Beiträge zur Tabakforschung International · Volume 10 · No. 2 · July 1980
DOI: 10.2478/cttr-2013-0479

# Effects Attributed to Maleic Hydrazide when used for Chemical Sucker Control on Bright Tobacco*

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## INTRODUCTION

The effect of the systemic sucker-controlling agent maleic hydrazide (MH) on the quality of cured leaf of bright (Virginia) tobacco has been reported (2, 5, 7). These early studies compared tobaccos from plants treated with MH to those from hand-suckered plants on which suckers were removed periodically. In general, the MH-treated tobaccos were higher in reducing sugars and equilibrium moisture content; lower in filling capacity, total ash, alkalinity of water-soluble ash, and nicotine. In the 1960's when a sprayable contact agent became available, studies were undertaken in which different degrees of sucker control were established by hand, with the contact, and with MH (8). It was found that the values of some of the characteristics of the cured leaf changed similarly for all methods of control as percent sucker control increased. Apparently, the degree of sucker control had a major influence upon the characteristics of the tobacco.

The hypothesis was tested in another field study in which various contact sucker-controlling agents and hand-suckering were manipulated in such a way that poor control and good control were obtained (10). Leaf experts tended to prefer tobaccos coming from treatments that resulted in poor control. The results also showed that where good sucker control was obtained, either through hand-suckering or with the contact agents, the chemical and physical characteristics of the cured leaf tended to be like those obtained from the contact/MH control treatment which also resulted in good control.

The question, however, still remained whether the differences seen between MH-treated and non-treated tobaccos were from the direct effect of the chemical or the difference in sucker growth. In 1971 the Regional Tobacco Growth Regulator Committee (4, 11) opted to test five potential contact suckering agents in sequential applications with MH. The author saw an opportunity here to obtain additional information needed to answer the question about MH by comparing the tobaccos from the sequential applications using MH with those from dual applications of the contacts without MH. The differences, if any, between treatments that differed only in MH should yield information on the effect of MH, *per se*.

## EXPERIMENTAL

Fifteen competitive plants of bright, Virginia type tobacco (*Nicotiana tabacum* L. cv. NC 2326) were planted in plotrows 115 cm apart and 50 cm in the drill on the Lower Coastal Plain Tobacco Research Station near Kinston, N. C., and on the Oxford Tobacco Research Station near Oxford, N. C., during the 1971 growing season. Cultural practices were consistent with recommendations for each location.

Five contact agents and a systemic sucker-controlling agent were used. They were 0.33% dimethyldodecylamine acetate [TD-248], 1.6% propargyl decanoate [UNI-414], 0.79% 7:3 w/w mixture of TD-248:1-octanol+1-decanol [TD-6635], 1.08% 1:1 w/w mixture of TD-248 : ethyl hexanol [TD-6587], 0.61% dimethyldodecylamine caprate [TD-6587], or 0.55% diethanolamine salt of maleic hydrazide (MH) in water. Three non-chemical control treatments used were topped but not suckered, normally hand-suckered (HS), and closely hand-suckered. The experiments began with topping of all plants when 70% to 90% were in the early flower stage of plant de-

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* Cooperative investigations of the North Carolina Agricultural Research Service (paper number 5815 of the Journal Series) and the United States Department of Agriculture.

This paper reports the results of research only. Mention of a pesticide in this paper does not constitute a recommendation by the North Carolina Department of Agriculture or by the United States Department of Agriculture nor does it imply registration under FIFRA.

Received: 27th December 1978 — accepted: 9th April 1980.

velopment (6). All large suckers present at the time of topping were removed prior to the chemical applications which were made with a high-clearance sprayer modified for plot work (9). All chemical treatments received two applications of the appropriate agents in thirty milliliters of the spray solutions directed downward toward each plant. First applications were only with the contact agents. Second applications were made seven days later either with the same contact agent or with the MH. The treatments that received the dual applications of the contact agents were checked to ensure that each sucker had been wetted by the sprayed solution. Suckers that were missed were treated individually with a drop of the appropriate solution.

Plants in the topped but not suckered treatment were used only to determine maximum sucker growth. Plants in the normally hand-suckered treatment were suckered three times. The first suckering occurred ten days after topping when the uppermost suckers were 100—150 mm long. Plants in the closely hand-suckered treatment were suckered by carefully rubbing out the sucker tissue in the leaf axil with the sharpened end of a small garden stake. The procedure like the chemical treatments began at the time of topping. These plants were checked frequently for axillary bud or callus tissue. The procedure was to simulate good chemical control.

Limited space in the field did not permit the use of two adjacent plot-rows for all treatments. The five contact/MH sequential treatments (Group I) were on two-row and the five dual contact treatments (Group II) were on one-row plots. In addition, the normally hand-suckered control was a two-row plot and the topped but not suckered as well as the closely hand-suckered were one-row plots. Treatments were randomized in each of four replications. The experiment utilized 76 plot-rows at each location.

Sucker control was determined using ten adjacent plants per treatment per replication after harvest was completed. Percent control on the plants in Group I was calculated as the percent reduction by weight compared to sucker weights obtained from the topped but not suckered treatment. Sucker weights for the normally hand-suckered treatments were accumulated from each suckering for the same ten plants. Sucker control for plants in Group II and closely hand-suckered treatments was assumed to be 99 %.

After curing, leaves from each sucker control treatment were sorted, weighed, and graded by a federal tobacco inspector. Yields and values of cured leaf per hectare were determined. Leaf experts from six cooperating tobacco companies visually appraised coded leaf samples from each priming of the upper two thirds of the stalk from one replication per location. Subsamples from each replication of cured leaf were taken (based upon priming weights), combined, stemmed, dried in a forced-draft oven at 65 °C, and ground to pass a one-millimeter mesh screen. The following determinations were made: percent total alkaloids, percent reducing sugars, percent total volatile bases minus nicotine (TVB—nic.), percent total ash, and alkalinity number of water-soluble ash. All analytical results were expressed on an oven dry-weight basis. The physical determinations of filling value at a standard relative humidity and at 13 % moisture as well as percent equilibrium moisture content (EMC) at 60 % relative humidity were determined on shredded leaf samples. The chemical and physical determinations were conducted in the laboratories of the cooperating tobacco companies by their standard methods.

## RESULTS AND DISCUSSION

Chemical sucker control was considered very good in most plots with the sequential contact/MH treatments of Group I (Table 1). In some plots the plants had suckers that appeared during the latter part of the harvest season usually on the lower portions of the plants. Two plots in the TD-6635/MH treatment in Kinston and the UNI-414/MH treatment in Oxford were the most obvious. Apparently faulty application technique resulted in reduced activity of the chemicals. However, control on most plants was considered comparable to the control obtained in Group II. Control with the Group I treatments, as measured after harvest was completed, resulted in mean values from 94 % to 97 % at the Kinston location with one treatment at 87 % and from 94 % to 99 % at the Oxford location with one treatment at 82 %. (The suckers that were responsible for the decreased control in some of the plots could not be removed because the plants were also being used for the regional sucker control study.) The average number of suckers per plant was about one or less and the average green weights were from 20 to 40 grams per sucker. The growth appeared about four to five weeks after treatment or about the time of harvest of

**Table 1. Percent sucker control after using various contact suckering agents in sequential applications with maleic hydrazide.**

| Treatments | Kinston | | | | | Oxford | | | | | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | II | III | IV | $\bar{x}$ | I | II | III | IV | $\bar{x}$ | |
| TD-248/MH | 93 | 98 | 99 | 98 | 97 | 94 | 90 | 100 | 93 | 94 | 96 |
| UNI-414/MH | 94 | 97 | 95 | 88 | 94 | 93 | 68 | 71 | 95 | 82 | 88 |
| TD-6607/MH | 99 | 95 | 92 | 93 | 95 | 100 | 99 | 99 | 99 | 99 | 97 |
| TD-6635/MH | 82 | 93 | 79 | 92 | 87 | 96 | 99 | 97 | 95 | 97 | 92 |
| TD-6587/MH | 98 | 97 | 93 | 97 | 96 | 94 | 100 | 96 | 99 | 97 | 97 |
| Normally HS | 50 | 57 | 48 | 45 | 50 | 54 | 56 | 74 | 62 | 62 | 56 |

**Table 3. Warehouse visual appraisals of the cured leaf from various contact suckering agents as sequential applications with maleic hydrazide (Group I) and as dual applications (Group II).**

| Treatment | Body | | | | | Texture | | | | | Percent usable |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | thin | medium | medium-heavy | heavy | sum of medium-heavy + heavy | open grain | medium | smooth | slick | other | |
| **Combined chemical treatments*** | | | | | | | | | | | |
| Group I | 4.9b | 30.4a | 37.8a | 26.8a | (65) | 1.6a | 27.3a | 47.4a | 16.8a | 8.7a | 20.5a |
| Group II | 8.9a | 32.2a | 37.1a | 21.8a | (59) | 2.4a | 28.1a | 46.0a | 17.2a | 6.2a | 22.0a |
| **Individual treatments*** | | | | | | | | | | | |
| *Group I* | | | | | | | | | | | |
| TD-248/MH | 0.0c | 27.8ab | 43.7a | 28.5abc | (72) | 0.0a | 25.0a | 41.1a | 28.5a | 5.2a | 12.5a |
| UNI-414/MH | 5.4bc | 39.3ab | 37.0a | 18.3c | (55) | 1.7a | 45.2a | 39.6a | 5.3c | 8.1a | 33.1a |
| TD-6607/MH | 5.2bc | 27.3ab | 42.0a | 25.4abc | (67) | 2.5a | 22.4a | 52.1a | 11.5abc | 11.3a | 26.9a |
| TD-6635/MH | 6.1abc | 28.1ab | 40.0a | 25.4abc | (65) | 2.5a | 18.2a | 48.9a | 20.1abc | 10.2a | 13.7a |
| TD-6587/MH | 7.8ab | 29.5ab | 26.4a | 36.2a | (63) | 1.4a | 25.9a | 55.2a | 18.6abc | 8.8a | 16.5a |
| *Group II* | | | | | | | | | | | |
| TD-248 | 13.7a | 23.8b | 40.5a | 21.9abc | (62) | 0.0a | 35.4a | 44.8a | 12.8abc | 6.9a | 17.9a |
| UNI-414 | 8.6ab | 30.9ab | 37.6a | 22.8abc | (60) | 3.8a | 22.3a | 44.4a | 22.8abc | 6.6a | 22.4a |
| TD-6607 | 5.9bc | 34.1ab | 34.5a | 25.4abc | (60) | 2.4a | 27.6a | 44.5a | 18.9abc | 6.6a | 29.7a |
| TD-6635 | 7.2abc | 33.3ab | 36.7a | 22.8abc | (60) | 1.9a | 25.4a | 53.3a | 16.7abc | 2.6a | 16.3a |
| TD-6587 | 8.9ab | 38.9ab | 36.0a | 16.1c | (52) | 3.7a | 29.9a | 43.3a | 14.6abc | 8.4a | 23.9a |
| Normally HS | 7.3abc | 42.1a | 28.7a | 21.8abc | (50) | 2.1a | 35.7a | 49.4a | 6.7bc | 6.0a | 34.6a |
| Closely HS | 9.9ab | 30.8ab | 39.2a | 20.1bc | (59) | 2.1a | 39.3a | 43.9a | 8.3bc | 6.3a | 26.0a |

* Duncan's multiple range test: values with common letter are not significantly different (0.05 level).

**Table 2. Agronomic values of the cured leaf from various contact suckering-agents as sequential applications with maleic hydrazide (Group I) and as dual applications (Group II).**

| Treatment | Yield (kg/ha) | Quality index ($/100 kg) | Hectare value ($) |
|---|---|---|---|
| | **Combined chemical treatments*** | | |
| Group I | 2666 a | 168.65 a | 4505 a |
| Group II | 2669 a | 169.19 a | 4527 a |
| | **Individual treatments*** | | |
| *Group I* | | | |
| TD-248/MH | 2651 abc | 168.30 a | 4470 bcd |
| UNI-414/MH | 2539 c | 167.67 a | 4266 cde |
| TD-6607/MH | 2715 abc | 169.27 a | 4602 abc |
| TD-6635/MH | 2636 abc | 169.92 a | 4486 bcd |
| TD-6587/MH | 2790 ab | 168.08 a | 4699 ab |
| *Group II* | | | |
| TD-248 | 2696 abc | 167.20 a | 4514 bcd |
| UNI-414 | 2490 cd | 168.90 a | 4217 de |
| TD-6607 | 2874 a | 169.71 a | 4886 a |
| TD-6635 | 2599 bc | 170.48 a | 4446 bcd |
| TD-6587 | 2686 abc | 169.64 a | 4570 abc |
| Normally HS | 2300 d | 175.06 a | 4027 e |
| Closely HS | 2583 bc | 170.94 a | 4415 bcd |

* Duncan's multiple range test: values with a common letter are not significantly different (0.05 level).

the upper leaves. The sucker growth referred to here was not like that described by *Chaplin* (1) who demonstrated that one sucker, which was allowed to grow from the time of topping, could result in a significant reduction in yield.

Yield (Table 2) for the combined Group I chemical treatments where MH was used (2666 kg/ha) was not different from the yield for the combined Group II chemical treatments where MH was not used (2669 kg/ha). These results suggested that MH *per se* will not increase yield. Although the actual values for yield were higher for some individual treatments in Group I when compared to the related treatments in Group II, none of the differences were significant. Yield from the normally HS treatments (2300 kg/ha) when compared to the yield from chemically suckered treatments was significantly lower in value for all but the UNI-414 treatment (2490 kg/ha) in Group II. On the other hand, yield from the closely HS treatment (2583 kg/ha) was not significantly different from all the treatments in Group I and from four of the five chemically suckered treatments in Group II. These findings support the earlier reports in which it was shown that good sucker control helped to achieve high yields but there was no indication in this study that MH *per se* increased yield.

No significant differences in the quality index (Table 2), as measured by government grade, were found between the combined treatments of Group I ($168.65 per 100 kg) from those in Group II ($169.19 per 100 kg). Although not statistically significant, the normally HS treatment resulted in tobaccos that received the highest rating ($175.06 per 100 kg) of all treatments. The finding was enforced by the fact that in the warehouse evaluation of the various tobaccos, normally HS tobaccos received the highest value from tobacco company leaf experts for percent usable (Table 4). Although the results were not statistically significant, the findings suggested that differences were recognizable in favor of the normally HS tobaccos.

Similarly, no significant differences in hectare value (Table 2) were found between the Group I and Group II treatments. Of the individual treatments, the value of the normally HS treatment was the lowest, and significantly so except for UNI-414 and UNI-414/MH, while the closely HS treatment was more like the chemical treatments. These values tended to reflect the values obtained for yield. The use of MH in the sequential contact/MH treatments did not significantly increase hectare value over the dual contact treatments except when compared to the normally HS treatment.

In the warehouse evaluation the only statistical difference between the combined treatments of Group I and of Group II was for less thin-bodied tobacco where MH was used (Table 3). Although only a small percentage of the tobacco was rated as thin-bodied in the individual treatments, the value obtained for each treatment in Group I was less than the comparable treatment in Group II. It has been reported elsewhere that MH-treated tobaccos when compared to traditionally hand-suckered tobaccos were more heavy-bodied. In the present study the sum of medium-heavy and heavy-bodied tobaccos was more obvious in the Group I treatments where MH was used. It is suggested that MH interfered with phloem transport and consequently cellular contents of the leaves increased. As a result there was an accumulation of materials that affected body.

Texture, according to tobacco leaf experts, of MH-treated tobaccos has been characterized as being more smooth and slick. The warehouse evaluation in the present study indicated that no differences occurred between the Group I and Group II treatments. In a previous study the smooth and slick characteristics were associated more with tobaccos from very good sucker control treatments than with tobaccos from poor sucker control treatments (10).

The tobaccos in Group I and Group II were not significantly different in value for percent usable. However, except for the UNI-414/MH treatments, Group II values were slightly higher than those from Group I. In a comparison leaf experts can determine subtle differences which can reflect treatment. In this study, usability reflected the slightly heavier body in the MH-treated tobaccos. In the comparison of normally HS tobaccos and closely HS tobaccos there was the tendency to rate the closely HS tobaccos lower in usability. Similar findings have been reported in a comparison of tobaccos from good and poor sucker-control practices with various chemicals (10).

A comparison of the combined treatments of Group I and those of Group II for the various chemical properties of

**Table 4. Chemical and physical properties of the cured leaf from various contact suckering-agents as sequential applications with maleic hydrazide (Group I) and as dual applications (Group II).**

| Treatment | Total alkaloids (%) | Reducing sugars (%) | TVB – nicotine* (%) | Total ash (%) | Alkalinity No.+ (ml) | Filling value [SRH] (ml/g) | Filling value [13 % $H_2O$] (ml/g) | Equilibrium moisture content** (%) |
|---|---|---|---|---|---|---|---|---|
| **Combined chemical treatments++** | | | | | | | | |
| Group I | 2.90 a | 22.3 a | 0.109 a | 9.06 a | 2.75 a | 2.76 a | 3.06 b | 14.82 b |
| Group II | 3.03 a | 20.0 a | 0.117 a | 9.30 a | 2.86 a | 2.80 a | 3.22 a | 15.34 a |
| **Individual treatments++** | | | | | | | | |
| *Group I* | | | | | | | | |
| TD-248/MH | 2.96 ab | 22.5 ab | 0.111 ab | 8.71 b | 2.53 a | 2.73 a | 3.05 b | 14.95 abcde |
| UNI-414/MH | 3.11 ab | 19.9 bc | 0.113 ab | 9.60 ab | 2.87 a | 2.91 a | 3.15 ab | 14.53 de |
| TD-6607/MH | 3.00 ab | 23.8 ab | 0.106 b | 8.85 b | 2.58 a | 2.65 a | 3.02 b | 15.12 abcde |
| TD-6635/MH | 2.45 c | 24.6 a | 0.101 b | 8.80 b | 2.79 a | 2.69 a | 2.99 b | 14.77 bcde |
| TD-6587/MH | 2.98 ab | 20.7 abc | 0.115 ab | 9.36 ab | 2.98 a | 2.80 a | 3.09 ab | 14.71 cde |
| *Group II* | | | | | | | | |
| TD-248 | 3.05 ab | 20.3 abc | 0.104 b | 9.32 ab | 2.79 a | 2.83 a | 3.26 ab | 15.28 abcd |
| UNI-414 | 3.15 a | 17.9 c | 0.125 ab | 9.55 ab | 2.82 a | 3.04 a | 3.35 a | 14.89 abcde |
| TD-6607 | 2.96 ab | 20.2 abc | 0.115 ab | 9.01 ab | 2.84 a | 2.65 a | 3.13 ab | 15.60 a |
| TD-6635 | 3.03 ab | 20.9 abc | 0.125 ab | 9.28 ab | 2.77 a | 2.71 a | 3.17 ab | 15.51 ab |
| TD-6587 | 2.99 ab | 20.8 abc | 0.116 ab | 9.37 ab | 3.12 a | 2.75 a | 3.18 ab | 15.40 abc |
| Normally HS | 3.10 ab | 17.8 c | 0.137 ab | 10.26 a | 2.60 a | 2.85 a | 3.07 ab | 14.44 e |
| Closely HS | 3.01 ab | 20.6 abc | 0.154 a | 9.62 ab | 2.53 a | 2.91 a | 3.27 ab | 14.95 abcde |

* Total volatile bases minus nicotine (as ammonia).

\+ Alkalinity number of water-soluble ash: ml of N/10 HCl/g of tobacco.

** Equilibrium moisture content at 60 % relative humidity.

++ Duncan's multiple range test: values with a common letter are not significantly different (0.05 level).

the cured leaf (Table 4) showed that no values between the two groups were significantly different. However, the actual values for percent total alkaloids, total volatile bases minus nicotine, percent total ash, and alkalinity number of water-soluble ash tended to be lower and percent reducing sugars tended to be higher with MH treatment. When the actual values for MH-treated tobaccos in the present study were compared to the two HS control treatments, then, in general, the MH-treated tobaccos were lower in total alkaloids, TVB minus nicotine, and total ash, but not in alkalinity number of water-soluble ash. Values for this characteristic were higher in MH-treated tobaccos. In an earlier study (2), values for alkalinity number also tended to be higher for MH-treated tobaccos when compared to the normally HS treatment, but then it was lower in another (5). Apparently this characteristic will not be consistent with MH treatment.

A comparison of the values obtained from the tobaccos of the two groups for their physical properties showed that filling value at a standard relative humidity (60%) was not different, but at 13% moisture in the tobacco the tobaccos treated with MH (Group I) were significantly less. A reduction in filling capacity with MH treatment was consistent with the earlier studies (2, 5, 7). However, the values for equilibrium moisture content (EMC) did not agree with the generally accepted characteristics of MH-treated tobaccos when compared to non-treated tobaccos, i.e. that EMC was higher with MH. Occasionally one may find a reduced value for a given study (2). Additional experimentation may be indicated but results suggested a direct effect upon filling value and equilibrium moisture content.

## SUMMARY

The effect of maleic hydrazide (MH) *per se* on bright tobacco was determined by comparing plants treated with MH to those without MH under conditions of good chemical sucker control. Sequential applications of each of five contact-type agents with MH one week later (Group I) were compared to dual applications of each of the same contact agents (Group II). In Group II suckers missed during applications were individually wetted to ensure excellent control. Sucker control was measured as 95% for Group I and assumed to be 99% for Group II. There were no agronomic differences between Groups I and II. In the visual warehouse appraisal, there was only a statistical difference for thin-bodied tobaccos between the two groups and a trend for slightly more heavy-bodied tobaccos in Group I. The chemical and physical analyses showed that filling value at 13% moisture and equilibrium moisture content (EMC) measured at 60% relative humidity were significantly lower in Group I than Group II. The result for EMC was questioned. Actual values for total alkaloids, total volatile bases minus nicotine, total ash, and alkalinity number of water-soluble ash were lower and reducing sugars were higher where MH was used. Except for EMC, the findings in this study reflected those established in studies where MH-treated and normally hand-suckered tobaccos were compared, but the differences here were generally not as great.

## ZUSAMMENFASSUNG

Die Wirkung von MH (Maleinsäurehydrazid/System-Typ) *per se* auf Virginiatabak wurde untersucht, indem MH-behandelte Tabakpflanzen mit nicht behandeltem Tabak unter den Bedingungen einer guten chemischen Geizenbekämpfung verglichen wurden. Eine einmalige Behandlung des Tabaks mit jeweils einem von fünf Agentien des Kontakt-Typs und eine Woche später folgender Applikation von MH (Gruppe I) wurde einer zweimaligen Anwendung von jeweils einem der Wirkstoffe (Gruppe II) gegenübergestellt. Bei Gruppe II wurden die Geizentriebe, die von der Behandlung nicht erfaßt worden waren, einzeln mit der Wirkstofflösung befeuchtet, damit die Wirkung des jeweiligen Mittels vollständig gewährleistet war. Das Geizenwachstum wurde in Gruppe I zu 95% und in Gruppe II zu annähernd 99% unterbunden. Hinsichtlich der landwirtschaftlichen Qualitäts- und Ertragskriterien unterschieden sich die beiden Gruppen nicht. Die visuelle Beurteilung im Lager ergab nur einen statistischen Unterschied bezüglich dünnblattiger Tabake; Gruppe I enthielt etwas mehr dickblattigen Tabak. Die chemische und physikalische Analyse zeigte, daß die Füllfähigkeit bei 13%iger Tabakfeuchte und die Gleichgewichtsfeuchte (EMC) bei 60%iger relativer Luftfeuchtigkeit in Gruppe I signifikant niedriger waren als in Gruppe II. Die für die Gleichgewichtsfeuchte erhaltenen Ergebnisse waren fragwürdig. Mit MH behandelte Pflanzen hatten einerseits niedrigere Analysenwerte für Gesamtalkaloide, gesamte flüchtige Basen minus Nikotin, Gesamtasche und die Alkalität der wasserlöslichen Asche, andererseits aber höhere Werte für reduzierende Zucker. Mit Ausnahme der Gleichgewichtsfeuchte entsprechen diese Befunde den Ergebnissen früherer Vergleiche zwischen MH-behandeltem Tabak und Pflanzen, deren Geizentriebe in üblicher Weise von Hand entfernt wurden; die in der vorliegenden Untersuchung beobachteten Unterschiede waren jedoch im allgemeinen nicht so groß..

## RÉSUMÉ

Afin d'étudier l'effet de l'hydrazide maléique du type systémique (MH) *per se* sur la qualité du tabac de Virginie (bright), on a comparé des plantes traitées au MH avec des plantes non traitées au MH, mais soumis à un traitement chimique efficace équivalent. Dans le groupe I, on a procédé à une application de 5 produits de contact suivie, à une semaine d'intervalle, d'une application de MH. Un traitement comportant deux applications de chaque produit de contact a été effectué dans le groupe II. Dans ce dernier groupe, les surgeons non touchés par le traitement ont été humectés individuellement afin d'assurer l'efficacité du traitement. Cette efficacité était de 95% dans le groupe I et de 99% environ dans le groupe II. En ce qui

concerne les critères agronomiques de qualité et de rendement, on n'a pas observé de différence entre les deux groupes. Lors de l'évaluation visuelle dans l'entrepôt, on n'a constaté qu'une différence statistique entre les deux groupes pour les feuilles minces seulement, ainsi qu'une tendance vers des feuilles plus épaisses dans le groupe I. Les analyses chimique et physique ont montré que le pouvoir de remplissage à 13% d'humidité du tabac et l'humidité d'équilibre (EMC) mesurée à 60% d'humidité relative sont significativement inférieurs dans le groupe I. Les résultats obtenus pour l'humidité d'équilibre sont douteux. Les plantes traitées au MH présentent des valeurs d'analyse inférieures pour les alcaloïdes totaux, les bases volatiles totales moins la nicotine, les cendres totales et l'alcalinité des cendres solubles dans l'eau; celles des sucres réducteurs, par contre, sont supérieures. À l'exception de ceux de l'humidité d'équilibre, les résultats de cette étude confirment ceux de comparaisons précédentes entre le tabac traité au MH et celui dont les surgeons ont été enlevés manuellement. Néanmoins, les différences observées dans la présente étude sont généralement moins marquées.

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