

PATENT SPECIFICATION

(11) 1334435

NO DRAWINGS

1334435

- (21) Application No. 17120/71 (22) Filed 26 May 1971
 (31) Convention Application No. 86329 (32) Filed 2 Nov. 1970 in
 (33) United States of America (US)
 (44) Complete Specification published 17 Oct. 1973
 (51) International Classification A01N 5/00
 (52) Index at acceptance C1B 3FX



(54) METHOD OF INCREASING THE RECOVERABLE SUGAR FROM SUGAR CANE

(71) We, VELSICOL CHEMICAL CORPORATION, a corporation organized under the laws of the State of Delaware, United States of America, of 341 East Ohio Street, Chicago, Cook County, State of Illinois, 60611 United States of America, (assignee of PANOS LOUIS POULOS), do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a method of increasing the yield of sugar from sugar cane. More particularly, this invention relates to a method of increasing the recoverable sugar in sugar cane by treating the sugar cane during its maturation with alkyl esters of dicamba.

A variety of plant growth stimulants and promoters have been tried in the past in attempts to increase the yield of crops. These attempts have met with varying success but have generally not attained commercial significance. One particular crop which has been under investigation with the purpose of increasing yields in sugar cane. However, only insignificant results have been obtained even with such well-known plant stimulants as the gibberellins.

Surprisingly it has now been found that the recovery of sugar from sugar cane can be substantially increased through the use of alkyl esters of 2 - methoxy - 3,6 - dichlorobenzoic acid. Thus, one embodiment of the present invention resides in a method of increasing the recoverable sugar from sugar cane which comprises contacting said sugar cane with an effective amount of alkyl ester of 2 - methoxy - 3,6 - dichlorobenzoic acid, preferably at least two weeks before harvest. In a preferred embodiment of the present invention the alkyl ester group of 2 - methoxy-3,6 - dichlorobenzoic acid has from 1 to 10 carbon atoms.

The alkyl esters of 2 - methoxy - 3,6-dichlorobenzoic acid are well-known in the

art and their preparation is fully described in United States Patent Number 3,013,054.

Examples of these esters are:

methyl 2-methoxy-3,6-dichlorobenzoate	50
ethyl 2-methoxy-3,6-dichlorobenzoate	
propyl 2-methoxy-3,6-dichlorobenzoate	
isopropyl 2-methoxy-3,6-dichlorobenzoate	
butyl 2-methoxy-3,6-dichlorobenzoate	
pentyl 2-methoxy-3,6-dichlorobenzoate	55
hexyl 2-methoxy-3,6-dichlorobenzoate	
heptyl 2-methoxy-3,6-dichlorobenzoate	
octyl 2-methoxy-3,6-dichlorobenzoate	
nonyl 2-methoxy-3,6-dichlorobenzoate	
decyl 2-methoxy-3,6-dichlorobenzoate	60

To effect the method of this invention, sugar cane is treated at a comparatively late stage of development with an effective amount of an active compound described above. This treatment is carried out during that stage of development of the sugar cane wherein sugar formation takes place. Thus, under normal growing conditions and common cultivation practice the active compounds described are preferably applied to the sugar cane during the period of from 2 to about 4 weeks before harvesting.

The amount of the active compound of this invention required to effectively increase the recoverable sugar from sugar cane can vary somewhat depending on such factors as the time of application, the weather, crop density, and the like. Generally, an amount of at least 0.25 pound per acre and preferably an amount of from 0.5 pound to 1.5 pounds per acre can be used. While amounts greater than those mentioned can be used, they will not result in an advantage that would warrant their expense and are therefore not practical.

For practical use in treating sugar cane, the compounds of this invention are generally incorporated into compositions or formulations which comprise an inert carrier and an effective amount of such a compound. These compositions enable the active compounds to be conveniently applied to the sugar cane in any desired quantity. These formulations are

[Price 25p]

preferably emulsifiable concentrates although other formulations may be applicable.

- 5 The preferred compositions are liquid formulations, particularly emulsifiable concentrates. Emulsifiable concentrates comprise an active compound according to this invention and as the inert carrier, a solvent and an emulsifier. Such emulsifiable concentrates can be extended with water and/or oil to any
- 10 desired concentration of active compound for application as sprays to the sugar cane. The emulsifiers most commonly used in these concentrates are nonionic or mixtures of non-ionic with anionic surface-active agents. With
- 15 the use of some emulsifier systems an inverted emulsion (water-in-oil) can be prepared.

- 20 Typical formulations according to the present invention useful for increasing the recoverable sugar in sugar cane are illustrated in the following example:

Example

Preparation of an Emulsifiable Concentrate

- 25 The following ingredients are blended thoroughly until a homogeneous liquid concentrate is obtained. This concentrate is mixed with water to give an aqueous dispersion con-

taining the desired concentration of the active ingredients for use as a spray.

Methyl 2-methoxy-3,6-dichlorobenzoate	25 pounds	30
Sodium lauryl sulfate	2 pounds	
Sodium lignin sulfate	3 pounds	
Kerosene	70 pounds	

The effectiveness of the active compounds of this invention for increasing the recoverable sugar in sugar cane was demonstrated by applying an emulsifiable concentrate containing 4 pounds of methyl 2 - methoxy 3,6-dichlorobenzoic acid per gallon of solution. The solution was applied to maturing sugar cane at the indicated concentrations 2 to 4 weeks before harvest. Sufficient water was added to insure full coverage of the foliar surface.

45 In the first experiment one plot of sugar cane was treated at 1/2 pound per acre of methyl 2-methoxy 3,6-dichlorobenzoic acid; a second plot of sugar cane was treated with 2 pounds per acre and third plot was not treated. The sugar content was determined at various intervals as follows.

Percent Sugar

Concentration Test Compound (lbs/acre)	Days after Application						
	0	5	12	19	26	32	40
1/2	10.16	10.66	11.33	12.00	11.83	12.00	12.50
2	11.33	10.66	11.67	12.33	12.50	10.83	12.50
0	11.83	12.00	11.83	12.16	12.50	11.16	11.83

In another experiment sugar cane plants were again treated with the solution of methyl

2 - methoxy 3,6 - dichlorobenzoic acid at a different site with the following results:

Yield of Sugar

Concentration Test Compound (lbs/acre)	(mg. of sugar per gram of stalk)		
	Days after Application		
	0	11	33
0	3.62	3.17	4.84
2	2.93	4.50	4.30
1/2	2.78	3.42	4.44

In an additional experiment, sugar cane plants at a third site were treated with a solution of methyl 2 - methoxy - 3,6 - dichlorobenzoic acid. The sugar cane treated with this test compound at a rate of 1/2 pound per acre resulted in the recovery of one ton of sugar from 11.7 tons of treated sugar cane whereas the untreated sugar cane required 12.8 tons of sugar cane from the recovery of one ton of sugar.

WHAT WE CLAIM IS:—

1. A method for increasing the recoverable sugar from sugar cane which comprises contacting the sugar cane with at least 0.25 pound per acre of an alkyl ester of 2-methoxy - 3,6 - dichlorobenzoic acid.
2. A method as claimed in claim 1, in which the sugar cane is contacted with an alkyl ester of 2 - methoxy - 3,6 - dichlorobenzoic acid during the period of from 2 to 4 weeks before harvest.
3. A method as claimed in claim 1 or 2, in which the alkyl ester group of 2 - methoxy-3,6 - dichlorobenzoic acid has from 1 to 10 carbon atoms.
4. A method as claimed in any one of the preceding claims, in which the ester is methyl 2 - methoxy - 3,6 - dichlorobenzoate.

5. A method as claimed in any one of claims 1 to 3, in which the ester is decyl 2-methyl - 3,6 - dichlorobenzoate.

6. A method as claimed in any one of the preceding claims, in which the sugar cane is contacted with at least 0.5 pound per acre of an alkyl ester of 2 - methoxy - 3,6 - dichlorobenzoic acid.

7. A method as claimed in claim 6, in which the sugar cane is contacted with from 0.5 pound to 1.5 pounds per acre of an alkyl ester of 2 - methoxy - 3,6 - dichlorobenzoate.

8. A method as claimed in any one of the preceding claims, in which the alkyl ester is used in the form of a composition.

9. A method as claimed in claim 8, in which the composition is a liquid formulation.

10. A method as claimed in claim 8, in which the composition is an emulsifiable concentrate.

11. A method as claimed in claim 1 for increasing the recoverable sugar from sugar cane substantially as hereinbefore described with reference to the foregoing example.

W. P. THOMPSON & CO.,
Coopers Building, 12 Church Street,
Liverpool, L1 3AB,
Chartered Patent Agents.

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