



Removing propiconazole residue from citrus packing lines

Catherine Savage, Wilma du Plooy and Paul Hardman
Citrus Research International (CRI), Citrus Growers Association (CGA)

Cutting Edge No. 312 was recently distributed detailing the change in the allowed export tolerance of propiconazole residue on citrus fruit for the European Union (EU). **The EU propiconazole citrus MRL (maximum residue limit) is 0.01 mg/kg** and comes into effect on 2nd September 2021. It is unclear when the United Kingdom (UK) MRL will change, if at all. Nevertheless, a cautious approach for fruit destined for the UK, in line with the details below, should be followed until more clarity can be obtained.

As packhouses look to clean their lines, and based on information from European and South African packhouses that stopped propiconazole use in previous years, it has become apparent that **propiconazole residue is extremely difficult to remove from the packing line.**

It is CRI's recommendation that packers without clean/new dedicated packing lines for sending fruit to the EU should stop applying propiconazole as soon as possible and begin concentrating on cleaning the packing lines that will be used for fruit destined to the EU. Those with dedicated lines for other markets and who use propiconazole, should be wary of cross contamination.

Cleaning the line

Propiconazole is offered as an EC (Emulsifiable Concentrate) formulation and as such does not mix easily with water, and quickly settles onto the bottom of tanks and applicators. The residue also settles in pipes, on brushes and on donuts.

When cleaning the line it is important to remember that **"the line" is not limited to where the fruit rolls over, but includes any area that has come into contact with propiconazole-containing mixtures**, and that may transfer residue, even indirectly. This includes, but is not limited to: all pipes, tanks, chains, bins, mixing utensils,

measuring jugs, gloves, pH meters, curtains, drains, floors, etc.

Steps to clean the line:

1. **Remove any brushes or donuts** that have been exposed to propiconazole and replace with new, unused ones.
 - Destroy the old donuts so that they do not accidentally get re-introduced into the packline. Propiconazole residue cannot be effectively removed from donuts without destroying the sponge.
 - Propiconazole contaminated brushes must be kept separate so as not to be accidentally used, but after multiple and thorough cleanings, may become residue free and can then be re-used. To clean the brushes the same method of washing, rinsing, treating, and rinsing again, is required with special care to clean to the core of the brush. Before the brushes are used on a line packing for the EU, the brush must be tested for residues as per the procedure below.
2. **Physically de-wax all surfaces** where wax accumulates, especially drying tunnels and packing surfaces prior to washing.
3. Physically **wash** all affected areas with an acceptable **soap and water**.
4. **Apply a residue stripping product** such as Skimmer Plus, leave for a few minutes (if possible also scrub) and thoroughly rinse with high volumes of clean water. It is very important not to let the treated surfaces dry before rinsing, as this may concentrate the active on the surface. Consult your supplier and make sure that the product is applied correctly.
5. **Rinse** the area very well before proceeding to the chlorine wash, as unwanted side reactions between the stripping product and chlorine may occur.
6. **Wash the line with calcium hypochlorite (chlorine)** to assist in breaking down loosened propiconazole particles.
7. It is recommended to **repeat the process**.



8. Ensure that the cleaning utensils, rags and brushes, are replaced or also stripped clean.

It is best to work on small areas at a time to ensure the area is washed, stripped and rinsed in quick succession. The surface area sizes to be stripped at a time will be determined by the ability of the packhouse to rinse the surfaces before they are dry.

Strict supervision is needed during the cleaning process so that no areas are missed and/or incorrectly cleaned.

Residue testing

Once the line has been stripped and cleaned it is important that packhouses and exporters follow and document the propiconazole residue on fruit. Historical data from packhouses show that **propiconazole residue can be detected on fruit for years after its use was stopped**. Residue testing will allow packhouses and exporters to track the problem as well as identify problem areas.

- Residue samples can be taken from fruit in line with normal analysis.
- Additionally, residue removal efficacy (% surface residue reduction) can be determined by sampling surfaces BEFORE and AFTER cleaning following specific sampling protocols. It must be stressed that the residue determined by sampling only after cleaning is of no use in determining residue reduction.

Packline Residue Sampling Procedure

- Use a clean plastic/metal ruler and throat swabs or new earbuds for accurate sampling. The ruler can be washed in diluted Skimmer Plus.
- Do not touch the swab surface.
- Wet the swab with diluted (as per label) Skimmer Plus, shake 3 times to remove excess solution.
- Sample surfaces BEFORE and AFTER cleaning with Skimmer Plus.
- Take three swab-samples per area, pool as one sample.

- If using earbuds, cut the side used for sampling into a new (unused) ziplock bag, without touching that side, and pooling three earbuds as one sample.
- Mark swabs clearly with area of sampling, packhouse name, & date.
- Dispatch to Hortec (www.hortec.co.za; 021 851 1044) or Hearshaw and Kinnes (www.hkal.co.za; 021 702 4129) for analysis.

1. Sampling flat surfaces:

- Sample by sweeping up-and-down, and then across on 25 cm² area, using a clean swab (can be prepared using Skimmer Plus as set out above).
- Per sample, repeat this action three times on different areas in close proximity to each other on the surface of interest, resulting in three swabs per sample.

2. Sampling irregular surfaces:

If the irregular surface has flat sections that are longer than 5 cm the procedure for "Sampling on flat surfaces" can be used otherwise do the following:

Repeated objects such as buckets on a conveyor:

- Place the plastic/metal ruler along the irregular surface as to support it on two points. With a clean swab swipe along the edge of the ruler for a known distance so that the tip of the swap is pushed against the surface to be sampled.
- When seen from above the line that is sampled should be straight.
- A **total** of a 50 cm line should be sampled in this manner. (Different lines to total 50 cm.)
- Pre- and post-cleaning sampling should be done by the same person (consistency)

3. Sampling brushes:

- Place the plastic/metal ruler on the brush roller.
- The bristles should be pushed as flat as possible against the axle of the roller.



- With a clean swab swipe 5 cm along the edge of the ruler.
- Repeat this 10 times.

To work out the percentage Reduction of Surface residues:

% = (Residue after cleaning/Residue before cleaning) X 100

Please consult CRI and your supplier of the stripping product if you have any problems.



Die verwydering van propikonasoolresidu uit sitrusverpakkingslyne

Catherine Savage, Wilma du Plooy en Paul Hardman
Citrus Research International (CRI), Citrus Growers Association (CGA)

Onlangs is die veranderinge in die toegelate uitvoertoleransie van propikonasoolresidu op sitrusvrugte vir die Europese Unie (EU) uiteengesit in Snykant No. 312. **Die EU MRL (maksimum residu limiet) vir propikonasool op sitrus is 0.01 mg / kg** en tree op 2 September 2021 in werking. Dit is onduidelik wanneer die MRL van die Verenigde Koninkryk verander (indien dit enigsins sal verander). 'n Versigtige benadering moet nietemin gevolg word vir vrugte wat bestem is vir die Verenigde Koninkryk, in ooreenstemming met die besonderhede hieronder, totdat meer duidelikheid verkry kan word.

Aangesien pakhuis hulle lyne moet skoonmaak en gebaseer op inligting uit Europese en Suid-Afrikaanse pakhuis wat die gebruik van propikonasool in vorige jare gestaak het, blyk dit dat **dit baie moeilik is om propikonasoolresidue van die verpakkingslyn te verwyder**.

Die CRI beveel aan dat verpakkingslyne sonder skoon / nuwe, toegewyde verpakkingslyne vir die versending van vrugte vir die EU so gou as moontlik die gebruik van propikonasool staak. Daar moet gekonsentreer word op die skoonmaak van die verpakkingslyne bestem vir vrugte na die EU. Diegene met spesifieke lyne vir ander markte waar propikonasool steeds toegelaat word, moet versigtig wees vir kruisbesmetting indien dit gebruik word.

Skoonmaak van die lyn

Propikonasool is beskikbaar as 'n EC-formulasie (emulgeerbare konsentraat) en meng as sodanig nie maklik met water nie, en sak maklik na die bodem van tenks en toediensers. Die residu sit ook in pype, borsels en sponsrollers.

By die skoonmaak van die lyn is dit belangrik om te onthou dat 'die lyn' nie beperk is tot waar die vrugte beweeg nie. Dit omskryf enige area wat in aanraking gekom het met propikonasoolbevattende mengsels wat residue kan oordra, selfs indirek. Dit sluit in, maar is nie beperk tot: alle pype, tenks, kettings, vullisdromme, menggereedskap, maatbekers, handskoene, pH-meters, gordyne, dreine, vloere, ens.

Stappe om die lyn skoon te maak:

1. **Verwyder borsels of sponsrollers** wat aan propikonasool blootgestel is en vervang dit met nuwe, ongebruikte eenhede.
 - Vernietig die ou sponsrollers sodat dit nie per ongeluk weer in die paklyn ingebring word nie. Propikonasoolreste kan nie effektief uit die sponsrollers verwyder word sonder om die spons te vernietig nie.
 - Borsels besmet met propikonasool moet apart gehou, word sodat dit nie per ongeluk in gebruik geplaas word nie. Dit kan egter na veelvuldige en deeglike skoonmaak, residu-vry wees en kan dan weer gebruik word. Om die borsels skoon te maak, is dit nodig om 'n deeglike, herhaalde protokol van was, afspoel, behandel en weer afspoel, te volg. Voordat hierdie borsels op 'n verpakkingslyn vir EU vrugte gebruik word, moet die borsel vir residue getoets word volgens die onderstaande prosedure.
2. **Verwyder alle verpakkingswas fisies van alle oppervlaktes** waar dit opgehoop het, veral droogtonnels en verpakkingsoppervlaktes, voordat dit gewas word.
3. **Was** alle geaffekteerde areas fisies met 'n aanvaarbare **seep en water**.
4. **Dien 'n residu-stroopmiddel toe**, soos Skimmer Plus, laat dit vir 'n paar minute staan (indien moontlik ook skrop) en spoel deeglik af met groot hoeveelhede skoon water. Dit is baie belangrik om nie die behandelde oppervlaktes te laat droog word voordat dit afgespoel word nie, aangesien dit die aktief op die oppervlak kan laat konsentreer. Raadpleeg u verskaffer en maak seker dat die produk korrek toegepas word.
5. **Spoel** elke gestroopte area deeglik voordat dit met chloor gewas word, aangesien ongewenste reaksies tussen die stroopmiddel en chloor amg plaasvind.
6. **Was die verpakkingslyn met kalsiumhipochloriet (chloor)** om losgemaakte propikonasooldeeltjies af te breek.
7. Dit word aanbeveel **om die proses te herhaal**.
8. Sorg dat alle skoonmaakgereedskap, lappe en borsels vervang word, of ook skoon gestroop word.



Dit is die beste om tegelykertyd op veelvuldige klein areas te werk om te verseker dat die area vinnig gewas, gestroop en gespoel word. Die grootte van die oppervlakareas wat u tegelyk moet stroop, word bepaal deur die pakhuis se vermoë om die oppervlaktes te spoel voordat dit droog is.

Streng toesig is nodig tydens die skoonmaakproses sodat geen areas misgeloop en / of verkeerd skoongemaak word nie.

Residuetoetsing

Nadat die lyn gestroop en skoongemaak is, is dit belangrik dat pakhuis en uitvoerders die propikonasoolresidu op vrugte moet volg en dokumenteer. Historiese gegewens uit pakhuis toon dat propikonasoolresidu jare op vrugte opgespoor kan word nadat die gebruik daarvan gestaak is. Residu-toetsing sal pakhuis en uitvoerders in staat stel om die probleem op te spoor en ook probleme te identifiseer.

- Residumonsters van vrugtemoet geneem word in ooreenstemming met normale ontleding.
- Verder kan die doeltreffendheid van die verwydering van residu (% vermindering van die oppervlakresidu) bepaal word deur monsterneming van oppervlaktes voor en na skoonmaak, volgens spesifieke monsternemingsprotokolle. Dit moet beklemtoon word dat residu-bepaling wat slegs na skoonmaak gedoen word, geen waarde het in terme van die bepaling van residu-vermindering nie.

Residue Monsternemingsprosedure vir die Paklyn

- Gebruik 'n skoon plastiek / metaal linaal en keel deppers (of nuwe oorpluisies) vir akkurate monsterneming. Die linaal kan in die verdunde Skimmer Plus gewas word.
- Moenie aan oppervlak waar monsterneming gedoen word, raak nie.
- Maak die depper nat met Skimmer Plus (volgens etiket), skud drie keer om oortollige oplossing te verwyder.
- Monster oppervlaktes VOOR en NA skoonmaak met Skimmer Plus.
- Neem drie watte-monsters per area, voeg dit as een monster.
- Indien oorpluisies gebruik word, moet die kant wat vir monsterneming gebruik was, in 'n nuwe (ongebruikte) "ziplock" sakkie

geplaas word. Moenie aan die kant waar die monster geneem was raak nie en plaas drie pluisies in een sakkie as 'm enkel monster.

- Merk deppers en sakkies duidelik met area van monsterneming, pakhuisnaam, & datum.
- Stuur na Hortec (www.hortec.co.za; 021 851 1044) of Hearshaw en Kinnes (www.hkal.co.za; 021 702 4129) vir ontleding.

1. Monsterneming van plat oppervlaktes:

- Doen monsterneming deur 25 cm² deur kruis en dan dwars met 'n skoon depper te vee (kan voorberei word met Skimmer Plus soos bo beskryf).
- Herhaal op drie verskillende nabygeleë posisies op die toetsoppervlakte per monster (dus drie deppers per monster).

2. Monsterneming van onreëlmatige oppervlaktes:

Indien die onreëlmatige oppervlak plat gedeeltes het wat langer is as 5 cm, kan die prosedure vir "Monsterneming op plat oppervlaktes" gebruik word, anders doen u die volgende:

Herhaalde voorwerpe soos die weegskuite op 'n vervoerband:

- Plaas die plastiek / metaal linaal langs die onreëlmatige oppervlak om dit op twee punte te steun.
- Vee met 'n skoon depper teen die linaal se rand vir 'n bekende afstand sodat die punt van die depper teen die oppervlak gedruk word vir monsterneming.
- As van bo gekyk word, moet die lyn wat gemonster word, reguit wees.
- 'n Totale lyn van 50 cm-lyn moet op die manier gemonster word. (Verskillende stukkies lyn tot 50 cm totaal.)
- Monsters voor en na skoonmaak moet deur dieselfde persoon gedoen word (konsekwentheid)

3. Steekproewe borsels

- Plaas die plastiek / metaal linaal op die borselrol.



- Die hare moet so plat as moontlik teen die as van die roller gedruk word.
- Met 'n skoon depper vee 5 cm oor die rand van die liniaal.
- Herhaal dit tien keer.

Om die persentasie vermindering van oppervlakreste uit te werk:

% = (Residue ná skoonmaak / Residue voor skoonmaak) X 100

Raadpleeg CRI en die verskaffer van u strooproduk indien u probleme ondervind.