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Knowledge and Adoption of Mentha Growers Regarding Recommended Cultivation Practices of Mentha Crop in Siddhaur Block of Barabanki District Uttar Pradesh

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Abstract: This study was conducted in Siddhaur block of Barabanki district of Uttar Pradesh in 2020-2021. With the help of random sampling method, 120 Mentha growers were selected and data were collected by personal interview method by using pre-tested interview schedule and later appropriate statistical analysis was done to find out the meaningful result. The finding of the study revealed that the overall level of knowledge of mentha growers regarding the recommended practices indicated they have medium knowledge level. The Adoption level of mentha growers on recommended cultivation practices of mentha also indicated as medium level of adoption (66.70%), followed by low level of adoption (21.70%) and high level of adoption (11.60%).

Keywords: Knowledge, Adoption, Recommended cultivation of Mentha

Introduction

Mentha (*Mentha arvensis*) popularly known as mint or pudina is an aromatic herb having pleasant odour leaves. Mentha is also considered as country's breadbasket, plays an important role in the export. Mentha oil is the major derivative of mentha leaves is of very high economic and medicinal value. Mints belong to the genus *Mentha*, in the family Labiatae (Lamiaceae) which includes other commonly grown essential oil-yielding plants such as basil, sage, rosemary, marjoram, lavender, pennyroyal and thyme. Within the genus *Mentha* there are several commercially grown species, varying in their major chemical content, aroma and end use. Their oils and derived aroma compounds are traded world-wide.

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Mentha (*Mentha arvensis*) popularly known as mint or pudina is an aromatic herb having pleasant odour leaves. Mentha is also considered as country's breadbasket, plays an important role in the export. Mentha oil is the major derivative of mentha leaves is of very high economic and medicinal value. Mints belong to the genus *Mentha*, in the family Labiatae (Lamiaceae) which includes other commonly grown essential oil-yielding plants such as basil, sage, rosemary, marjoram, lavender, pennyroyal and thyme. Within the genus *Mentha* there are several commercially grown species, varying in their major chemical content, aroma and end use. Their oils and derived aroma compounds are traded world-wide.

The menthol content was varied from 32.92%-42.83% in the above-mentioned cultivar (Singh et al., 2007). Menthol mint is cultivated in a large area in the Indo-Gangetic plains in the states of Punjab, Haryana, Uttarakhand, Uttar Pradesh and Bihar (Khanuja et al., 2005). The major districts in Uttar Pradesh where this crop is being cultivated are Badaun, Bareilly, Sahajanpur, Pilibhit, Lakhimpur Khiri, Barabanki and Ambedkar Nagar (Kumar et al., 2011). Now this crop has been cultivated in all the districts of Uttar Pradesh along with entire north India region.

Research Methodology

The present study was conducted in the District Barabanki in the East direction of Lucknow the Capital of Uttar Pradesh.Out of 17 blocks in Barabanki district in Uttar Pradesh, Siddhaur block is selected purposively for present study.

In Siddhaur block of Barabanki district, there were one hundred and sixty-nine villages. Out of which, six villages were selected purposively where maximum number of farmers grow mentha. The list of selected villages was Arui, Budhani, Jalalpur, Sarsa, Usmanpur and Siddhaur. The structured interview schedule was prepared for data collection. Descriptive research design was used for this study. The statistical tools like frequency, percentage, mean, standard deviation were used to interpret the data and for drawing logical conclusion.

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Measurement of Knowledge

Knowledge and adoption about recommended practices of Mentha cultivation

In the present study, knowledge has been operationally defined as the body of awareness and understood information possessed by an individual mentha grower about mentha cultivation practices.It is the degree to which the factual information is possessed by the respondent regarding farming experiences. The responses were recorded on three-point continuum as fully correct, partially correct and not correct as 3, 2 and 1 respectively.most of the respondents had medium knowledge (51.70%), followed by low level of knowledge (33.30%) and high level of knowledge (15%)..For Adoption, The responses of adoption regarding recommended cultivation practices of mentha was recorded on three point continuum as fully adopted, partially adopted and not adopted as 3, 2 and 1 respectively. most of the respondent had medium level of adoption (66.70%), followed by low level of adoption (21.70%) and high level of adoption (11.60%).

RESULTS AND DISCUSSIONS

Table 1. Socio-economic profile characteristics of the mentha growers

S.No.	Independent variable	Category		Frequency	Percentage
1	**Age**	Young age group		14	11.70
		Middle age group		98	81.70
		Old age group		8	6.60
2	**Education**	Illiterate		26	21.70
		Primary and secondary		56	46.60
		High School		26	21.70
		Graduate and diploma		12	10.00
3	**Occupation**	Agriculture	Main occupation	98	81.7
			Subsidiary occupation	22	18.3

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		Business + service	Main occupation	22	18.3
			Subsidiary occupation	98	81.7
4	**Land holding**	Below 1 hectare		50	41.70
		1-2 hectare		46	38.30
		2-3 hectare		24	20.00
5	**Annual Income**	Low		18	15.00
		Medium		82	68.30
		High		20	16.70
6	**Farming Experiences**	Low		18	15.00
		Medium		82	68.30
		High		20	16.70
7	**Mass Media Exposure**	Low		60	50.00
		Medium		48	40.00
		High		12	10.00
8	**Innovativeness**	Low		82	68.30
		Medium		32	26.70
		High		6	5.00
9	**Social participation**	No membership in any organization		40	33.30
		Membership in one organization		54	45.00
		Membership in more than one organization		24	20.00

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		Office bearer	2	1.70
10	**Risk orientation**	Low	26	21.67
		Medium	79	65.83
		High	15	12.50
11	**Economic motivation**	Low	30	25.00
		Medium	62	51.70
		High	28	23.30
12	**Extension contacts**	Low	34	28.33
		Medium	70	58.33
		High	16	13.33

The table 1 above shows that 81.70 per cent of the respondent belonged to the age group of middle age. Majority of the respondents i.e. 46.60 percent have primary and secondary level of education.81.70 percent of the respondents depends agriculture as the main occupation .In terms of land holdings,41.70 percent respondents having land below 1 hectre.68.30 percent of respondents are having a medium level of annual income. It is evident that 68.30 percent of respondents are having medium farming experiences. Only 50 percent of respondents are exposed to mass media exposure.68.30 percent of respondents having low level of innovativeness. In terms of social participation 45 percent respondents are having membership in any one organization.58.33 percent of respondents having medium level of extension contact.

Knowledge level of mentha growers on recommended cultivation practices of mentha and the results were presented in table 2.

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Table.2. Distribution of mentha growers according to their knowledge level

Sl. No.	Statement	Evaluation					
		Fully correct		Partially correct		Not correct	
		f	%	*f*	%	*f*	%
1.	Field preparation: i.Traditional method- 2-3 times ploughing and harrowing ii. Use of zero tillage machine	21	17.50	43	35.83	56	46.67
2.	Improved variety: I. MAS 1 II. Hybrid 77 III. EC 41911 IV. Kalka V. Gomti VI. Himalaya VII. Kosi	12	10.00	81	67.50	27	22.50
3.	Seed and its treatment: I. Agallol (0.1%) II. Captan sol.	27	22.50	80	66.67	13	10.83
4.	Sowing time: I. Last week of Dec to 1 week of march II. 1 Week of Jan to 3 week of Feb	11	9.17	82	68.33	27	22.50
5.	Spacing: I. 40 cm ×10cm II. 60cm×15cm	18	15.00	70	58.33	32	26.67

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6.	Fertilizers: I. 40:60:40 Kg NPK/ha	27	22.50	48	40.00	45	37.50
7.	Irrigation: I. 5 times II. 6 times III. 8 times IV. 9 times	16	13.33	71	59.17	33	27.50
8.	Weeding and hoeing operations: I. 2times II. 3times III. 4times	13	10.83	59	49.17	48	40.00
9.	Weed control: I. Sulfosulfuron II. Metribuzin III. Clodinafop IV. Fenoxaprop-p-ethyl	21	17.50	62	51.67	37	30.83
10.	Diseases: I. Rust II. Stolon decay III. Verticillium wilt IV. Septoria leaf spot	24	20.00	68	56.67	28	23.33
11.	Harvesting: I. 80-90days II. 90-100days III. 100-110days IV. 110-120days	13	10.83	69	57.50	38	31.67
12.	Yield:(2 cuts) I. 150-160kg/ha II. 145-155kg/ha III. 130-140kg/ha	21	17.50	54	45.00	45	37.50

Table.2, interprets that 46.67 per cent of the respondents had no knowledge on field preparation, followed by 35.83 per cent had partial correct knowledge and 17.50 per cent of

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the respondents had knowledge on field preparation. Whereas, 67.50 per cent of the respondents had knowledge on improved variety, 22.50 per cent had no knowledge on improved variety and 10 per cent had knowledge on improved variety. With reference to seed and its treatments, 66.67 per cent had partial knowledge, followed by 22.50 per cent had knowledge and 10.83 per cent had no knowledge. 68.33 per cent of the respondents had partial knowledge on sowing time, followed by 22.50 per cent had no knowledge and 9.17 per cent had knowledge on sowing time. Regarding spacing, more than half of the respondents (58.33%) had partial knowledge, followed by 26.67 per cent of the respondents had no knowledge and 15 per cent of the respondents had knowledge.

Meanwhile, 40 per cent of the respondents has partial knowledge on fertilizers, followed by 37.50 per cent of the respondents had no knowledge and 22.50 per cent of them had knowledge on fertilizers. 59.17 per cent of the respondents had medium knowledge on irrigation, followed by 27.50 per cent of the respondents had no knowledge and 13.33 per cent of the respondents had knowledge on irrigation. Similarly, 49.17 per cent of the respondents had partial knowledge on weeding and hoeing operations, 40 per cent of the respondents had no knowledge and only 10.83 per cent of them had knowledge on weeding and hoeing operations.

Similarly, half of the respondents (51.67%) had partial knowledge, 30.83 per cent had no knowledge and 17.50 per cent had knowledge on weed control respectively. With reference to diseases, 56.67 per cent of the respondents had medium knowledge, 23.33 per cent had no knowledge and 20 per cent had knowledge on diseases. More than half (57.50%) of the respondents had partial knowledge, 31.67 per cent had no knowledge and 10.83 per cent had knowledge on harvesting respectively. Whereas, 45 per cent of the respondents had partial knowledge, 37.50 per cent of the respondents had no knowledge and only 17.50 per cent of the respondents had knowledge on yield.

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Table.3 Distribution of mentha growers according to their overall knowledge level

S. No.	Category	Frequency	Per cent
1	Low knowledge	40	33.30
2	Medium knowledge	62	51.70
3	High knowledge	18	15.00
Total		120	100.00

The results regarding knowledge about the recommended cultivation of mentha table 3 and fig. 1 indicated that most of the respondents had medium knowledge (51.70%), followed by low level of knowledge (33.30%) and high level of knowledge (15%). The probable reason might be the interest in knowing about the recommended cultivation practices in mentha and their eagerness to learn about new knowledge or technology which is related to Mentha cultivation.

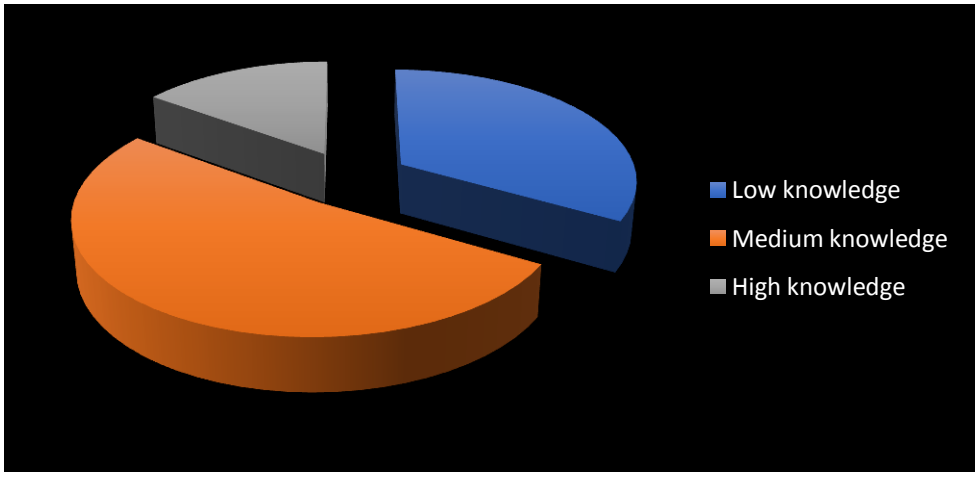

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Table.4. Adoption level of mentha growers about recommended cultivation practices of mentha

S. No.	Recommended improved cultivation practices	Responses					
		Fully adopted		Partially adopted		Not adopted	
		f	%	*f*	%	*f*	%
1.	Varieties sowing	11	9.17	93	77.50	16	13.33
2.	Nursery Sowing time:	17	14.17	71	59.17	32	26.67
3.	Planting time : (a) Early- (b) Mid- (c) Late-	9	7.50	76	63.33	35	29.17
4.	Seed treatment:	18	15.00	71	59.17	31	25.83
5.	Seed rate : (a)Early- (b)Mid (c) Late-	8	6.67	101	84.17	11	9.17

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6.	Source of seed material : a)Private shop b) Government center c)From Agriculture research station	6	5.00	87	72.50	27	22.50
7.	Method of sowing followed : a)Seeding b)Transplanting	16	13.33	70	58.33	34	28.33
8.	Spacing adopted (a) Early- (b) Mid- (c) Late-	33	27.50	55	45.83	32	26.67
9.	Chemical Fertilizer and manure management: a)FYM - b)Nitrogen- c)Phosphorus- d)Potassium-	12	10.00	89	74.17	19	15.83
10.	Inter cultivation	5	4.17	97	80.83	18	15.00

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11.	Weed management: Pre planting- Post Planting- Hand Weeding	29	24.17	80	66.67	11	9.17
12.	Plant protection measures:	5	4.17	81	67.50	34	28.33
13	Yield:- i)Early : ii) Medium: iii) Late:	15	12.50	86	71.67	19	15.83

Table.4. reported that 77.50 per cent of the respondents partially adopted varieties for sowing, followed by 13.33 per cent had not adopted and only 9.17 per cent adopted varieties for sowing. More than half of the respondents (59.17%) had partially adopted, 26.67 per cent not adopted and 14.17 per cent fully adopted nursery sowing time. Meanwhile, 63.33 per cent partially adopted, 29.17 per cent not adopted and only 7.50 per cent fully adopted planting time. 59.17 per cent of the respondents had partially adopted, 25.83 per cent of the respondents not adopted and only 15 per cent of the respondents fully adopted seed treatment practices. More than three-fourth of the respondents (84.17%) had partially adopted, 9.17 per cent not adopted and only 6.67 per cent fully adopted seed rate techniques.

Meanwhile, a higher percentage of the respondents (72.50%) had partially adopted, 22.50 per cent not adopted and only 5 per cent fully adopted source of feed material. More than half of the respondents (58.33%) partially adopted, 28.33 per cent not adopted, 13.33 per cent fully adopted the method of sowing. Whereas, 45.83 per cent of the respondents partially adopted, 27.50 per cent fully adopted and 26.67 per cent not adopted spacing related practices. Nearly three-fourth of the respondents (74.17%) had partially adopted, 15.83 per cent had not adopted and only 10 per cent had fully adopted chemical fertilizer and manure management.

Similarly, 80.83 per cent of the respondents had partially adopted, 15 per cent not adopted and only 4.17 per cent fully adopted intercultivation practices. More than two-third of the

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respondents (66.67%) had partially adopted, 24.17 per cent had fully adopted and only 9.17 per cent not adopted weed management practices. More than half of the respondents (67.50%) had partially adopted, 28.33 per cent had not adopted and only 4.17 per cent had fully adopted plant protection measures. Eventually, 71.67 per cent of the respondents partially adopted, 15.83 per cent not adopted and only 12.50 per cent fully adopted yield related practices respectively

Table 5. and Fig. 1Distribution of mentha growers according to their overall adoption level

S. No.	Category	Frequency	Per cent
1	Low adoption	26	21.70
2	Medium adoption	80	66.70
3	High adoption	7	11.60
Total		120	100.00

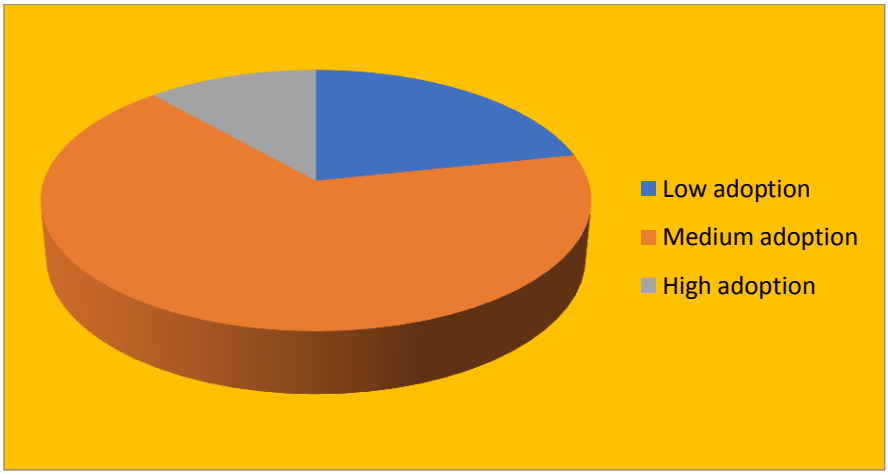

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Table 6 .Association between the independent variables and knowledge level of the farmers about recommended mentha cultivation practices

S. No.	Characteristics	'r' value	Regression co-efficient	Standard error	t-value
X_1	Age	-0.551	-0.22	0.140	0.873
X_2	Education	0.012*	1.326*	0.596	0.031*
X_3	Land holding size	0.054*	0.880**	2.373	0.508**
X_4	Occupation	0.354	5.408	7.942	0.499
X_5	Annual income	0.041*	4.065**	5.590	0.471**
X_6	Farming experience	0.027*	6.372**	0.000	0.131**
X_7	Mass media exposure	0.030*	-3.805*	1.774	0.037*
X_8	Innovativeness	0.857	-2.986	0.000	0.620
X_9	Social participation	0.022*	3.863*	1.894	0.047*
X_{10}	Economic motivation	0.045*	3.465*	1.682	0.045*
X_{11}	Risk orientation	0.036*	2.435*	1.623	0.127*
X_{12}	Extension contact	0.019*	2.674*	1.143	0.096*

R^2 = 0.45 F=2.732 a= 151.677

NS = Not Significant; * = Significant at 5%, ** = Significant at 10%.

It could be understood from the table.4 that age, innovativeness and occupation had non-significant association with the knowledge of the farmers about recommended mentha cultivation practice. Meanwhile, education, land holding size, mass media exposure, social

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participation, economic motivation, risk orientation and extension contact had positive and significant association with the knowledge of the farmers about recommended mentha cultivation practices at 5 per cent level of probability. In addition to this, annual income and farming experience had positive and significant association with the knowledge level of the farmers about recommended mentha cultivation practices at 10 per cent level of probability.

Table 7. Association between the independent variables and adoption level of the farmers about recommended mentha cultivation

S. No.	Characteristics	'r' value	Regression co-efficient	Standard error	t-value
X_1	Age	-0.367	-0.677	0.258	0.459
X_2	Education	0.101**	2.519*	1.374	0.073*
X_3	Land holding size	0.035*	0.450*	3.465	0.056*
X_4	Occupation	0.690	0.110	1.429	0.939
X_5	Annual income	0.415	6.995	4.367	0.689
X_6	Farming experience	0.010*	-2.965*	1.184	0.016*
X_7	Mass media exposure	0.038*	-4.072*	1.637	0.017*
X_8	Innovativeness	0.769	4.987	0.110	0.939
X_9	Social participation	0.049*	5.876*	3.547	0.034*
X_{10}	Economic motivation	0.037*	7.584*	1.524	0.023*
X_{11}	Risk orientation	0.041*	4.065**	5.590	0.471**

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X_{12}	Extension contact	0.027*	6.372**	0.000	0.131**

$R^2 = 0.51$ F=3.489 a= 151.677

NS = Not Significant; * = Significant at 5%, ** = Significant at 10%.

It could be understood from the table.4.23, that age, occupation, annual income and innovativeness had non-significant association with the adoption of the farmers about recommended mentha cultivation practices. Meanwhile, land holding size, farming experience, mass media exposure, social participation, economic motivation and risk orientation had positive and significant association with the adoption of the farmers about recommended mentha cultivation practices at 5 per cent level of probability. In addition to this, education and extension contact had positive and significant association with the adoption level of the farmers about recommended mentha cultivation practices at 10 per cent level of probability.

Conclusion

It is concluded that higher percentage of the mentha growers were middle aged (81.70%), followed by young age (11.70%) and old age (6.60%).Nearly half of the respondents had primary and secondary level of education (46.60%), followed by high school (21.70%) and illiterate (21.70%) and graduate and diploma (10%).81.70 per cent of the mentha growers took agriculture as their main occupation, whereas only 18.30 per cent of the mentha growers considered business + service as their subsidiary occupation. Higher percentage of the mentha growers had a land holding of below 1 hectare (41.70%), followed by land holding of more than 1-2 hectares (38.30%), had holding of more than 2-3 hectare (20%).Higher percentage of the mentha growers had medium level of annual income (68.30%), followed by high (16.70%) and low (15%).Most of the respondents had medium farm power (61.70%), followed by low farm power (20%) and high farm power (18.30%).More than half of the respondents (58.40%) had medium level of source of information, followed by low (23.30%) and high (18.30%) level of source of information.45 per cent of the respondents had membership in one organization, followed by 33.30 per cent of the respondents had no membership in any organization, 20 per cent of them had membership in more than one organization and only 1.70 per cent of the respondents were office bearer. 58.33 per cent of the mentha growers had medium level of extension contact,

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followed by 28.33 per cent of them had low level of extension contact and only 13.33 per cent of them had high level of extension contact. Most of the respondents had low level of innovativeness (68.30%), followed by medium (26.70%) and high (5%) level of innovativeness .Half of the respondents had low level of mass media exposure (50%), followed by medium (40%) and high (10%) level of mass media exposure. More than half of the respondents had medium level of economic motivation (51.70%), followed by low (25%) and high level of economic motivation (23.30%).Most of the respondents had medium knowledge (51.70%), followed by low level of knowledge (33.30%) and high level of knowledge (15%).Most of the respondent had medium level of adoption (66.70%), followed by low level of adoption (21.70%) and high level of adoption (11.60%).

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