Consult supplier | 0.01 |
| mercaptotion (malathion) | aphids | 8.0 | 7 | 0.02 | >>7 Consult supplier | 8.0 | 7 | 0.02 |
| mercaptotion (malathion) / pyrethrins | aphids | 8.0/ 1.0 | 7 | 0.02/ 3.0 | >>7 Consult supplier | 8.0/ 1.0 | 7 | 0.02/ NL |
| omethoate | thrips | 0.1 | 21 | 0.01 | >>21 Consult supplier | 1.0 | 21 | 0.01 |
| oxamyl | nematodes | 0.05 | 80 | 0.01 | >80 Consult supplier | 0.1 | 80 | 0.01 |
| pirimicarb | aphids | 0.05 | 21 | 0.02 | >21 Consult supplier | NL | >21 Consult supplier | 0.02 |

| | | | | | | | | |
|-------------------|---|------|----------|------|-----------------------|------|----------------------|------|
| terbufos | astylus beetle, black maize beetle, false wireworm, nematodes, rootworm, wireworm | 0.1 | 90 | 0.01 | >>90 Consult supplier | 0.05 | >90 Consult supplier | 0.01 |
| thiamethoxam | aphids, thrips, white grubs, wireworm | 0.02 | Seed tmt | 0.02 | Seed tmt | 0.02 | Seed tmt | 0.02 |
| zeta-cypermethrin | African bollworm, cutworms | 0.05 | 7 | 0.1 | 7 | 0.05 | 7 | 0.05 |

**** Additional Information:** Certain insecticide active ingredients used for cutworm control either do not have set Withholding Periods (PHI's) or MRL's, or MRL's are set at LOD. This is due to the Agricultural Practice, i.e., early post-plant applications leading to no detectable residue at harvest.

Table 3. Herbicide products registered for use on South African Peanuts, plus MRL's for RSA and MRL's (Import Tolerances) for the EU and Japan.

| Active ingredient | South Africa | | Europe | | Japan | | Limit Of Determination (LOD) |
|------------------------------------|-------------------|--------------|-------------------|-----------------------|-------------------|-----------------------|------------------------------|
| | MRL (ppm) / mg/kg | PHI (days) | MRL (ppm) / mg/kg | PHI (days) | MRL (ppm) / mg/kg | PHI (days) | |
| acetochlor | 0.02 | ***See below | 0.01 | ***See below | NL | ***See below | 0.01 |
| acetochlor / benoxacor (safener) | 0.02/ NL | ***See below | 0.01/ NL | ***See below | NL/ 0.01 | ***See below | 0.01/ 0.01 |
| acetochlor / dichlormid (safener) | 0.02/ NL | ***See below | 0.01/ NL | ***See below | NL/ NL | ***See below | 0.01/ NL |
| alachlor | 0.05 | ***See below | 0.02 | ***See below | 0.02 | ***See below | 0.02 |
| bendioxide (bentazone) | NL | ***See below | 0.05 | ***See below | 0.05 | ***See below | 0.05 |
| clethodim | 1.0 | 28 | 5.0 | 28 | 5.0 | 28 | NL |
| cycloxydim | 0.5 | 35 | 0.2 | >35 Consult supplier | 0.05 | >>35 Consult supplier | 0.05 |
| diclosulam | NL | ***See below | NL | ***See below | 0.02 | ***See below | 0.01 |
| dimethenamid-p (s-dimethenamid) | NL | ***See below | 0.01 | ***See below | 0.01 | ***See below | 0.01 |
| fluaizifop-P-butyl | NL | 40 | 0.01 | >40 Consult supplier | 2.0 | >40 Consult supplier | 0.01 |
| flufenacet | NL | ***See below | 0.05 | ***See below | NL | ***See below | 0.05 |
| flumetsulam | NL | 28 | 0.01 | >28 Consult supplier | 0.05 | >28 Consult supplier | NL |
| flumetsulam / s-metolachlor | NL/ NL | ***See below | 0.01/ 0.05 | ***See below | 0.05/ 0.2 | ***See below | NL/ 0.05 |
| flumioxazin (flumioxazine) | NL | ***See below | 0.05 | ***See below | 0.02 | ***See below | 0.05 |
| fomesafen | 0.05 | 56 | 0.02 | >56 Consult supplier | NL | >56 Consult supplier | 0.02 |
| haloxyfop-R-methyl | 2.0 | 40 | 0.01 | >>40 Consult supplier | 0.05 | >>40 Consult supplier | 0.01 |
| imazethapyr | 0.05 | 85 | 0.01 | >85 Consult supplier | 0.1 | 85 | NL |
| metazachlor | 0.05 | ***See below | 0.02 | ***See below | NL | ***See below | 0.02 |
| metolachlor | 0.05 | ***See below | 0.05 | ***See below | 0.2 | ***See below | 0.05 |
| metolachlor / benoxacor (safener) | 0.05/ NL | ***See below | 0.05/ NL | ***See below | 0.2/ 0.01 | ***See below | 0.05/ 0.01 |
| metolachlor / dichlormid (safener) | 0.05/ NL | ***See below | 0.05/ NL | ***See below | 0.2/ NL | ***See below | 0.05/ NL |
| metolachlor / safener | 0.05/ - | ***See below | 0.05/ - | ***See below | 0.2/ - | ***See below | 0.05/ - |
| pendimethalin | NL | ***See below | 0.05 | ***See below | 0.2 | ***See below | 0.05 |
| propaquizafop | NL | 40 | 0.05 | >40 Consult supplier | 0.05 | >40 Consult supplier | 0.05 |
| quizalofop-P-ethyl | 0.2 | 24 | 0.1 | >24 Consult supplier | 0.1 | >24 Consult supplier | 0.1 |

| | | | | | | | |
|--|-----------|--------------|-------------|--------------|--------------|--------------|---------------|
| quizalofop-P-tefuryl | NL | ***See below | 0.1 | ***See below | 0.1 | ***See below | 0.1 |
| s-metolachlor (metholachlor-s) | NL | ***See below | 0.05 | ***See below | 0.2 | ***See below | 0.05 |
| s-metolachlor / benoxacor (safener) | NL/ NL | ***See below | 0.05/ NL | ***See below | 0.2/ 0.01 | ***See below | 0.05/ 0.01 |
| terbutryn | 0.05 | ***See below | 0.01 | ***See below | NL | ***See below | NL |
| trifluralin | 0.05 | ***See below | 0.01 | ***See below | 0.2 | ***See below | 0.01 |

***** Additional Information:** Most herbicide active ingredients either do not have set Withholding Periods (PHI's) or MRL's, or MRL's are set at LOD. This is mainly due to the Agricultural Practice, i.e., pre-plant or early post-plant applications leading to no detectable residue at harvest.

Table 4. Post-harvest Storage products registered for use on South African Peanuts, plus MRL's for RSA and MRL's (Import Tolerances) for the EU and Japan. ****

| Active ingredient | Pest | South Africa | Europe | Japan | Limit Of Determination (LOD) |
|---|-------------------------|-------------------|--|----------------------|------------------------------|
| | | MRL (ppm) / mg/kg | MRL (ppm) / mg/kg | MRL (ppm) / mg/kg | |
| Aluminium phosphide. Residues as phosphine (hydrogen phosphide) | Pests of stored product | NL | 0.05 | 0.1 | 0.01 |
| Magnesium phosphide. Residues as phosphine (hydrogen phosphide) | Pests of stored product | NL | 0.05 | 0.1 | 0.01 |
| piperonyl butoxide | Pests of stored product | 10.0 | Not classified as a plant protection product | 1.0 | NL |
| pirimiphos-methyl | Pests of stored product | 5.0 | 0.5 Consult supplier | 1.0 Consult supplier | NL |
| pyrethrins | Pests of stored product | 1.0 | 3.0 | 1.0 | NL |

****** Additional Information:**

- Fumigation is the process of killing insects with a toxic gas, phosphine (PH₃) being the most commonly used. Phosphine concentration and exposure time are both important in killing insects, but time is more important than concentration. Phosphine treatment involves 5-14 days under fumigation, followed by 2-5 days ventilation and a further two days withholding period. The overall fumigation can take up to 21 days where kernel temperature is below 25°C and fans are not used to purge the gas during venting. Fumigated grain must be vented for the required time before it can be legally transported.
- All other insecticides used in storage facilities e.g. pyrethroids, must comply with the importing country's legislation. Refer to Table 2 for specific import tolerances set for these products.

IMPORTANT NOTES:

- Use of chemical products (fumigation or otherwise) should be managed according to the HACCP plan of the processing facility if not handled by the farmer. Chemical contamination from these products fall outside the scope of pre-farm gate control points and care should be taken when following label instructions to ensure ventilation after treatment. In all cases NO RESIDUE is allowed to remain.
- Only products (formulations) registered under Act no. 36 of 1947 may be used and product label prescriptions should always be followed in accordance with the Act.
- NL = No MRL is listed in the country. **In these cases the MRL will default to Level of Determination (LOD).**
- In addition to production and storage chemicals, care should be taken to use only cleaning and sanitation products acceptable in terms of GAP, GMP and GDP requirements.
- Always follow requirements of published Food Safety legislation, including GAP, GMP and GDP.

REFERENCES:

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11. Questions and Answers on the Procedure to Obtain Import Tolerances and the Inclusion of Active Substances for Plant Protection uses in the European Communities list:
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