Int.J.Curr.Microbiol.App.Sci (2021) *10*(01): 337-346

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 10 Number 01 (2021)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2021.1001.042

Level of Value Addition of Milk at Farm and its Relationship with Socio-Economic Characteristics of Dairy Farmers in Punjab State

Harpreet Kaur, Inderpreet Kaur*, Varinder Pal Singh and Nitin S. Wakchaure

Department of Dairy Economics and Business Management, College of Dairy Science and Technology, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab, India

**Corresponding author*

Keywords

Dairy Farmers, Farm, Income, Occupation, Punjab, Value Addition

Article Info

Accepted:
04 December 2020
Available Online:
10 January 2021

A B S T R A C T

Dairy farming played an important role in the socio-economic livelihood of the dairy farmers as its importance to generate additional income when limited access to raw milk market or value of liquid milk sold economically lesser than that of value-added milk products. The present study was conducted in eight districts of Punjab state in 2018. Fifty farmers were selected by simple random sampling method and categorized into small, medium and large on the basis of the quantity of the milk produced per day by cumulative cube root frequency method. The level of value addition to milk was highest i.e. 19.95 per cent at a large farm, 17.87 per cent at medium farm and 13.89 per cent at small farm. The socio-economic characteristics of dairy farmers revealed that 66 per cent farmers of age group 30-40 years, 62 per cent educated up to higher secondary level, 68 per cent family size of 4-6 members while 58 per cent with 2-4 years of experience in value addition as manufacturing of milk products. The level of value addition of milk increased significantly with an increase in farm size (0.788), herd size (0.870), total milk production per day (0.974), crossbred cows (0.944) and milk yield per animal per day (0.706).

Introduction

Dairy farming plays a pivotal role in the economy of our country. It helps in supplementing food supply, employment generation and raising the nutritional level. Majority of the dairy farmers are occupied in agriculture, animal husbandry, and other ancillary activities but income from agriculture activity has been as erratic, so rural people were forced to think of generating an additional source of income. The significant aspect of the dairy sector is that the role played by it in improving the socio-economic conditions of millions of rural families by providing insurance against crop failures and generating a regular source of additional income and employment (Mishra and Sharma, 1990). Therefore, majority of them selling milk as a secondary source income. Dairy sector is the most important segment of India's livestock economy and is a vital part of the total farming system. The majorities of milk producers are smallholders

and contribute more than 70 per cent to total milk production in India (Dries *et al.,* 2004; Minten *et al.,* 2007; Brar *et al.,* 2017). Milk production is an important component of the agricultural economy in the state of Punjab. Dairy farming is a subsidiary profession in most of the rural parts of Punjab. Dairying has been considered as one of the means for poverty alleviation and improvement of nutritional security (Kumar and Shah, 2016). In order to supplement the stagnating incomes, the small and marginal farmers have particularly moved to dairy enterprise, which uses their surplus family labour and requires fewer land resources and generate regular cash incomes. Dairying reduces the farmer's risk by mitigating the strain when rains are not good, keep income flowing which fulfills the aim to provide the income to the farmers throughout the year rather than on seasonal basis only (Singh and Kumari, 2017).

Value addition refers to the act of adding value(s) to a product to create form, place, and time utility which increase the value offered by a product or service (Kuma *et al.*, 2011). It is a practice that enhances or improves the quality and shelf life of an existing product or introduces new products for uses. It has a particular importance for the dairy producers especially where the producers have limited access to the raw milk market or where the value of milk is economically less than the value of value added products. The Value addition at the farm level is being promoted due to different reasons but the most important reason is that it will increases the per litre returns of the farms benefit is that it increases the shelf life of milk. Farm value addition of milk and milk products is recognized and highly promoted through value chain approaches for its benefit in terms of improving farm income. Promoting on-farm value addition to milk and milk products is believed to be useful for poverty reduction by creating income generating opportunities to the rural poor farmers (Kuma *et al.,* 2011).

The value addition of milk at farm level varies across various socio-economic and demographic characteristics of farm households (Kuma *et al.*, 2011). The income from dairy activities helped the farmers to fulfill their basic needs (Paudel, 2014). The dairy enterprises have the potential for providing ample work opportunities for those people who are either uneducated or with limited skills (Kumar and Kumar, 2018). From the several socio-economic studies, it was observed that socio-economic parameters viz. education, caste, land holding, occupation and income level were playing a great role in rural development of many aspects of society and its relationship between socio-economic characteristics with the level of value addition of milk might help in understanding of the importance of the social parameters that subsequently assists in the promotion of value addition of milk at farm level in Punjab state.

Materials and Methods

The present study was conducted in eight districts of Punjab State and total sample size of 50 farmers was selected. For the selection of dairy farmers, a simple random sampling method was used as there was no specific area in any district where value addition of milk activity carried out and the farmers were scattered all over the districts. The dairy farmers were categorized into 19 small, 16 medium and 15 large by cumulative cube root frequency method (Singh, 1975) on the basis of per day milk production at the respective farm. The dairy farms having daily milk production up to 41.52 litres, between 41.52 – 51.29 litres and more than 51.29 litres were denoted as small, medium large dairy farms respectively. Primary data were collected from the respondent dairy farmers by specially designed and pre-tested survey

schedule conducting personal interview method. The socio-economic parameters collected from the dairy farmers for the study such as age, literacy level, caste, family size and main occupation on the basis of annual income. The collected data were compiled, tabulated and analyzed by statistical software IBM SPSS v24.0 to interpret the results.

Correlation analysis

It was assumed that the level of value addition of milk has a relationship with herd size, milk production per day, milk yield per animal, farm size, type of animal species, age of farmers and education level of farmers. These independent variables were selected that will directly or indirectly contribute in the value addition of milk. The variable herd size was selected as because number of animals present at farm will encourage farmer for value addition, animal species of crossbred cows and buffaloes were selected as both are good milk producing species, age of the farmer will certainly affect the level of value addition of milk as the young farmers have interest about various milk processing techniques while old farmers have wider experience of value addition, educated farmers can apply updated knowledge, skills and modern methods. For these reasons the above independent variables were selected.

Correlation analysis was carried out to determine the degree of relationship between the level of value addition and different independent variables by using the following Pearson correlation coefficient formula.

$$r_{xy} = \frac{n\sum_{i=1}^{n} x_i y_i - \sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i}{\sqrt{n\sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2}\sqrt{n\sum_{i=1}^{n} y_i^2 - \left(\sum_{i=1}^{n} y_i\right)^2}}$$

Where, r_{xy}= correlation coefficient between variable x and y

n = sample size

x = Independent variables such as herd size, milk production per day, milk yield per animal, farm size, type of animal species, age of farmer and education level of farmer etc.

y = Dependent variable i.e. the Production of value added milk products depends upon the quantity of milk used (represents level of value addition).

Correlation coefficient r_{xy} indicates the direction and degree of relationship between x and y variables and the value of r_{xy} varies from -1 to +1. Prof. R. A. Fisher suggested t-test in order to check whether the correlation coefficient r_{xy} is statistically significant or there was no correlation between the variables in the population by using following formula:

$$t = r\sqrt{\frac{(n-2)}{1-r^2}}$$

The level of significance was tested on the basis of the value of t-statistics at n-2 degree of freedom. If the calculated value of t exceeds $t_{0.05}$ for (n-2) degree of freedom, the value of r is said to be significant at 5 per cent level of significance and vice versa.

Results and Discussion

The results of the study highlight the information about the level of value addition of milk at farm level, socio-economic profile of the sample dairy farmers and correlation analysis that determined the relationship between the level of value addition of milk and socio-economic characteristics.

Level of value addition of milk at the farm level

The level of value addition of milk refers to that out of the total quantity of milk produced

at farm level, the quantity of liquid milk (in lit.) used for the manufacturing of value added milk products. The level of value addition of milk differed as per the farm size of small, medium and large farm. Also, it depends upon the number of factors such as herd size of farm, number of in-milk animals, species and breeds of animals kept at farm, the income level of farmer, the storage equipment's, market access and technology and machineries available used for manufacturing of milk products.

The level of value addition of milk at small, medium and large farm is given in Table 1. The level of value addition of is expressed in (%) and its formula given below as,

$$\text{Level of value addition of milk (\%)} = \frac{\text{Quantity of liquid milk used for manufacturing of milk products}}{\text{Total quantity of milk produced at farm level}}$$

From Table 1, it was observed that, out of total 50 dairy farmers, on small, medium and large farm respectively 16, 19 and 15 dairy farmers were practicing the value addition of milk. The large farm constitutes maximum herd size of 19 animals followed by at medium farm 15 animals and least at small farm i.e. 9 animals kept. The total quantity of milk produced on large farm was 70.76 litres at medium farm 46.45 litres and on small farm 24.05 litres per day.

The level of value addition of milk was highest on large farm as 19.95 per cent because out of total milk produced per day at farm i.e. 70.76 lit, 14.12 lit. of milk was used for manufacturing of milk products; at medium farm level of value addition was 17.87 per cent as out of total milk produced (46.45 lit. per day), 8.30 litres of quantity of milk used while at small farm level of value addition was 13.89 per cent as out of total quantity of milk produced of 24.05 litres per day, only 3.34 litres used for manufacturing of milk products.

Socio-economic characteristics of dairy farmers

The socio-economic attributes of sample dairy farmers may affect decision making power in the context of the value addition of milk and rearing of dairy animals. Therefore, it was imperative to assess the socio-economic characteristics of dairy farmers. The results of socio-economic characteristics of sample dairy farmers are presented in Table 2.

Age

Out of total 50 dairy farmers, the majority of the farmers 33 (66 per cent) belonged to the age group of 30-40 years while 12 farmers (24 per cent) in the 40-50 years age category. This was in agreement with the results of Thomaskutty (1975), Kakoty (1980), George and Chauhan (2004), Ashwar (2005), Patel (2011), Rathod *et al.,* (2011), Karkarne *et al.,* (2017), Patel *et al.,* (2018) who stated that majority of the dairy farmers belong to medium age category group.

Out of the total dairy farmers, the highest number of dairy farmers falls in age category between 30-40 years on small, medium and large farms were 13 (68.42 per cent), 10 (62.50 per cent) and 10 (66.67 per cent) respectively. The probable reason might be that this age category considered to be actively working and have responsibilities of earning for their families, so that played an important role in income generation for the family.

Literacy level

With the higher literacy level, farmers were aggressively participate in seeking knowledge and acquiring skills regarding the management practices as a means of improving the productivity of dairy animals and thereby increasing profitability.

Education also enables the farmers to keep farm records of production so that they would be able to quantify their performance and lay down targets for improvement.

Out of the total 50 respondents, most of them i.e. 31 farmers (62 per cent) had attained education up to 10+2 while 11 farmers (22 per cent) were illiterate. Out of the total farmers, maximum number of the farmers have attained education up to 10+2 level on all farms i.e. 11 farmers (59.79 per cent) on small farms, 9 farmers (56.25 per cent) on medium farms and 11 farmers (73.33 per cent) on large farms, respectively.

The per cent share of the respondent farmers who had not taken education i.e. illiterate reported to be being declined with an increase in farm size. It was the highest among small farms (31.58 per cent), followed by medium farms (25.00 per cent) and least on large farms (6.67 per cent).

The level of education of all sample respondents was supposed to be adequate on account of adopting the latest techniques for livestock production and value addition activities in the study area. The reason for this could be observed that the high school level of formal schooling and the non-availability of government jobs might have motivated them to attend the training on dairy.

The education could help the dairy farmers to gather new information required for dairy practices which in turn might create a positive impact on the management of the dairy enterprise.

The reasons behind illiterate dairy farmers could be their lack of interest, lack of encouragement and their low economic status. The above results are similar to the findings of Choudhary and Panwar (2005) and Sheela (1991).

Caste-wise

Caste-wise distribution of dairy farmers showed that the majority of the respondent farmers i.e. 47 (94.00 per cent) belonged to general caste, while the remaining 3 farmers (6.00 per cent) belonged to the backward class. Category-wise, all dairy farmers (100 per cent) of medium and large farms belonged to the general category, while 84.21 per cent on small farm. The results of the study different from the findings of Vekariya *et al.,* (2016) who stated that majority of the dairy farmers belong to the OBC.

Family size

The operational efficiency of the farm and farm productivity was greatly influenced by the availability of family labour. The availability of family labour observed to be varied with family size. Out of the total 50 dairy farmers, 34 farmers (68.00 per cent) belonged to the families having members between 4-6 members while 14 farmers (28.00) have > 6 family members. The results are in agreement with the findings of George and Chauhan (2004). All the farms have maximum number of farmers whose family size between 4-6 members on small, medium and large size 12 farmers (63.16), 12 farmers (75 per cent) and 10 farmers (66.67 per cent) respectively.

Occupation

Crop farming and dairy farming considered to be two allied enterprises. All the respondents were classified into main and subsidiary occupations on the basis of the extent of income generated from the particular occupation. It was seen that almost all the sample households were engaged in dairy farming to supplement their family income, but it could not be treated as the main occupation because the level of income

generated from this occupation considerably lower than the main occupation.

The occupational details of the sampled respondents indicated that 82 per cent of the respondents had been taking up crop farming as the primary occupation, whereas, 18 per cent of the total respondents adopted dairy farming as their main occupation. The results of the study conflicting as per the findings of Vekariya *et al.*, (2016) who stated that the majority of dairy farmers had animal husbandry as the major occupation.

Table.1 Level of value addition of milk at the farm level in Punjab state

Category of farm	Number of dairy farmers	Herd size (avg. no. of animals)	Total milk production (lit/per day)	Quantity of milk used for manufacturing of value added milk products (lit)	Level of value addition (%)
Small	16	9	24.05	3.34	13.89
Medium	19	15	46.45	8.30	17.87
Large	15	19	70.76	14.12	19.95

(Kaur, 2020)

Table.2 Socio-economic characteristics of the dairy farmers at farm level in Punjab state

Characteristics	Particulars	Small	Medium	Large	Overall
Age (years)	< 30	1 (5.26)	2 (12.50)	1 (6.67)	4 (8.00)
	30 - 40	13 (68.42)	10 (62.50)	10 (66.67)	33 (66.00)
	40 - 50	4 (21.06)	4 (25.00)	4 (26.67)	12 (24.00)
	Above 50	1 (5.26)	0 (0.00)	0 (0.00)	1 (2.00)
Literacy level	Illiterate	6 (31.59)	4 (25.00)	1 (6.67)	11 (22.00)
	Matric	1 (5.26)	2 (12.50)	1 (6.67)	4 (8.00)
	10+2	11 (57.89)	9 (56.25)	11 (73.33)	31 (62.00)
	Graduation	1 (5.26)	1 (6.25)	2 (13.33)	4 (8.00)
Caste	General	16 (84.21)	16 (100.00)	15 (100.00)	47 (94.00)
	Backward class	3 (15.79)	0 (0.00)	0 (0.00)	3 (6.00)
Family size (No. of members)	Up to 4	1 (5.26)	1 (6.25)	0 (0.00)	2 (4.00)
	4 - 6	12 (63.16)	12 (75.00)	10 (66.67)	34 (68.00)

	> 6	6 (31.58)	3 (18.75)	5 (33.33)	14 (28.00)
Main occupation	Crop Farming	17 (89.47)	13 (81.25)	11 (73.33)	41 (82.00)
	Dairy farming	2 (10.53)	3 (18.75)	4 (26.67)	9 (18.00)
Dairy farming experience (years)	Up to 5	1 (5.26)	2 (12.50)	1 (6.67)	4 (8.00)
	5 -10	4 (21.05)	1 (6.25)	3 (20.00)	8 (16.00)
	10 - 15	9 (47.37)	9 (56.25)	7 (46.67)	25 (50.00)
	> 15	5 (26.32)	4 (25.00)	4 (26.67)	13 (26.00)

(Figures in parenthesis indicates the percentage to the total) (Kaur, 2020)

Table.3 Experience of manufacturing of value added milk products

Experience (years)	Small	Medium	Large	Total
Up to 2	2 (10.53)	0 (0.00)	1 (6.67)	3 (6.00)
2 - 4	8 (42.11)	13 (81.25)	8 (53.33)	29 (58.00)
> 4	9 (47.37)	3 (18.75)	6 (40.00)	18 (36.00)
Average	4.37	3.50	4.07	4.00

(Kaur, 2020)

Table.4 Correlation analysis of level of value addition of milk with socio-economic characteristics of dairy farmers

Socio-economic Characteristics	Correlation coefficient (r)
Age of farmer	-0.119^{NS}
Education level of farmer	0.162^{NS}
Farm size	0.788**
Herd size	0.870**
Indigenous cows	0.026^{NS}
Crossbred cows	0.944**
Total milk production per day	0.974**
Milk yield per day per animal	0.706**
Number of milk products produced	0.840**
Experience of manufacturing value added milk products	-0.02^{NS}

** Significant at 0.01 level NS Non-significant

It was noticed here that the share of respondents having crop farming as main occupation declined with an increase in farm size i.e. it was the highest on small farms (89.47 per cent) and lowest large farms (73.33 per cent). On the contrary, the share of respondents having dairy-farming as the main occupation was observed to be increased with an increase in farm size.

Dairy farming experience

Farming experience improves the skill of performing various farm operations which could make the farmer able to solve farm problems more efficiently. Out of total sample size of 50 farmers, 25 farmers (50 per cent) have 10-15 years of experience in dairy farming, 13 farmers (26 per cent) have more than 15 years of experience while 8 farmers (16 per cent) have less than 5 years of experience. The results further revealed that the number of farmers having dairy farming experience of 10-15 years was maximum on small, medium and large farms of 9 farmers (47.37 per cent), 9 farmers (56.25 per cent) and 7 farmers (46.67 per cent) respectively.

Experience of manufacturing of value added milk products at farm level

It was noticed that the practice of adoption of value addition activities of milk was new one to many farmers. The experience of manufacturing of milk products determined the number of value added milk products produced at small, medium and large farm was given in Table 3.

Out of total 50 farmers, 29 farmers (58 percent) were reported to have 2-4 years of experience in the manufacturing of milk products while 18 farmers (36 per cent) have more than 4 years of experience and remaining 3 farmers (6 percent) have started this activity 2 years back.

Across the different farm categories, the proportion of the farmers having experience of manufacturing milk products between 2-4 years came out to be the highest i.e. 13 farmers on medium farms (81.25 per cent). The results further revealed that on small farms, there was almost similar number of farmers having 2-4 years and more than 4 years of experience in dairy farming were manufacturing milk products. An average figure with regard to the experience of manufacturing milk products calculated to be 4.00 years on an overall farm, while the respective figure was 4.37, 3.50 and 4.07 years on small, medium and large farms.

Correlation analysis

It was assumed that the level of value addition hasa positive relationship with herd size, milk production, milk yield, farm size, type of animal species, age, education, etc. In order to know the degree of relationship between these variables for the level of value addition of milk, correlation analysis was carried out to calculate the Pearson correlation coefficient. The test of significance of the correlation coefficient was checked by the t-test at 5 per cent (0.05*) level of significance.

Table 4 indicates that the value of correlation coefficient of the variables such as farm size, herd size, crossbred cows, buffaloes, total milk production per day, milk yield per day per animal and number of milk products produced came out to be 0.788, 0.870, 0.944, 0.520, 0.974, 0.576 and 0.840 was statistically significant.

The results of farm size and herd size were in accordance with the findings of Singh and Tyagi (1994), Kadian and Kumar (2002), Brar *et al.,* (2004) and Lahoti *et al.,* (2011) while contradictory in relation to findings of Hossain *et al.,* (2011) in accordance with age.

The variables such as the age of farmer and experience of manufacturing value added milk products have a negative correlation coefficient and not statistically significant. The variables such as the education level of the farmer and indigenous cows were not statistically significant.

In conclusions the maximum level of value addition to milk was observed at the large farm (19.95 per cent) while the socio-economic characteristics revealed that 68 per cent of dairy farmers belong to 30-40 age group at small farm, 62 per cent farmers have taken education up to higher secondary school, 82 per cent farmers have their main occupation as crop farming, 50 per cent farmers have 10-15 years of experience in dairy farming and 58 per cent farmers have 2-4 years of experience of manufacturing of milk products. The level of value addition of milk at the farm level increased significantly with an increase in total milk production per day (0.974), cross-bred cows (0.944) and herd size (0.870). The socio-economic characteristics and its relationship with the level of value addition of milk will help to bring out the socio-economic development of farmers by generating an additional source of income in Punjab state.

Acknowledgement

The authors express their sincere regards and gratitude to the Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana Punjab for providing necessary facilities, help and support given during the research study period.

References

Ashwar, B.K., 2005. Determinants of attitude and adoption of improved animal husbandry practices of dairy farmers of North Gujarat. Ph.D. Thesis (unpublished), Sardarkrushinagar Dantiwada Agricultural University, Dantiwada, Gujarat, (India).

Brar, D.P.S., Kalra, R.K. and Hansra, B.S., 2004. Personality linkages with communication behaviour of cotton growing farmers. *Journal of Extension Education*, 15: 3561-3565.

Brar, R.S., Kaur, I., Singh, V.P. and Chopra, S., 2017. Comparative profitability of small and medium sized dairy farmers in Punjab. *Indian Journal of Economics and Development*,13(1): 143-152.

Chaudhary, H. and Panwar, J.S., 2005. Gender based knowledge analysis of milk producers about advanced dairy production technology. *Indian Journal of Social Research*, 46(3): 183-190.

Dries, L., Reardon, T. and Swinnen, J., 2004. The rapid rise of supermarkets in central and Eastern Europe: Implications for the agri-food sector and rural development. *Development Policy Review*, 22:525-556.

George, S. and Chauhan, J.P.S., 2004.Profile characteristics of dairy farmers of Ernakulum district.*Agricultural Science Digest*, 24: 274-276.

Hossain, K.Z., Islam, M.R., Bhuiyan, M.H., Wazedand Rahman, M.M, 2011. Farmers communication behavior in receiving information on improved rice production technologies. *Journal of Innovation and Development Strategy*, 5:28-33.

Kadian, K.S. and Kumar, R., 2002. Inter relationship between information processing pattern and socio-economic characteristics of dairy farmers. *Indian Journal of Dairy Science*, 55: 290-293.

Kakoty, H.N., 1980. Differential influence of incentives and disincentives in determining the adoption behaviour of small dairy farmers of Dimoria tribal development block, Assam. Ph. D. Thesis, submitted to Kurukshetra University, Haryana, (India).

Kankarne, Y., Siddiqui, F. and Kochewad, S.K., 2017.Effect of socio-economic traits on the level of knowledge of dairy farmers. *International Journal of Agricultural Science and Research*,7(1): 287-292.

Kaur., 2020. A study of value addition of milk at farm level in Punjab state. M.Sc. Thesis

(Unpublished), Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana Punjab (India)

Kumar, A. and Shah, J., 2016. Dairying as an instrument for ensuring socio-economic and nutritional security in rural India. *Indian Journal of Agricultural Economics*, 71(1): 78-89.

Lahoti, S.R., Cholean, R.R. and Rathi, N.S., 2011.A study on sources of information used by goat keepers.*Journal of Dairying, Foods and Home Sciences*, 30: 72-74.

Minten, B., Randrianarison, L. andSwwinnen, J., 2007. Global retail chains and poor farmers: Evidence from Madagascar. LICOS Discussion Paper no.164, Leuven: LICOS.

Mishra, S.N. and Sharma, H., 1990. Livestock Development in India. Sage Publications, New Delhi.

Patel K.S., 2011. Privatization of extension services as perceived bythe farmers, researchers and extension workers of Gujarat state. Ph.D. Thesis (unpublished). Sardarkrushinagar Dantiwada Agricultural University, Dantiwada, Gujarat, (India).

Patel N.K., Ashwar B.K., Rajput M.B. and Prajapati M.V., 2018. Personal and socio-economic characteristics of commercial dairy farmers and their association with economics of commercial farms in Aravalli district of Gujarat. *International Journal of Agriculture Sciences,* 10(11): 6187-6191.

Rathod, P.K., Landge, S., Nikam, T.R and Vajreshwari, S., 2011. Socio-personal profile and constraints of dairy farmers. *Karnataka Journal of Agricultural Sciences,* 24(4): (619-621).

Sheela, B., 1991. A study on knowledge and adoption of improved dairy practices by dairy practicing women in Bidar district, Karnataka. M.Sc. (Agri.) Thesis, University Agricultural Sciences, Dharwad, Karnataka (India).

Singh, P. and Kumari, B., 2017. Importance of livestock sector in doubling farmers income by 2022. *Indian Journal of Economics and Development*, 13(2a): 136-140.

Singh, R., 1975. On Optimum stratification for proportional allocation. *Sankhya*, 37, 109-193 115.

Singh, R. and Tyagi, K.C., 1994. Correlates of communication behaviour of dairy farmers. *Indian Journal of Dairy Science*, 47: 480-486.

Thomaskutty, K.I., 1975. An appraisal of farmers training programme, farmers training center, Trivendrum, Kerala state. M.Sc. (Agri). Thesis submitted to Allahabad University, Uttar Pradesh, (India).

How to cite this article:

Harpreet Kaur, Inderpreet Kaur, Varinder Pal Singh and Nitin S. Wakchaure. 2021. Level of Value Addition of Milk at Farm and its Relationship with Socio-Economic Characteristics of Dairy Farmers in Punjab State. *Int.J.Curr.Microbiol.App.Sci.* 10(01): 337-346.
doi: https://doi.org/10.20546/ijcmas.2021.1001.042