

# Knowledge of farmers regarding PDKV liquid micro grades

## ABSTRACT

The research study was conducted in Balapur and Akot talukas of Akola district of Maharashtra state. Twelve villages were selected on the basis of maximum number of farmers using PDKV liquid micro grades. From these villages, those respondents were selected who had been using PDKV liquid micro grades from last two year. Thus, 120 farmers constituted the sample for the study. The data were collected on knowledge of farmers regarding PDKV liquid micro grades.

The findings of the study revealed that, 56.67% of respondents belonged to high level of knowledge, while 41.67% of respondents belonged to medium level of knowledge and only 1.66% respondents having low level of knowledge regarding PDKV liquid micro grades. under study. Based on the findings, it has been established that, those respondents who has adopted it and use in their own field have knowledge about importance, its use for particular crop and method of application of PDKV liquid micro grades. Thus, there is necessary efforts should be made to popularize this product among the general farmers by the concern agencies.

**Keywords:** Knowledge, Micronutrients, PDKV Liquid Micro Grades, Fertilizer

## INTRODUCTION

Agriculture, as the backbone of many economies, plays a crucial role in ensuring food security and sustaining livelihoods. One of the key determinants of agricultural productivity is the availability of essential nutrients that support the growth and development of crops. Micronutrients, though required in smaller quantities compared to macronutrients, are indispensable for plant health and overall crop yield. Deficiencies in micronutrients such as zinc, iron, copper, manganese, and boron can severely impede crop growth, leading to reduced yields and compromised nutritional quality.

Recognizing the pivotal role of micronutrients in optimizing crop production, Dr. Panjabrao Deshmukh Krishi Vidyapeeth has developed a specialized liquid micronutrient fertilizer known as PDKV liquid micro grades. This innovative product aims to address micronutrient deficiencies effectively, offering a targeted solution to enhance crop yield and quality (Falke et al., 2023; Jejal et al., 2024). The formulation of PDKV liquid micro grades is designed to provide a balanced supply of micronutrients, tailored to the specific needs of diverse crops. Now a day the farmers are well aware about the micronutrients available in the market manufactured by different companies [10]. Meanwhile Dr. PDKV, Akola has also prepared three different grades of micronutrients and made available to the farmers from last two years. Dr. PDKV, Akola is trying to provide the trustworthy products to the farmers to increase the yield. The present investigation was undertaken with specific objective viz., to study the knowledge of farmers regarding PDKV liquid micro grades.

## MICRONUTRIENT GRADES PREPARED BY DR. PDKV, AKOLA

There are three different types of the grades prepared by Department of Soil Science and Agricultural Chemistry, Dr. PDKV, Akola.

### 1. PDKV Liquid Micro Grade II-

Used for vegetables, cereals, pulses and fruit crops.

Component: iron-25%, zinc-2%, boron-0.5%, manganese-1%, copper-1%, molybdenum-0.1%

### 2. PDKV Liquid Micro Grade X-

Used for pulses.

Component: iron-2.5%, zinc-5%, boron-0.5%, molybdenum-0.1%

### 3. PDKV Liquid Micro Grade XI-

Used for cotton crops.

Component- iron-2.5%, zinc-5%, boron-0.5

The present investigation was planned to assess knowledge of farmers towards utility of PDKV liquid micro grades.

## METHODOLOGY

The present investigation was conducted in Akola district of Maharashtra. On the basis of maximum number of farmers using PDKV liquid micro grades, two tahsils namely, Balapur and Akot were selected for the study. For this study, a list of villages using PDKV liquid micro grades was collected from Department of Soil Science and Agricultural Chemistry, Dr. PDKV, Akola. From this list, on the basis of maximum number of farmers using PDKV Liquid Micro Grades within a village were selected from Akot and Balapur taluka. Accordingly, 6 villages from each taluka were selected. From each village 10 farmers and thus, total 120 respondents selected for the study, who had been using PDKV Liquid Micro Grades from last two year. The exploratory research design of social research was used. Knowledge of farmers regarding PDKV Liquid Micro Grades was measured with the help of schedule prepared with assistance of experts. The statements of the schedule were developed and total statements were about 15. Responses of the respondents were measured on two-point continuum as yes and no and it was scored as 1 and 0, respectively. Finally score for all items of knowledge scale for individual respondent was summed up to obtain total score. The knowledge score was converted into knowledge index with help of following formula.

$$\text{Knowledge Index} = \frac{\text{Actual obtained knowledge score}}{\text{Maximum obtainable knowledge score}} \times 100$$

On the basis of equal interval method, the respondents were categorized into three categories as low, medium and high.

## RESULTS AND DISCUSSION

### Personal, socio-economic, communicational, psychological and situational characteristics of the farmers who used PDKV Liquid Micro Grades

The data presented in Table 1 that, 57.50% of respondents belonged to middle age group (ranging from 36 to 50 years), followed by 25.00 per cent and 17.50% of respondents belonged to young age group (up to 35 years) and old age group (Above 50 years), respectively. 35.00% of the respondents had received education up to the secondary school level, while 33.33% had completed their education up to higher secondary school. 33.33% of the respondents had an annual income in range of Rs. 2,35,781 to Rs. 4,05,960, followed by 30.84% of the respondents whose annual income fell in the range of Rs. 4,05,961 to Rs. 5,76,140. 44.17% of farmers had semi-medium sized land holdings, while 38.33 per cent possessed medium-sized land holdings. Majority (65.83%) of farmers follow both Kharif and Rabi season cropping pattern. More than half (56.67%) of the respondent relied on wells/ tubewells as their primary source of irrigation. 44.17% of the farmers possessed a medium level of information sources, followed by, 30.00 and 25.83% of farmers had a low level and high level of information sources. Largest proportion of respondents (66.67%) reported having a medium level of extension contact, followed by high-level contact (17.50%) and low-level contact (15.83%). Majority (62.50%) of respondents exhibited a medium level of innovativeness, followed by higher level of innovativeness (29.17 %) and low level of innovativeness (8.33%). 59.17% of the respondents demonstrated a medium level of scientific orientation, while 30.83% of the respondents exhibited a high level of scientific orientation and only 10.00% of respondents had a low level of scientific orientation.

**Table 1. Personal, socio-economic, communicational, psychological and situational characteristics of the farmers who used PDKV Liquid Micro Grades**

| Sr. | Particulars | Frequency | Percentage |
|-----|-------------|-----------|------------|
|-----|-------------|-----------|------------|

| No.        |   | (n=120)   |       |
|------------|---|-----------|-------|
| <b>1.</b>  | <b>Age</b>  |           |       |
|            | Young (up to 35)  | 30        | 25.00 |
|            | Middle (36 to 50)   | 69        | 57.50 |
|            | Old (above 50)  | 21        | 17.50 |
| <b>2.</b>  | <b>Education</b>  |           |       |
|            | Illiterate (no school)  | 00        | 00.00 |
|            | Primary school (1 <sup>st</sup> to 4 <sup>th</sup> )            | 06        | 05.00 |
|            | Middle school (5 <sup>th</sup> to 7 <sup>th</sup> )             | 12        | 10.00 |
|            | Secondary school (8 <sup>th</sup> to 10 <sup>th</sup> )         | 42        | 35.00 |
|            | Higher secondary school (11 <sup>th</sup> to 12 <sup>th</sup> ) | 40        | 33.33 |
|            | Graduate and above (above 12 <sup>th</sup> )                    | 20        | 16.67 |
| <b>3.</b>  | <b>Annual income</b>  |           |       |
|            | Upto Rs. 2,35,780/-   | 19        | 15.83 |
|            | Rs. 2,35,781 to Rs. 4,05,960 /-                                 | 40        | 33.33 |
|            | Rs. 4,05,961 to Rs. 5,76,140/-                                  | 37        | 30.84 |
|            | Rs. 5,76,141 to Rs. 7,46,320/-                                  | 16        | 13.33 |
|            | Above Rs. 7,46,320/-  | 8         | 06.67 |
| <b>4.</b>  | <b>Land holding</b>   |           |       |
|            | Marginal (Up to 1.00 ha)  | 06        | 05.00 |
|            | Small (1.01 to 2.00 ha)   | 09        | 07.50 |
|            | Semi-medium (2.01 to 4.00 ha)                                   | 53        | 44.17 |
|            | Medium (4.01 to 10.00 ha)                                       | 46        | 38.33 |
|            | Large (Above 10.00 ha)  | 06        | 05.00 |
| <b>5.</b>  | <b>Cropping pattern</b>   |           |       |
|            | Kharif  | 36        | 30.00 |
|            | Kharif + Rabi   | 79        | 65.83 |
|            | Kharif + Rabi + Summer  | 05        | 04.17 |
| <b>6.</b>  | <b>Sources of irrigation</b>                                    |           |       |
|            | No source   | 43        | 35.83 |
|            | River   | 00        | 00.00 |
|            | Well/ Tubewell  | 68        | 56.67 |
|            | Canal   | 05        | 04.17 |
|            | Farm pond   | 04        | 03.33 |
| <b>7.</b>  | <b>Sources of information</b>                                   |           |       |
|            | Low (Up to 08.21)   | 36        | 30.00 |
|            | Medium (08.21 to 09.71)   | 53        | 44.17 |
|            | High (Above 09.71)  | 31        | 25.83 |
|            | Mean = 8.96   | SD = 0.75 |       |
| <b>8.</b>  | <b>Extension contact</b>  |           |       |
|            | Low (Up to 3.62)  | 19        | 15.83 |
|            | Medium (3.62 to 6.34)   | 80        | 66.67 |
|            | High (Above 6.34)   | 21        | 17.50 |
|            | Mean = 4.98   | SD = 1.36 |       |
| <b>9.</b>  | <b>Innovativeness</b>   |           |       |
|            | Low (Up to 9.72)  | 10        | 08.33 |
|            | Medium (9.72 to 14.76)  | 75        | 62.50 |
|            | High (Above 14.76)  | 35        | 29.17 |
|            | Mean = 12.24  | SD = 2.52 |       |
| <b>10.</b> | <b>Scientific orientation</b>                                   |           |       |

|  |                         |           |       |
|--|-------------------------|-----------|-------|
|  | Low (Upto 17.13)        | 12        | 10.00 |
|  | Medium (17.13 to 21.54) | 71        | 59.17 |
|  | High (Above 21.54)      | 37        | 30.83 |
|  | Mean = 19.33            | SD = 2.21 |       |

### Knowledge of farmers regarding PDKV Liquid Micro Grades

Knowledge refers to a kind of understood information possessed by an individual (English and English, 1961). Operationally, knowledge is defined as the amount of information possessed by the respondents about PDKV Liquid Micro Grades. The information regarding the knowledge of farmers regarding PDKV Liquid Micro Grades was collected, tabulated and analyzed.

**Table 2. Statement wise distribution of farmers according to their knowledge**

| Sr. No. | Statement   | Yes             | No            |
|---------|---|-----------------|---------------|
| 1.      | Use of micronutrients is recommended for basic soils for increase in yield  | 74<br>(61.67)   | 46<br>(38.33) |
| 2.      | Micronutrients help in increasing uptake of major nutrients from the soil required for plant growth                           | 100<br>(83.33)  | 20<br>(16.67) |
| 3.      | PDKV liquid micro grade helps in mitigating the micronutrient deficiency in the soil for plant growth                         | 113<br>(94.17)  | 07<br>(05.83) |
| 4.      | PDKV Liquid fertilizer has three different types of grades  | 110<br>(91.67)  | 10<br>(08.33) |
| 5.      | PDKV Liquid Micro Grade II is use for vegetables, cereals, pulses and fruit crops   | 109<br>(90.83)  | 11<br>(09.17) |
| 6.      | PDKV Liquid Micro Grade X is use for Pulses only  | 120<br>(100.00) | 00<br>(00.00) |
| 7.      | PDKV Liquid Micro Grade XI is use for cotton crop only  | 114<br>(95.00)  | 06<br>(05.00) |
| 8.      | PDKV Liquid Micro Grades are applied through foliar spray   | 120<br>(100.00) | 00<br>(00.00) |
| 9.      | Spraying of PDKV Liquid Micro Grade should be done before 11 in the morning and after 4 in the afternoon                      | 109<br>(90.83)  | 11<br>(09.17) |
| 10.     | PDKV Liquid Micro Grade spraying is done twice, 50 ml at branching stage and 100 ml per 10 litres of water at flowering stage | 108<br>(90.00)  | 12<br>(10.00) |
| 11.     | PDKV Liquid Micro Grades should not be mix with insecticides and fungicides   | 120<br>(100.00) | 00<br>(00.00) |
| 12.     | PDKV Liquid Micro Grades has waiting period of 4-5 days   | 105<br>(87.50)  | 15<br>(12.50) |
| 13.     | PDKV liquid micro grade should be thoroughly mix with water before spraying   | 120<br>(100.00) | 00<br>(00.00) |
| 14.     | For spraying of PDKV liquid micro grade, knapsack sprayer should be used preferably   | 117<br>(97.50)  | 03<br>(02.50) |
| 15.     | For spraying of PDKV liquid micro grade by power spray, the quantity should be doubled  | 108<br>(90.00)  | 12<br>(10.00) |

(Figures in parenthesis indicates percentage)

From Table 2, the statement wise distribution of respondents observed that, the statements like, PDKV Liquid Micro Grade X is use for Pulses only, PDKV Liquid Micro Grades are applied through foliar spray, PDKV Liquid Micro Grades should not be mix with chemical fertilizers,

insecticides and fungicides and PDKV liquid micro grade should be thoroughly mix with water before spraying are in agreement with the percentage of 100 per cent.

The statements like For spraying of PDKV liquid micro grade, knapsack sprayer should be used preferably, PDKV Liquid Micro Grade XI is use for cotton crop only, PDKV liquid micro grade helps in mitigating the micronutrient deficiency in the soil for plant growth, PDKV Liquid fertilizer has three different types of grades, PDKV Liquid Micro Grade II is use for vegetables, cereals, pulses and fruit crops and Spraying of PDKV Liquid Micro Grade should be done before 11 in the morning and after 4 in the afternoon are in agreement with the percentage of 97.50 per cent, 95.00 per cent, 94.17 per cent, 91.67 per cent, 90.83 per cent and 90.83 per cent, respectively.

The statements like, PDKV Liquid Micro Grade spraying is done twice, 50 ml at branch growth stage and 100 ml per 10 litres of water at flowering stage, For spraying of PDKV liquid micro grade by power spray, the quantity should be doubled, PDKV Liquid Micro Grades has waiting period of 4-5 days, Micronutrients help in increasing uptake of major nutrients from the soil required for plant growth and Use of micronutrients is recommended for basic soils for increase in yield are in agreement with the percentage of 90 per cent, 90 per cent, 87.50 per cent, 83.33 per cent and 61.67 per cent, respectively.

From Table 2, concluded that, 38.33 per cent and 10 per cent of the respondents don't have knowledge about statements like use of micronutrients is recommended for basic soils for increase in yield, for spraying of PDKV liquid micro grade by power spray, the quantity should be doubled. In spite of this, they are still using PDKV Liquid Micro Grades due to their relatives and friend's suggestions.

**Table 3. Distribution of the respondents according to their level of knowledge**

| Sr. No. | Category               | Respondents (n=120) |               |
|---------|------------------------|---------------------|---------------|
|         |                        | Frequency           | Percentage    |
| 1.      | Low (66.67 - 77.78)    | 02                  | 01.66         |
| 2.      | Medium (77.78 - 88.89) | 50                  | 41.67         |
| 3.      | High (88.89 - 100)     | 68                  | 56.67         |
|         | <b>Total</b>           | <b>120</b>          | <b>100.00</b> |

According to the data provided in Table 3, it noticed that, 56.67 per cent of the respondents demonstrated a high-level knowledge of PDKV Liquid Micro Grades, while 41.67 per cent of respondents exhibited a medium level of understanding and only 1.66 per cent displayed a low level of knowledge on the subject.

Based on the information presented in the Table 3, we concluded that, the majority of respondents fell into the category of high-level of knowledge. This implies that, most of the respondents have knowledge about PDKV Liquid Micro Grades. These results align closely with those reported by Madhuri Morey (2020) and Payal Dahiwale (2020).

### **Relationship of characteristics of farmers with knowledge of farmers regarding PDKV Liquid Micro Grades**

From Table 4, it is depicted that, cropping pattern, sources of information and innovativeness of farmers were found positive and highly significant with knowledge at 0.01 level of probability. Whereas, education, extension contact and scientific orientation were found positively significant with

knowledge at 0.05 level of probability. The positive significant relationship shows that, when the level of the variables viz. education, cropping pattern, sources of information, extension contact, innovativeness and scientific orientation increases then the knowledge of farmers regarding PDKV Liquid Micro Grades will also increases. The variables age, annual income, land holding, and sources of irrigation were determined to have no significant relationship with knowledge.

**Table4. Relationship between personal, socio-economic, communicational, psychological and situational characteristics of respondents with their knowledge**

| Sr. No. | Characteristics        | Correlation coefficient |
|---------|------------------------|-------------------------|
| 1.      | Age                    | 0.109 <sup>NS</sup>     |
| 2.      | Education              | 0.222*                  |
| 3.      | Annual income          | 0.064 <sup>NS</sup>     |
| 4.      | Land holding           | -0.062 <sup>NS</sup>    |
| 5.      | Cropping pattern       | 0.266**                 |
| 6.      | Sources of irrigation  | 0.064 <sup>NS</sup>     |
| 7.      | Sources of information | 0.295**                 |
| 8.      | Extension contact      | 0.206*                  |
| 9.      | Innovativeness         | 0.231**                 |
| 10.     | Scientific orientation | 0.193*                  |

\*\*Significant at 0.01 level of probability

\*Significant at 0.05 level of probability

NS- Non-Significant

This finding strongly suggested that, the majority of the chosen independent variables exhibit a notable and positive correlation with knowledge of farmers regarding PDKV Liquid Micro Grades.

## CONCLUSION

The finding of the investigation revealed that, 56.67 per cent of the respondent were exhibited a high level of knowledge regarding PDKV Liquid Micro Grades, followed by, medium level of knowledge (41.67%) and only 1.66 per cent of the respondent were displaying a low level of knowledge regarding PDKV Liquid Micro Grades. The education, cropping pattern, sources of information, extension contact, innovativeness and scientific orientation had significant relationship with knowledge of farmers regarding PDKV Liquid Micro Grades. Whereas, age, annual income, land holding and sources of irrigation had non-significant relationship with knowledge of farmers regarding PDKV Liquid Micro Grades. Thus, the conclusion of the study is maximum number of respondents (98.34%) have knowledge about importance, its use for particular crop and method of application of PDKV Liquid Micro Grades. But these respondents or those who has adopted it and use in their own field. Hence, necessary efforts should be made to popularize this product among the general farmers by the concern agencies.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

- 1.
- 2.
- 3.

## REFERENCES

1. Kumar, R. 2004. Farmers knowledge and adoption regarding use of micronutrients in the major crops of Haryana. Ph.D. (Agri.) Thesis (Unpub.), CCSHAU, Hisar.
2. Madhuri, D. M., 2020. Knowledge and Adoption of Integrated Pest Management Practices by the Maize Growers. M.Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
3. Payal, R. D., 2020. Impact of PKV Kisan variety of paddy on the growers. M. Sc. (Agri.) Thesis (Unpublished), Dr. PDKV, Akola.
4. Rodhe, S. R. 2020. Perception of soybean growers about use of biofertilizers. M.Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.
5. Sihare, A. 2015. A study of farmers knowledge and attitude related to organic farming in Tikamgarh district of Madhya Pradesh, M.Sc. (Agri.) Thesis (Unpub.), Tikamgarh, JNKVV, Jabalpur, (M. P.).
6. Sunilkumar, N. M. 2017. Knowledge, perception and utilization of herbicides by the farmers of North Karnataka. M.Sc. (Agri.) Thesis, University of Agricultural Science, Dharwad.
7. Verma, A. K. 2019. Study on knowledge and adoption of organic fertilizers among the farmers in Ailiya block Sitapur district. M.Sc. (Agri.) Thesis, NDUAT, Ayodhya.
8. Falke VM, Lambe SP, Lawankar MD, Gawande SA. Utility perception of farmers towards PDKV Liquid Micro Grades. *Young (Upto 35)*. 2023;30:25-00.
9. Jejal AD, Giri MD, Nagoshe SG, Shaniware YA, Bachhav SS. Enhancing Nutritional Value of Urdbean (*Vigna mungo* L. hepper) Through Agronomic Biofortification with Zinc and Iron. *International Journal of Plant & Soil Science*. 2024 May 14;36(6):562-9.
10. Shinde GU, Agrawal RC, Mani I, Agrawal A, Khodke UM, Muley SV, Tekale DD, Bhalerao SR, Kakade OD. Digital Farming Solution by Automation Using Agri-Bot, Agri-Drone, and Agri-AGV for Organic Farming Practices. In *International Conference on Agriculture Digitalization and Organic Production 2024 Jun 5* (pp. 3-21). Singapore: Springer Nature Singapore.

UNDER PEER REVIEW

UNDER PEER REVIEW