

DUAL-METOLACHLOR EXPERIENCES AND NEW FINDINGS AFTER TEN YEARS OF USE IN PRACTICE

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SUMMARY

Dual-Metolachlor is a acetanilide based herbicide. The product is on the market for more than 10 years in more than 75 countries. It is registered in more than 35 different crops including sunflowers. Mainly due to his outstanding performance concerning weed control, selectivity, lasting effect and toxicological behaviour, Dual-Metolachlor has become one of the 5 leading herbicides in the world. In order to avoid tank-mixtures various Metolachlor containing prepacks have been developed: Codal, Dualin, Tobacron and Maloran special. All of them can be successfully used in sunflowers.

INTRODUCTION

Dual-Metolachlor was developed by Ciba-Geigy in the early 70ties and introduced in all important agricultural countries from 1976 - 77 onwards. During the last ten years Dual-Metolachlor became one of the five herbicides mostly used worldwide.

The following factors have essentially contribution to this successful development.

- good selectivity in many crops, also especially in sunflowers
- flexible application timing
- optimum lasting effect
- good chemical, physical and biological properties
- broad spectrum of action against weeds
- different formulations and pre-packs adaptable to practice
- product without toxicological problems

These points will be further discussed in detail.

1. HIGH SELECTIVITY IN MANY CROPS

Products containing metolachlor are registered worldwide in 75 countries and 35 crops. The most important ones are:

maize	beans	tomatoes
soya	peas	red pepper
sunflower	tobacco	onions
sugarbeet	flax	sugar cane
cotton	potatoes	hemp, etc.

In 1985 more than 20 mio ha of these crops were treated worldwide with products containing metolachlor.

The part of sunflowers is estimated at approx. 1 mio. ha

1.1 Possibilities of use in different crops

The great advantage of Dual-Metolachlor is the fact that this product can be used in many crops.

Dual-Metolachlor is the only graminicide that can be used in all the four most important crops after cereals.

- maize
- sunflower
- soya
- sugarbeet

This means for the user: he can solve his weed problem with one product in four important crops.

2. FLEXIBLE TIMING

For a herbicide used on large areas and in many crops a high degree of flexibility concerning application period is of advantage. For that reason the use can be better tuned to the cultivation technology and inconvenient work

peaks can be avoided. In relation to flexible timing, Dual-Metolachlor offers an optimum as it can be applied not only before sowing but also after sowing. Furthermore, in maize Dual-Metolachlor can be applied as well at post-emergence. In cases where tank mixtures or prepacks are used in sunflowers they are usually applied after sowing, pre-emergence to the crop.

3. OPTIMUM LASTING EFFECT (TABLE 1)

One of the most estimated qualities of Dual-Metolachlor is its almost ideal residual effect in the soil: not too long but also not too short.

The lasting effect is influenced by the leaching behavior and by the speed of the biological-chemical degradation in the soil.

With the help of the leaching-index and the half-life period the lasting effect of individual products can be judged and compared.

As visible in table 1 the figures for Dual-Metolachlor guarantee an optimum persistence during the whole period of vegetation but exclude a negative effect on crop rotation.

In comparison to other acetanilides Dual-Metolachlor shows a distinctly longer lasting effect. DNA containing herbicides have a longer lasting effect than DUAL-Metolachlor, but these products have in some cases negative impacts on crop rotation.

4. CHEMICAL-PHYSICAL PROPERTIES

4.1 Vapourisation - Incorporation (table 2)

Dinitroanilides (trifluralin, pendimethalin) and carbamates (butylate, EPTC) act via vapour phase. Because of the high vapour pressure those products usually have to be incorporated so that they can develop their effect entirely. In the case of trifluralin and butylate this has to be done immediately - within minutes - after application.

Dual-Metolachlor in contrary does not act via vapour phase and has, therefore, not to be incorporated.

Like all residual herbicides, Dual-Metolachlor needs humidity that means rainfall to activate its herbicidal activity. In areas with regular periods of drought (usually in spring) it is therefore recommended to incorporate Dual-Metolachlor superficially in order to achieve better stimulation of the herbicidal activity through the humidity of the soil. The incorporation does not have to be carried out immediately after the treatment, it can also take place 1 to 3 days after application. The only important point is that the incorporation has to be done only superficially, that means to a depth of 3 - 5 cm. We recommend to use a tillage equipment like "Rau-Kombi" or all other equipments which guarantee a superficial incorporation.

4.2 Cold Stability (table 3)

Good chemical-physical properties are not only important in regard to an optimal weed control, but can also be of importance in view of the storage of products. For example Dual 960 (metolachlor) shows a high cold stability in comparison to other products. As the illustration shows, the quality of the product is not even negatively influenced by lowest temperatures of - 35 °C.

5. WEED SPECTRUM (TABLE 4)

The special strength of Dual-Metolachlor is the outstanding activity against annual grasses which are controlled during the whole season. It is also important to know that Dual-Metolachlor has a good activity against seedlings of Sorghum halepense and Cyperus esculentus.

Furthermore, Dual-Metolachlor provides activity on a number of broadleaved weeds e.g. Capsella, Stellaria, Solanum nigrum, Amarantus, Galinsoga etc.

Perennial weeds and grasses like e.g. Cirsium or Agropyron are not controlled by Dual-Metolachlor.

MIXTURES OF COMBI PRODUCTS

To improve the activity against broadleaved weeds Dual-Metolachlor has often to be mixed with anti-dicot herbicides. The following tank-mixtures can be applied in sunflowers (table 5):

DUAL + Prometryn	(Gesagard [®])
DUAL + Terbutryn	(Igran [®])
DUAL + Chlorobromuron	(Maloran [®])
DUAL + Metobromuron	(Patoran [®])
DUAL + Linuron	(Afalon ^{® 1})
DUAL + Flurochloridon	(Racer ^{® 2})

In addition, Ciba-Geigy is in a position to offer prepack-products for sunflowers (table 6).

- Codal[®] 400 EC contains:
200 g/lt Metolachlor
200 g/lt Prometryn
- Tobacron 500 EC contains
333 g/lt Metolachlor
167 g/lt Metobromuron
- Maloran[®] spezial 500 EC contains:
300 g/lt Metolachlor
200 g/lt Chlorbromuron
- Dualin 500 EC contains:
300 g/lt Metolachlor
200 g/lt Linuron

The big advantage of prepack products is the fact that the user has to make no troublesome tank mixtures anymore.

7. PRODUCTS WITHOUT TOXICOLOGICAL PROBLEMS

Ciba-Geigy has always applied highest standards concerning the toxicological behaviour of their products.

Relating to Dual-Metolachlor the following can be noted:

- Dual-Metolachlor is acknowledged worldwide by the authorities as a toxicologically safe product in relation to residual behaviour as well as to security for users and environment.
- Dual-Metolachlor is registered in all countries with the normal conditions for use of pesticides.
- In no country a restriction to use of closed filling systems for the preparation of spray liquid or treatment.
- Dual-Metolachlor has never lost a given registration in any country and in any crop.
- In the biggest market (USA) Dual-Metolachlor is not classified restricted.

FINAL REMARKS

I would like to end this presentation with the following statements:

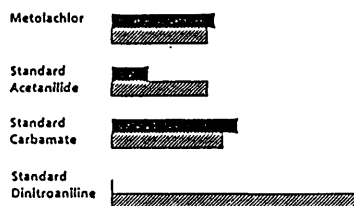
- Dual as well as Metolachlor containing prepacks and tank mixtures are used in sunflowers in a lot of countries for more than 10 years.
- Due to the outstanding chemical and biological properties the use of Dual-Metolachlor leads to outstanding crop tolerance and weed control.
- Beside of Dual-Metolachlor CIBA-GEIGY is offering to the sunflower growers different Metolachlor containing prepacks like Codal, Dualin, Maloran special and Tobacron.

DUAL - Metolachlor

Table 1

Leaching index / Half lifetime

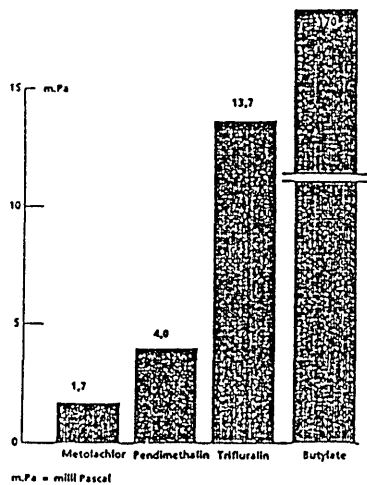
Leaching index	1	3	5	7	9	10	11
Half lifetime	0	10	20	30	40	50	60 days



leaching Index
 half lifetime
 (= numbers of days for 50% degradation)

DUAL - Metolachlor

Table 2

Chemical-physical properties
- vapour pressure

DUAL - Metolachlor**Table 3****Tank-mixtures for sunflowers**

- DUAL[®] + Prometryne (Gesagard[®])
- DUAL[®] + Terbutryne (Igran[®])
- DUAL[®] + Chlorobromuron (Maloran[®])
- DUAL[®] + Metobromuron (Patoran[®])
- DUAL[®] + Linuron (Afalon[®]1)
- DUAL[®] + Flurochloridon (Racer[®]2)

[®] = registered trademark of CIBA-GEIGY

[®]1 = registered trademark of Bayer GmbH

[®]2 = registered trademark of Stauffer Chemical
Company

DUAL - Metolachlor**Table 4****Prepack products**

- Codal[®] 400 EC contains
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200 g/l Prometryn
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- Dualin[®] 500 EC contains
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