The Quality Criteria of Oriental Tobacco Leaves Grown Under Dry Farming

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ABSTRACT

A field experiment in split plot design was carried out to evaluate the oriental tobacco leaves , cultivar Gullsor grown under dry farming at Sulaimani Region .

The results indicated that the quality of tobacco grown with both mulching and non-mulching were acceptable under dry farming in terms of chemical constituents such as reducing sugar , total alkaloide , and chlorine and some physical properties including leaf dimentions , specific surface area , leaf density , filling value and equilibrium moisture content .

INTRODUCTION

Tobacco plant grown as a summer crop with aid of irrigation , while the available dry farming land for agriculture in tobacco producing areas are forming 95% of the total cultivable land in Iraqi Kurdistan (1) , Thus , a dry farming might be considered to be one of the most effective aim of increasing acreage and production without reverse effect in its quality and quantity . Moreover , growing tobacco under dry farming could reduce the competition between the tobacco growing areas and summer vegetables and legume crops areas which are grown in the region in limited areas due to un adequate natural water resources ; thus , providing more lands for producing foods which could be considered of vital importance for human nutrition . Earlier investigations confirm the influence of irrigation according to available water on the quality criteria of tobacco leaves . It was found that excess irrigation resulted in decreasing the burning rate of tobacco (2) . However , dry farming was found to increase siginficantly the weight per unit area as compared to irrigated crop , while tobacco with supplement irrigation tend to be lighter in color , thinner in body , lower in oil , and nicotin , but high in sugar content (3) . Oriental tobacco leaf quality was found to fluctuate according to varieties and growing seasons (4) .

The aim of this study was to investigate the quality criteria of tobacco leaf grown under dry farming with mulching and nonmulching .

MATERIALS & METHODS

Afield experiment was carried out at Tobacco Experimental Station at Sulaimani in split plot design with three replications and two main treatments , mulching with straw of wild grass which provide a mulch of approximately (2cm) depth cover on May 20 and non-mulching . While sub-treatments were harvesting leaves in four primings with ten days intervals starting from June 1 . Each primings was harvested at complete maturity then sun-cured . The plants were fertilized with 60 kg N and 80 kg P_2O_5 / ha (10) . Cured tobacco leaves were classified into grades according to their quality . Reducing sugar (5) , total alkaloids (6) and chlorine (7) were determined and physical properties such as leaf dimensions , leaf thickness , leaf bulkness (g/cm^3) , leaf density ($g/100cm^2$) , equilibrium moistire content and filling power (cm^3/g) were evaluated also (8,9) . The obtained data were statistically analyzed and all possible comparisons among means were carried out using Duncans Multiple Range Test . Averages having the same latter or the same group of letters are not significantly different at (5 %) level , also averages which are not bearing letter are not significantly different .

Total annual precipitation was (710mm) ; moreover , averages of monthly temperature in c° during the growing season (April , May , June and July) was 15.8 , 23.0 , 28 and 33.2 respectively . (Meteorological Station at Sulaimani) .

RESULTS AND DISCUSSION

It has been well established that the amount of water available to tobacco crop during growing season have substantial impact on quality criteria of harvested leaves (3,10) . However , dry farming tends to produce leaves with different quality in comparison with irrigated tobacco . Mulching of cultivated land will results in increasing soil moisture and reducing evaporation which is of a great importance under tobacco dry farming .

In the preasent study the results suggested that mulching produced leaves with slightly more reducing sugar than non mulching (Table 1) . Such differences may be attributed to soil moisture maintained under mulching condition (3) . Under these conditions , lower stalk position possessed more reducing sugar than upper stalk position (10) , (Table 1) .

Non- mulching of top soil resulted in producing leaves with high percentage nicotine in comparison with mulching (Table 2) . Leaves of third priming possessed highest nicotine content for both treatments . The results in Tables (1,2) reveal that under mulching , leaves tend to produce less nicotine and more reducing sugar .

The results shown in Table 3 indicate that the percentage of chlorine content increases from lower priming up to the top of the plant , but the fourth priming is exceptional . No significant differences has been found between treatments in their chlorine content .

Leaves under mulching was significantly longer in comparison to non-mulching treatment (Table 4) . As it had been known in oriental tobaccos (10) , length , width , and area of leaves become smaller as their psition moves up the stalk (10) , (Table 5 and 6) . Leaf area under mulching was slightly greater than that of mulching , (Table 6) . Thicker leaf was produced under non-mulching was slightly greater than that of mulching , (Table 6) . Thicker leaf was produced under non-mulching (Table 7) . The thickest leaves were that of the fourth priming . Leaf density was found to be not significantly different due to mulching and non-mulching and primings treatments (Table 8) . However , mulching tended to increase the leaf density of the first priming , while non mulching increased the density of the second priming . No significant distinct pattern of differences was found between the tobacco leaf bulkness among treatments and primings (Table 9) . Filling value of tobacco leaf was not affected by mulching and non - mulching treatments significantly (Table 10) , although , mulching tented to increase filling value in comparison with non-mulching . The filling value of tobacco leaf is determined by other properties such as thickness , leaf bulkness and equilibrium moisture content (9) . As shown in (Table 11) , mulching was found to produce leaves with higher equilibrium moisture content in comparision with non-mulching treatment .

It is apparent that moisture holding capacity of leaf increases from the first priming and up to the fourth priming . Indeed , the higher the equilibrium moisture content , the superior is the quality of tobacco leaf . It is worth to suggest that dry farming of oriental tobacco with mulching might provide leaves with more acceptable quality than non-mulching .

From the results of this study it could be concluded that the quality of oriental tobacco grown under dry farming conditions is within the acceptable range . This suggests that the future studies in this respect must be concentrated in the mountain regions , were the enviromental conditions are more favorable for the production of oriental tobacco .

Table (1) : Percentage reducing sugar content of tobacco leaves as affected by mulching and non mulching

Priming / Treatment	Reducing sugar content (%)				
	1st	2nd	3rd	4th	Mean
Mulching	9.88	10.12	8.96	8.37	9.34
Non-Mulching	7.03	8.48	7.31	6.97	7.45
Mean	8.46^{ab}	9.30^{a}	8.14^{b}	7.67^{b}	

Table (2) : Percentage total alkaloids (as nicotine) content of tobacco leaves as affected by by mulching and non mulching

Priming / Treatment	Total alkaloids (%)				
	1st	2nd	3rd	4th	Mean
Mulching	1.66	2.28	2.53	2.34	2.20^{b}
Non-Mulching	2.57	2.56	3.01	1.98	2.53^{a}
Mean	2.12 ^{b}	2.42^{ab}	2.77^{a}	2.16^{b}	

Table (3) : Percentage chlorine content of tobacco leaves as affected by mulching and non mulching .

Priming / Treatment	Chlorine content (%)				
	1st	2nd	3rd	4th	Mean
Mulching	0.65	0.75	0.85	0.75	0.75
Non-Mulching	0.55	0.65	0.85	0.75	0.70
Mean	0.60 ^{c}	0.70^{bc}	0.85^{a}	0.75^{ab}	

Table (4) : Tobacco leaf lenght (cm) as affected by mulching and non mulching .

Priming / Treatment	Leaf lenght (cm)				
	1st	2nd	3rd	4th	Mean
Mulching	20.72^{ab}	20.22^{b}	19.82^{b}	16.14^{d}	19.23^{a}
Non-Mulching	19.76^{b}	21.56^{a}	17.82^{c}	14.26^{c}	18.35^{b}
Mean	20.24^{a}	20.89^{a}	18.82^{b}	15.20^{c}	

Table (5) : Tobacco leaf width (cm) as affected by mulching and non mulching .

Priming / Treatment	Leaf width (cm)				
	1st	2nd	3rd	4th	Mean
Mulching	10.20	9.82	9.70	7.56	9.32
Non-Mulching	8.98	10.60	7.76	6.38	8.43
Mean	9.59^{a}	10.21^{a}	8.73^{b}	6.97^{c}	

Table (6) : Tobacco leaf area (cm^2) as effected by mulching and non mulching .

Priming / Treatment	Leaf area (cm^2)				
	1st	2nd	3rd	4th	Mean
Mulching	145.1	149.9	115.9	76.5	123.9
Non-Mulching	137.9	160.1	97.2	63.9	114.8
Mean	141.5^{a}	155.0^{a}	106.6^{b}	70.2^{c}	

Table (7) : Tobacco leaf thickness (mm) as affected by mulching and non mulching .

Priming / Treatment	Leaf thickness (mm)				
	1st	2nd	3rd	4th	Mean
Mulching	0.120^{d}	0.125^{d}	0.126^{d}	0.124^{d}	0.123^{b}
Non-Mulching	0.140^{c}	0.149^{b}	0.138^{c}	0.167^{a}	0.148^{a}
Mean	0.130^{c}	0.137^{b}	0.132^{c}	0.145^{a}	

Table (8) : Tobacco leaf density (g/100 cm^2) as affected by mulching and non mulching .

Priming / Treatment	Leaf density (g/100 cm^2)				
	1st	2nd	3rd	4th	Mean
Mulching	0.360^{a}	0.335^{b}	0.335^{b}	0.320^{b}	0.338
Non-Mulching	0.275^{b}	0.380^{a}	0.320^{b}	0.330^{b}	0.326
Mean	0.318	0.358	0.328	0.235	

Table (9) : Tobacco leaf bulkness (g/cm^3) as affected by mulching and non mulching .

Priming / Treatment	Leaf bulkness (g/cm^3)				
	1st	2nd	3rd	4th	Mean
Mulching	0.305	0.315	0.300	0.285	0.311
Non-Mulching	0.315	0.235	0.325	0.345	0.330
Mean	0.310	0.320	0.312	0.315	

Table (10) : Filling value (cm^3/g) of tobacco leaf as affected by mulching and non mulching .

Priming / Treatment	Filling value (cm^3/g)				
	1st	2nd	3rd	4th	Mean
Mulching	3.27	3.20	3.32	3.44	3.31
Non-Mulching	3.20	3.03	2.95	2.94	3.03
Mean	3.24	3.19	3.14	3.19	

Table (11) : Equilibrium moisture content (%) of tobacco leaf as affected by mulching and non mulching .

Priming / Treatment	Equilbrium moisture content (%)				
	1st	2nd	3rd	4th	Mean
Mulching	12.2^{c}	13.3^{b}	13.3^{b}	14.5^{a}	13.3^{a}
Non-Mulching	11.6^{e}	11.4^{e}	12.0^{d}	11.7^{e}	11.7^{b}
Mean	11.9^{d}	12.3^{c}	12.6^{b}	13.1^{a}	

Table (12) : Tobacco leaf grade (classified as percentage of total) as affected by mulching and non mulching .

Treatment	Priming	Grade Classes of tobacco leaf (%)					
		First		Second		Third	
		1	2	1	2	1	2
Mulching	1			100			
	2		90	10			
	3	90	10				
	4			20	75	5	
Non - Mulching	1				10	80	10
	2		10	80			10
	3		90	5	5		
	4			10	20	50	20

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الصفات النوعية لاوراق التبغ الشرقي المزروع تحت ظروف الزراعية الجافة

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الخلاصة

تم زراعة التبغ الشرقي صنف كول سور في تجربة حقلية ضمن تصميم القوالب المنشقة بحيث كانت تغطية سطح التربة بالقش وعدم التغطية هي المعاملات الرئيسية في حين ان قطفات الاورا ق كانت المعاملات الثانوية .

أظهرت النتائج بأن نوعية اوراق التبغ المزروعة تحت ظروف الزراعة الجافة باستعمال التغطية او عـدم استعمالها كانت مقبولة من ناحية المكونات الكيمياوية مثل السكريات المختزلة ، القلويـدات الكليـة والكلـور . بالاضافـة الى الصفات الفيزياوية مثل ابعاد الورقة ، دليل المساحة السطحية ، الكثافة النوعية ، قدرة الملىء والقابلية على الاحتفاظ بالرطوبة .

سیفەتە جۆری یەکانی گەلای توتنی رۆژهەلاتی لە ژێر دۆخی دێمـدا

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کورتە

توتن لە چەشنی گوڵ سوور لێدرا لە تاقیکردنەوەیەکی کێڵگەیی کە ئەنجام درا بە شێوازی تیرە-تیرە Split Block Design . تیرە سەرەکییەکانی تەرخان کراوبوو بۆ داپۆشین بە پۆش وە بە بێ داپۆشین وە تیرە لاوەکی یەکان تەرخان کرابوو بۆ شکاندنەوەی گەڵاکان ، بە گوێرەی پێگەیشتنیان .

ئەنجامی توژینەوەکە روونی کردەوە کە سیفتە جۆری یەکانی گەلای توتن لە ژێر دۆخی دێمدا چی بە داپۆشین یاخود بەبێ داپۆشین پەسەند بوو سەبارەت بە شەکر و نیکوتین و کلور . جگە لە سیفەتە فیزیاویەکان وەک درێژی وپانی و رووبەر و چڕی گەڵاکان ، هەروەها توانای گەڵاکان سەبارەت بە پاراستنی شێ .