



# Information Sheet

## 12. RIPENING

### 12.5 Registered chemicals for ripening sugarcane: MODDUS

*This Information Sheet provides important information and recommendations for the correct and optimal use of trinexapac-ethyl (MODDUS) as a sugarcane ripener.*

#### Product information and mode of action

MODDUS (Syngenta South Africa (Pty) Ltd.; registration number L8565) is an emulsifiable concentrate containing 250 g of the active ingredient, trinexapac-ethyl, per litre of product.

At the correct dosage MODDUS can be used as a chemical ripener in sugarcane both for early and late-season application. Once absorbed through the leaves, the active ingredient's mode of action leads to the inhibition of internode elongation (Figure 1), but without affecting the stalk apical meristem (growing point). Inhibition of internode elongation typically causes the formation of a compressed leaf whorl (Figure 2). Besides its effect on internode elongation, MODDUS might also cause the shortening of new leaves emerging after application (Figure 2). Once the active ingredient has been sufficiently metabolised, there is a gradual resumption of normal internode and leaf elongation.

MODDUS is a plant growth regulator affecting cereals and grass species. Spray drift onto neighboring non-target crops should be avoided. Care should be taken to minimise

the drift of MODDUS into natural vegetation. Published evidence (Correia & Leite 2012 – Scientia Agricola 69: 194 – 200) indicates that accidental spraying of MODDUS onto a diverse range of non-target broad-leaf species (e.g. citrus, mango, potato, common bean, soybean, cotton and sunflower) do not affect flowering and yield, unlike ETHEPHON (and generics), which can have severe consequences.

MODDUS is not persistent in water or soil and does not accumulate in nature. However, MODDUS must not be applied directly to water bodies (dams, rivers and standing surface water) because of toxicity towards aquatic organisms (fish, invertebrates and algae) that could cause long-term adverse effects in the aquatic environment. MODDUS poses a very low risk to birds, bees and mammals.

#### Recommendations

##### **Crop suitability for the use of MODDUS**

Refer to Information Sheets 12.1 for detailed guidelines for selecting cane suitable for chemical ripening. MODDUS is effective on relatively mature cane and good responses can be expected when the whole-stalk juice purity is below 85% at the time of application. Since MODDUS does not kill the stalk growing point, late-season ripening can be approached with far greater confidence than in the case of FUSILADE FORTE.

Juice purity can be determined in a laboratory from stalk samples collected from the target field a week or less before spraying. Sixteen randomly selected stalks (of uniform length), collected from a number of positions within the field, must be stripped of all leaves, topped at the natural breaking point, and bundled together into a single sample. These samples should be submitted to the Cane Testing Service (CTS) at the mill, or submitted to your local Extension Specialist, who will make arrangements for testing at the SASRI millrooms (Pongola or Mount Edgecombe). An alternative method is to determine Brix% along the length of stalks from the target field with a portable refractometer and to use these values to estimate juice purity with the smartphone app **PurEst™**. Refer to SASRI Information Sheet 12.2 that explains how to estimate whole-stalk juice purity on the farm with **PurEst™**.



*Figure 1. Inhibition of internode elongation at the top of a MODDUS-treated stalk.*



*Figure 2. Compressed leaf whorl and shortened leaves in MODDUS-treated cane.*

Application of MODDUS to crops with whole-stalk juice purities above 85% at the time of planned application is not recommended because such crops are in a process of natural ripening.

It is essential that cane growth is vigorous at the time of application and that the supply of moisture is sufficient to maintain maximum sucrose production rates by the leaf canopy for as long as possible. Premature withdrawal of irrigation will result in lower sucrose production rates and reduced chemical efficacy. To achieve maximum chemical efficacy it is recommended that a MODDUS-ripened crop be irrigated for as long as possible after product application, yet allowing enough time without irrigation to avoid complications during harvesting (stool damage and poor burning efficiency).

For rainfed crops the same conditions stipulated above apply. Crops ripened with MODDUS on good soils, holding abundant soil moisture, will achieve much better results than crops grown under marginal conditions.

### Varietal response to MODDUS

Research conducted in other countries (Australia, Brazil and USA) suggests that there might be varietal differences in response to MODDUS. Screening of local varieties for their responsiveness to MODDUS has commenced in 2015 and variety-specific recommendations will be communicated to growers as they become available. At this stage positive responses have been observed in a number of popular rainfed and irrigated SASRI varieties.

### Treatment options and application timing

MODDUS can be used on its own, or in combination with FUSILADE FORTE, depending on the whole-stalk juice purity of the crop at the time of MODDUS application. The combination treatment could be particularly effective in very vigorously growing crops with whole-stalk juice purities below 80% at the time of MODDUS application. However, when whole-stalk juice purities are above 80%, MODDUS on its own is recommended. This would typically be the case for many rainfed crops, or for late-season ripening before mill closure. The application of these treatments are explained in Table 1.

The optimal timing of application of MODDUS might very well vary from the general recommendation of 10 weeks before harvest depending on crop growth vigour, which is influenced by many factors including location, climate, variety, crop maturity and management. For precision-agriculture purposes, timing may be adjusted based on information gleaned from hand-held refractometer measurements, recorded at intervals between spraying and the planned harvest date. Refer to Information Sheet 12.2 for more information on the measuring method and interpretation of refractometer readings for this purpose.

Table 1: Timing of treatment application for the relevant crop maturities.

Treatment	Timing of application	Crop maturity guidelines*
MODDUS	Apply MODDUS 10 weeks ** before harvest	Crops with juice purities below 85% at the time of MODDUS application
Combination	Apply MODDUS 10 weeks** before harvest followed by FUSILADE FORTE 4 weeks later	Crops with juice purities below 80% at the time of MODDUS application

\*Crop maturity can be estimated on the farm with a hand-held refractometer in conjunction with **PurEst**<sup>TM</sup> (refer to Information Sheet 12.2)

\*\*Timing based on research conducted on irrigated annual crops on an April/May cutting cycle at Pongola and Heatonville (Empangeni)

### Application rates

In the following table the application rates for using MODDUS on its own, or as part of a combination treatment, are provided.

Table 2: Treatment application rates and water volume.

Treatment	Application rate	Water volume
MODDUS	Apply MODDUS at 1.0 L/ha	Apply in 50 - 200 L water/ha (ground application) or 30 – 35 L water/ha (aerial application)
Combination	MODDUS (0.8 L/ha) followed by FUSILADE FORTE 4 weeks later at 225 – 275 ml/ha (aerial application) or 200 – 250 ml/ha (ground application)	

### Does MODDUS affect the growth of the following crop (residual effects)?

Research conducted in other countries (Australia and Brazil) have shown that MODDUS has no negative effects on the following crop. Improved early tillering has been reported in many cases including some local observations made in varieties N27 and N42.

### Can cane which has been sprayed with MODDUS be used for seedcane?

Yes. In some countries MODDUS is registered for internode shortening in cane to be used for seed piece production.