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# Longevity of Paddy Seeds as Influenced by Priming with Organic Solutions

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**ABSTRACT:** The present experiment was conducted to evaluatethe longevity of paddy seeds primed with different organic solutions. The seeds of paddy variety Sonamasoori were pre-soaked inwater, coconut water, custard apple leaf extract, cow urine, panchagavya, vermiwashand*Trichoderma*at different concentrations, either alone or in combination. Among the treatments, seeds primed with 12.5 % coconut water + 3 % custard apple leaf extract showed significantly superior field emergence (92.8, 86.9 and 70.6 %), seed germination (98.8, 93.7 and 78.9 %), speed of germination (27.9, 24.6 and 20.0), seedling length (28.6, 27.1 and 24.1 cm), seedling dry weight (179, 170 and 157 mg), SVI (2819, 2539 and 1905), dehydrogenase activity (0.665, 0.621 and 0.578 OD value), α-amylase activity (12.1, 11.9 and 9.3 mm), lowest seed moisture content (10.8, 10.9 and 11.9) and electrical conductivity (0.164, 0.191 and 0.295 $dSm^{-1}$) at initial, 6 and 12 months after storage respectively, which was followed by seeds primed with 12.5 % coconut water + 3 % panchagavya treatment. Lowest seed quality parameters were recorded in control. From this study, it is concluded that soaking of seeds in 12.5 % coconut water + 3 % custard apple leaf extract for 16 h improves the longevity of paddy seeds.

**Key words:** Invigoration, organic solutions, longevity, paddy, seed quality

Rice (*Oryza sativa* L.) is the major staple food for more than half of the global population, supplying 50 to 80 per cent calories of energy and hence, is considered as the "global grain". In India, rice continues to hold the key for sustained food production and assures food security for more than half of the total population.

Quality seed plays a vital role in enhancing the crop productivity. Seed invigoration, carried out prior to sowing and before they are exposed to complex and unfavorable field conditions, confer to the crop a good start [1]. Seed priming is "a presowing seed treatment in which seeds are soaked in different solutions that allow them to imbibeand go through the first stage of germination but does not permit radicle protrusion through the seed coat" [2]. These seeds can be dried back to original moisture content and stored prior to sowing. Maintenance of high quality until it is needed for next sowing is a paramount task of any seed production programme. Diverse biological processes occur in the seed during storage which results in seed deterioration that leads to reduction in vigour and viability of the seeds [3 & 4].

Currently several organic based materials are used to invigorate seeds. The fresh leaf extract of some plants, for example custard apple leaf extracts and organic solutions like tender coconut water, panchagavya, cow urine,vermivashand *Trichoderma* have been reported to be useful to invigorate seeds, with greater benefits than a number of chemicals [5 & 6]. The factors responsible for promotion of germination and growth due to use of these are not yet clearly understood. Keeping the above points in view, laboratory studies were initiated with an objective to know the influence of organic seed priming on longevity of paddy seeds cv sonamasoori.

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## MATERIALS AND METHODS

The present experiment was carried out in the Department of Seed Science and Technology, College of Agriculture, University of Agricultural Sciences, Raichur, Karnataka, India, during 2013-14. The seeds of sonamasoori variety were pre-soaked for 16 h in water, 25 % coconut water, 25 % cow urine, 25 % vermiwash, 5 % panchagavya,10 % *Trichoderma*, 3 % custard apple leaf extract, 12.5 % coconut water + 12.5 % cow urine, 12.5 % coconut water + 12.5 % vermiwash, 12.5 % coconut water + 3 % panchagavya, 12.5 % coconut water + 5 % *Trichoderma*, 12.5 % coconut water + 3 % custard apple leaf extract, 12.5 % cow urine + 12.5 % vermiwash, 12.5 % cow urine + 3 % panchagavya, 12.5 % cow urine + 5 % *Trichoderma*, 12.5 % cow urine + 3 % custard apple leaf extract, 12.5 % vermiwash + 3 % panchagavya, 12.5 % vermiwash + 5 % *Trichoderma*, 12.5 % vermiwash + 3 % custard apple leaf extract, 3 % panchagavya + 5 % *Trichoderma*, 3 % panchagavya + 3 % custard apple leaf extract and5 % *Trichoderma* + 3 % custard apple leaf extract as per the required weight by volume ratio; seed to solution (1:1.5). Then, the seeds were dried back to original moisture content and stored in cloth bag for 12 months, under ambient condition, for longevity study.Different seed quality parameters were recordedat initial, 6 and 12 months after storage by adopting standard procedure [7]. The experiment was performed by following completely randomized design. The mean data of the experiment were statistically analyzed by using appropriate statistical methods [8]. The critical differences were calculated at one per cent level of probability wherever 'F' test was found significant.

## RESULTS AND DISCUSSION

An era of synthetic chemicals came with widely spread use of several insecticidesand fungicides, which successfully manage the infestation caused by insects, fungi and other micro-flora during storage. But, the excessiveuse of chemicals and their residual toxicity adversely impact the non target animals including human beings, besides affecting the seed quality. Hence, asafe and feasible approach is the treatment of seeds with botanicals, which are safe, eco-friendly, economical and easily available. Itis also immensely useful to the farming community and seed industry not only for getting higher seed yield but also for maintenance of seed quality during storage of carry over seeds evenunder ambient condition with minimum qualitative and quantitative losses. In the present study, paddy seeds were subjected to priming using organic solutions and analysed for the longevity of primed seeds. The observations on different seed quality parameters were recorded at initial, 6 and 12 months after storage. All the seed quality parameters were found to differ significantly due to different priming treatments except moisture content,as compared to control (Tables 1, 2 and 3).

Among the treatments, seeds primed with 12.5 % coconut water + 3 % custard apple leaf extract showed significantly highest seed quality parameters *viz.*, field emergence (92.8, 86.9 and 70.6 %), seed germination (98.8, 93.7 and 78.9 %), speed of germination (27.9, 24.6 and 20.0), seedling length (28.6, 27.1 and 24.1 cm), seedling dry weight (179, 170 and 157 mg), SVI (2819, 2539 and 1905), dehydrogenase activity (0.665, 0.621 and 0.578 OD value), α-amylase activity (12.1, 11.9 and 9.3 mm), lowest seed moisture content (10.8, 10.9 and 11.9 %) and electrical conductivity (0.164, 0.191 and 0.295 $dSm^{-1}$) at initial, 6 and 12 months after storage respectively, which was followed by seeds primed with 12.5 % coconut water + 3 % panchagavya treatment. Lowest seed quality parameters *viz.*, field emergence (81.1, 73.9 and 54.0 %), seed germination (87.5, 82.7 and 70.1 %), speed of germination (22.2, 20.4 and 14.0), seedling length (24.7, 23.4 and 19.8 cm), seedling dry weight (97.0, 83.0 and 69.0 mg), SVI (2161, 1935 and 1386), dehydrogenase activity (0.521, 0.471 and 0.396 OD value), α-amylase activity (8.2, 7.9 and 5.8mm), highest seed moisture content (11.0, 12.0 and 12.5 %) and electrical conductivity (0.223, 0.251 and 0.357 $dSm^{-1}$)were recorded in control at initial, 6 and 12 months after storage respectively. Treated seeds exhibited a gradual reduction in all the seed quality parameters as storage, advanced. The reduction in seed quality parameters during storage was attributed to the retardation in the enzyme activity (Figures 1 & 2) which may reduce valuable nutrients necessary for growth and development [9 & 10]. The beneficial effect of botanicals on seed viability has not been clear due to lack of information on the active compounds

**Table 1. Influence of organic seed priming on physiological seed quality in paddy (cv. Sonamasoori) during storage**

| Treatments(T) | Moisture content (%) | | | Germination (%) | | | Seedling length (cm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Initial month | 6 month | 12 month | Initial month | 6 month | 12 month | Initial month | 6 month | 12 month |
| $T_1$ | 11.0 | 12.0 | 12.5 | 87.5 | 82.7 | 70.1 | 24.7 | 23.4 | 19.8 |
| $T_2$ | 11.0 | 11.8 | 12.2 | 89.1 | 83.9 | 73.3 | 26.0 | 27.1 | 22.9 |
| $T_3$ | 10.8 | 11.0 | 11.9 | 98.1 | 93.1 | 78.3 | 28.1 | 27.1 | 24.0 |
| $T_4$ | 11.1 | 11.8 | 12.2 | 89.7 | 86.2 | 74.0 | 26.9 | 27.3 | 23.3 |
| $T_5$ | 10.9 | 11.0 | 12.0 | 96.9 | 91.8 | 76.9 | 27.9 | 26.5 | 23.7 |
| $T_6$ | 10.9 | 11.0 | 12.0 | 97.2 | 92.0 | 77.4 | 28.0 | 26.6 | 23.8 |
| $T_7$ | 10.9 | 10.0 | 12.0 | 96.6 | 91.4 | 76.8 | 27.8 | 26.5 | 23.6 |
| $T_8$ | 10.9 | 11.0 | 12.0 | 97.4 | 92.4 | 75.9 | 28.0 | 26.8 | 23.8 |
| $T_9$ | 10.9 | 11.1 | 12.1 | 95.4 | 90.5 | 76.1 | 27.5 | 26.2 | 23.5 |
| $T_{10}$ | 10.9 | 11.0 | 12.0 | 97.6 | 92.5 | 77.7 | 28.1 | 26.9 | 23.9 |
| $T_{11}$ | 10.8 | 10.9 | 11.9 | 98.3 | 93.4 | 78.7 | 28.2 | 27.1 | 24.1 |
| $T_{12}$ | 10.9 | 11.0 | 11.9 | 97.8 | 93.0 | 78.1 | 28.1 | 26.9 | 23.9 |
| $T_{13}$ | 10.8 | 10.9 | 11.9 | 98.8 | 93.7 | 78.9 | 28.5 | 27.1 | 24.1 |
| $T_{14}$ | 11.1 | 11.2 | 12.3 | 90.8 | 87.5 | 74.2 | 26.9 | 25.4 | 23.3 |
| $T_{15}$ | 11.0 | 11.2 | 12.2 | 92.0 | 88.2 | 74.6 | 27.0 | 25.5 | 23.3 |
| $T_{16}$ | 11.0 | 11.2 | 12.2 | 92.9 | 88.7 | 74.8 | 27.1 | 25.5 | 23.3 |
| $T_{17}$ | 11.0 | 11.2 | 12.2 | 93.4 | 89.1 | 75.2 | 27.1 | 25.7 | 23.4 |
| $T_{18}$ | 11.0 | 11.1 | 12.2 | 94.3 | 89.4 | 75.4 | 27.2 | 25.9 | 23.4 |
| $T_{19}$ | 11.0 | 11.1 | 12.1 | 94.6 | 90.2 | 75.8 | 27.2 | 26.0 | 23.4 |
| $T_{20}$ | 10.9 | 11.1 | 12.1 | 95.2 | 90.3 | 76.0 | 27.3 | 26.1 | 23.4 |
| $T_{21}$ | 10.9 | 11.1 | 12.1 | 95.7 | 90.6 | 76.2 | 27.6 | 26.2 | 23.5 |
| $T_{22}$ | 10.9 | 11.0 | 12.0 | 96.2 | 91.3 | 76.5 | 27.8 | 26.3 | 23.6 |
| $T_{23}$ | 10.9 | 11.1 | 12.0 | 96.1 | 90.9 | 76.4 | 27.7 | 26.3 | 23.6 |
| Mean | 10.9 | 11.1 | 12.1 | 94.9 | 90.1 | 76.0 | 27.4 | 26.3 | 23.4 |
| SEm± | 0.37 | 0.46 | 0.50 | 0.61 | 0.47 | 0.61 | 0.2 | 0.2 | 0.2 |
| CD @ 1 % | NS | NS | NS | 1.81 | 1.44 | 1.85 | 0.6 | 0.6 | 0.5 |

$T_1$: Control; $T_2$: Water soaking; $T_3$: 25 % Coconut water; $T_4$: 25 % Cow urine; $T_5$: 25 % Vermiwash; $T_6$: 5 % Panchagavya; $T_7$: 10 % Trichoderma; $T_8$: 3 % Custard apple leaf extract; $T_9$: 12.5 % Coconut water + 12.5 % Cow urine; $T_{10}$: 12.5 % Coconut water + 12.5 % Vermiwash; $T_{11}$: 12.5 % Coconut water + 3 % Panchagavya; $T_{12}$: 12.5 % Coconut water + 5 % Trichoderma; $T_{13}$: 12.5 % Coconut water + 3 % Custard apple leaf extract; $T_{14}$: 12.5 % Cow urine + 12.5 % Vermiwash; $T_{15}$: 12.5 % Cow urine + 3 % Panchagavya; $T_{16}$: 12.5 % Cow urine + 5 % Trichoderma; $T_{17}$: 12.5 % Cow urine + 3 % Custard apple leaf extract; $T_{18}$: 12.5 % Vermiwash + 3 % Panchagavya; $T_{19}$: 12.5 % Vermiwash + 5 % Trichoderma; $T_{20}$: 12.5 % Vermiwash + 3 % Custard apple leaf extract; $T_{21}$: 3 % Panchagavya + 5 % Trichoderma; $T_{22}$: 3 % Panchagavya + 3 % Custard apple leaf extract; $T_{23}$: 5 % Trichoderma + 3 % Custard apple leaf extract

**Table 2. Influence of organic seed priming on seedling vigour attributes in paddy (cv. Sonamasoori) during storage**

| Treatments(T) | Speed of germination | | | Dry matter production (mg seedlings$^{-10}$) | | | Seedling vigour | | | Field emergence (%) index | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Initial month | 6 month | 12 month | Initial month | 6 month | 12 month | Initial month | 6 month | 12 month | Initial month | 6 month | 12 month |
| $T_1$ | 22.2 | 20.4 | 14.0 | 97 | 83 | 69 | 2161 | 1935 | 1386 | 81.1 | 73.9 | 54.0 |
| $T_2$ | 25.2 | 21.3 | 17.2 | 120 | 105 | 71 | 2314 | 2278 | 1680 | 83.5 | 76.9 | 58.6 |
| $T_3$ | 27.5 | 24.2 | 19.9 | 173 | 166 | 150 | 2756 | 2520 | 1876 | 92.2 | 84.4 | 68.0 |
| $T_4$ | 25.5 | 21.8 | 17.2 | 126 | 113 | 78 | 2414 | 2350 | 1720 | 83.9 | 76.4 | 55.4 |
| $T_5$ | 26.7 | 21.7 | 19.2 | 155 | 150 | 129 | 2704 | 2418 | 1821 | 91.2 | 83.7 | 62.9 |
| $T_6$ | 26.9 | 23.9 | 19.4 | 159 | 152 | 136 | 2717 | 2431 | 1840 | 91.3 | 84.0 | 63.8 |
| $T_7$ | 26.5 | 23.7 | 19.1 | 153 | 148 | 128 | 2687 | 2405 | 1813 | 91.0 | 83.3 | 62.1 |
| $T_8$ | 26.9 | 24.0 | 19.5 | 166 | 160 | 141 | 2729 | 2459 | 1806 | 91.5 | 83.9 | 62.8 |
| $T_9$ | 26.1 | 23.1 | 18.5 | 146 | 132 | 118 | 2628 | 2351 | 1789 | 89.8 | 82.4 | 62.0 |
| $T_{10}$ | 27.1 | 24.1 | 20.0 | 169 | 163 | 144 | 2739 | 2487 | 1856 | 91.9 | 84.7 | 64.8 |
| $T_{11}$ | 27.6 | 24.3 | 20.0 | 175 | 168 | 151 | 2774 | 2530 | 1898 | 92.5 | 86.5 | 69.9 |
| $T_{12}$ | 27.2 | 24.2 | 19.8 | 171 | 165 | 149 | 2749 | 2502 | 1868 | 92.1 | 84.5 | 66.4 |
| $T_{13}$ | 27.9 | 24.5 | 20.0 | 179 | 170 | 157 | 2819 | 2539 | 1905 | 92.8 | 86.9 | 70.6 |
| $T_{14}$ | 25.6 | 21.9 | 17.7 | 128 | 108 | 80 | 2444 | 2296 | 1724 | 84.2 | 76.5 | 55.3 |
| $T_{15}$ | 25.8 | 22.3 | 17.8 | 130 | 111 | 81 | 2481 | 2324 | 1738 | 84.9 | 77.3 | 56.2 |
| $T_{16}$ | 25.8 | 22.4 | 17.9 | 133 | 113 | 88 | 2514 | 2339 | 1746 | 85.6 | 78.4 | 58.5 |
| $T_{17}$ | 25.9 | 22.5 | 18.0 | 135 | 118 | 93 | 2531 | 2364 | 1755 | 86.3 | 79.7 | 61.5 |
| $T_{18}$ | 25.9 | 22.7 | 18.1 | 138 | 120 | 105 | 2563 | 2393 | 1765 | 88.2 | 80.5 | 59.0 |
| $T_{19}$ | 26.0 | 22.9 | 18.2 | 141 | 125 | 107 | 2574 | 2422 | 1774 | 88.6 | 81.4 | 61.5 |
| $T_{20}$ | 26.0 | 23.0 | 18.3 | 144 | 130 | 115 | 2601 | 2441 | 1780 | 89.1 | 83.1 | 66.5 |
| $T_{21}$ | 26.2 | 23.2 | 18.5 | 149 | 143 | 119 | 2643 | 2455 | 1791 | 90.1 | 82.5 | 61.4 |
| $T_{22}$ | 26.3 | 23.4 | 18.9 | 151 | 147 | 127 | 2673 | 2486 | 1806 | 90.8 | 83.1 | 61.6 |
| $T_{23}$ | 26.2 | 23.4 | 18.7 | 150 | 146 | 120 | 2659 | 2471 | 1799 | 90.3 | 82.8 | 61.9 |
| Mean | 26.2 | 23.0 | 18.5 | 147 | 135 | 116 | 2601 | 2399 | 1778 | 88.8 | 81.6 | 62.6 |
| SEm± | 0.4 | 0.4 | 0.4 | 3 | 4 | 5 | 39 | 32 | 37 | 81.1 | 73.9 | 54.0 |
| CD@1% | 1.3 | 1.1 | 1.2 | 11 | 12 | 15 | 117 | 98 | 111 | 83.5 | 76.9 | 58.6 |

$T_1$: Control; $T_2$: Water soaking; $T_3$: 25 % Coconut water; $T_4$: 25 % Cow urine; $T_5$: 25 % Vermiwash; $T_6$: 5 % Panchagavya; $T_7$: 10 % Trichoderma; $T_8$: 3 % Custard apple leaf extract; $T_9$: 12.5 % Coconut water + 12.5 % Cow urine; $T_{10}$: 12.5 % Coconut water + 12.5 % Vermiwash; $T_{11}$: 12.5 % Coconut water + 3 % Panchagavya; $T_{12}$: 12.5 % Coconut water + 5 % Trichoderma; $T_{13}$: 12.5 % Coconut water + 3 % Custard apple leaf extract; $T_{14}$: 12.5 % Cow urine + 12.5 % Vermiwash; $T_{15}$: 12.5 % Cow urine + 3 % Panchagavya; $T_{16}$: 12.5 % Cow urine + 5 % Trichoderma; $T_{17}$: 12.5 % Cow urine + 3 % Custard apple leaf extract; $T_{18}$: 12.5 % Vermiwash + 3 % Panchagavya; $T_{19}$: 12.5 % Vermiwash + 5 % Trichoderma; $T_{20}$: 12.5 % Vermiwash + 3 % Custard apple leaf extract; $T_{21}$: 3 % Panchagavya + 5 % Trichoderma; $T_{22}$: 3 % Panchagavya + 3 % Custard apple leaf extract; $T_{23}$: 5 % Trichoderma + 3 % Custard apple leaf extract

**Table 3. Influence of organic seed priming on biochemical attributes in paddy (cv. Sonamasoori) during storage**

| Treatments(T) | Moisture content (%) | | | Germination (%) | | | Seedling length (cm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Initial month | 6 month | 12 month | Initial month | 6 month | 12 month | Initial month | 6 month | 12 month |
| $T_1$ | 0.521 | 0.471 | 0.396 | 8.2 | 7.9 | 5.8 | 0.223 | 0.251 | 0.357 |
| $T_2$ | 0.583 | 0.510 | 0.419 | 10.0 | 9.5 | 8.3 | 0.215 | 0.226 | 0.350 |
| $T_3$ | 0.654 | 0.618 | 0.538 | 12.0 | 11.7 | 9.2 | 0.169 | 0.192 | 0.306 |
| $T_4$ | 0.591 | 0.513 | 0.423 | 10.1 | 9.6 | 8.3 | 0.213 | 0.225 | 0.348 |
| $T_5$ | 0.640 | 0.599 | 0.520 | 11.8 | 11.3 | 9.1 | 0.178 | 0.202 | 0.310 |
| $T_6$ | 0.642 | 0.606 | 0.523 | 11.8 | 11.3 | 9.1 | 0.175 | 0.200 | 0.308 |
| $T_7$ | 0.638 | 0.594 | 0.518 | 11.7 | 11.2 | 9.0 | 0.179 | 0.205 | 0.310 |
| $T_8$ | 0.643 | 0.610 | 0.525 | 11.9 | 11.4 | 9.1 | 0.171 | 0.200 | 0.308 |
| $T_9$ | 0.629 | 0.578 | 0.508 | 11.1 | 11.1 | 8.9 | 0.185 | 0.209 | 0.320 |
| $T_{10}$ | 0.645 | 0.613 | 0.526 | 11.9 | 11.5 | 9.2 | 0.174 | 0.198 | 0.307 |
| $T_{11}$ | 0.659 | 0.620 | 0.560 | 12.1 | 11.7 | 9.2 | 0.166 | 0.192 | 0.300 |
| $T_{12}$ | 0.648 | 0.615 | 0.530 | 12.0 | 11.7 | 9.2 | 0.172 | 0.193 | 0.306 |
| $T_{13}$ | 0.665 | 0.621 | 0.578 | 12.1 | 11.9 | 9.3 | 0.164 | 0.191 | 0.295 |
| $T_{14}$ | 0.598 | 0.521 | 0.441 | 10.2 | 10.1 | 8.3 | 0.211 | 0.220 | 0.344 |
| $T_{15}$ | 0.603 | 0.530 | 0.460 | 10.3 | 10.1 | 8.4 | 0.210 | 0.218 | 0.341 |
| $T_{16}$ | 0.607 | 0.533 | 0.478 | 10.4 | 10.0 | 8.5 | 0.207 | 0.217 | 0.335 |
| $T_{17}$ | 0.610 | 0.540 | 0.488 | 10.6 | 10.2 | 8.5 | 0.203 | 0.215 | 0.333 |
| $T_{18}$ | 0.619 | 0.541 | 0.490 | 10.9 | 10.3 | 8.5 | 0.197 | 0.218 | 0.329 |
| $T_{19}$ | 0.622 | 0.557 | 0.493 | 11.0 | 10.4 | 8.6 | 0.194 | 0.218 | 0.322 |
| $T_{20}$ | 0.626 | 0.563 | 0.505 | 11.1 | 11.9 | 8.8 | 0.189 | 0.215 | 0.320 |
| $T_{21}$ | 0.630 | 0.580 | 0.510 | 11.2 | 11.9 | 8.9 | 0.184 | 0.213 | 0.313 |
| $T_{22}$ | 0.637 | 0.590 | 0.515 | 11.7 | 11.1 | 9.0 | 0.180 | 0.211 | 0.310 |
| $T_{23}$ | 0.633 | 0.583 | 0.511 | 11.4 | 11.0 | 9.0 | 0.183 | 0.210 | 0.311 |
| Mean | 0.623 | 0.570 | 0.498 | 11.1 | 10.6 | 8.7 | 0.189 | 0.210 | 0.322 |
| SEm± | 0.005 | 0.006 | 0.007 | 0.1 | 0.0 | 0.0 | 0.003 | 0.004 | 0.005 |
| CD @ 1 % | 0.015 | 0.018 | 0.021 | 0.2 | 0.1 | 0.1 | 0.009 | 0.012 | 0.016 |

$T_1$: Control; $T_2$: Water soaking; $T_3$: 25 % Coconut water; $T_4$: 25 % Cow urine; $T_5$: 25 % Vermiwash; $T_6$: 5 % Panchagavya; $T_7$: 10 % Trichoderma; $T_8$: 3 % Custard apple leaf extract; $T_9$: 12.5 % Coconut water + 12.5 % Cow urine; $T_{10}$: 12.5 % Coconut water + 12.5 % Vermiwash; $T_{11}$: 12.5 % Coconut water + 3 % Panchagavya; $T_{12}$: 12.5 % Coconut water + 5 % Trichoderma; $T_{13}$: 12.5 % Coconut water + 3 % Custard apple leaf extract; $T_{14}$: 12.5 % Cow urine + 12.5 % Vermiwash; $T_{15}$: 12.5 % Cow urine + 3 % Panchagavya; $T_{16}$: 12.5 % Cow urine + 5 % Trichoderma; $T_{17}$: 12.5 % Cow urine + 3 % Custard apple leaf extract; $T_{18}$: 12.5 % Vermiwash + 3 % Panchagavya; $T_{19}$: 12.5 % Vermiwash + 5 % Trichoderma; $T_{20}$: 12.5 % Vermiwash + 3 % Custard apple leaf extract; $T_{21}$: 3 % Panchagavya + 5 % Trichoderma; $T_{22}$: 3 % Panchagavya + 3 % Custard apple leaf extract; $T_{23}$: 5 % Trichoderma + 3 % Custard apple leaf extract

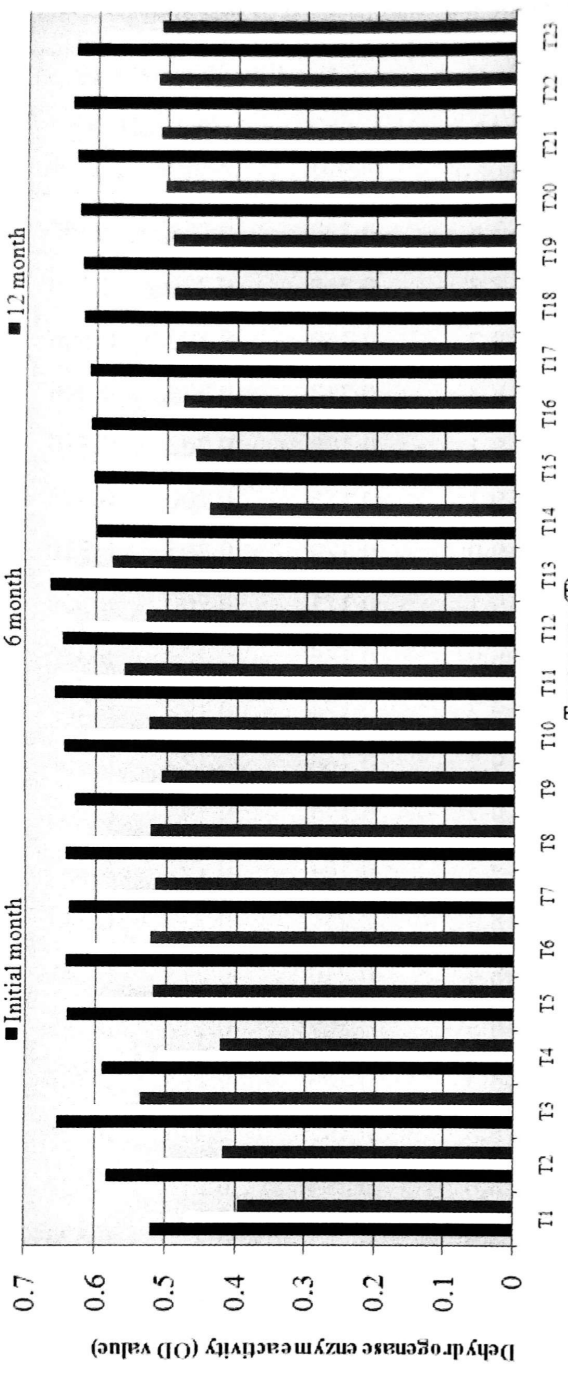


Fig. 1. Influence of organic seed priming on dehydrogenase enzyme activity (OD value) in paddy cv sona masoori during storage

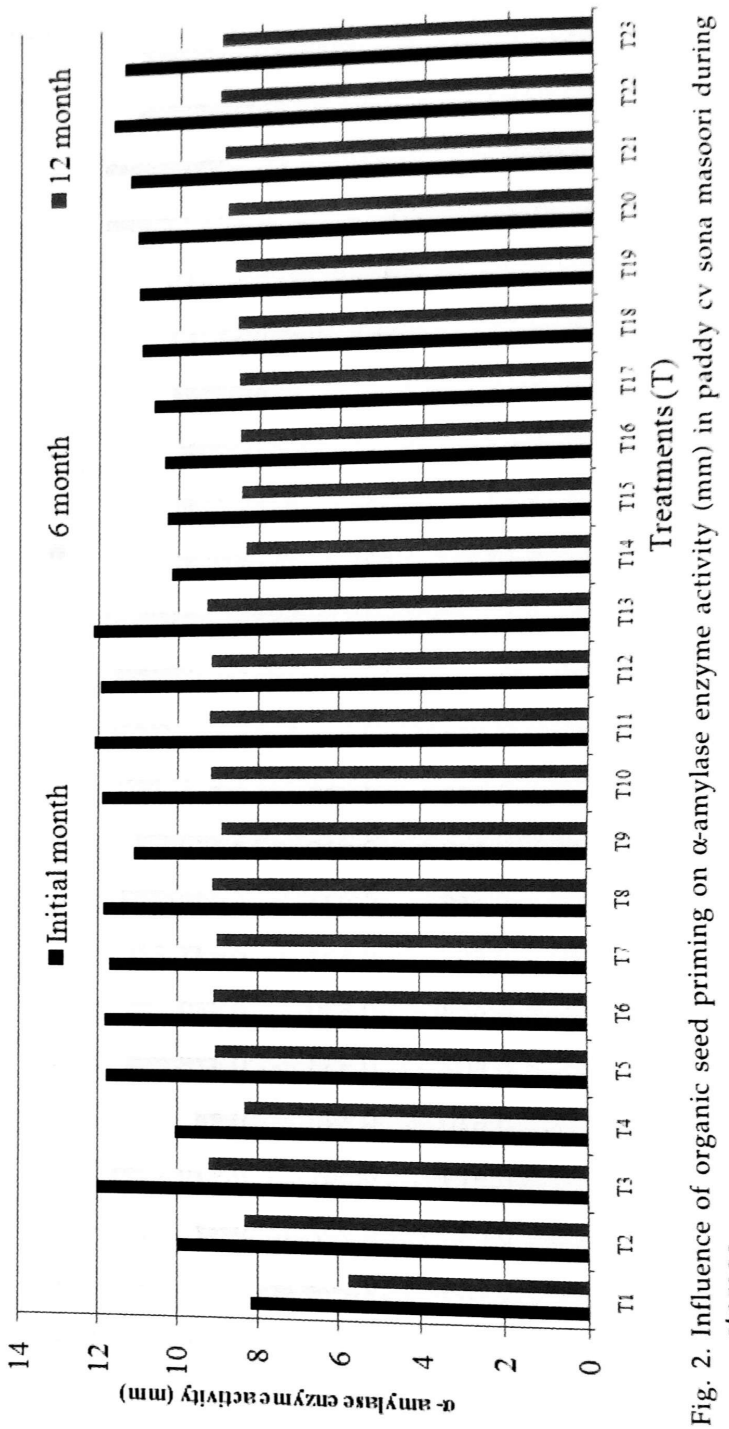


Fig. 2. Influence of organic seed priming on α-amylase enzyme activity (mm) in paddy cv sona masoori during storage

involved in it, which would have physiologically activated the seed and maintained its quality in storage [11-13]. However, similar studies carried out in few crops earlier by several scientists have reported that the plant products *viz.*, coconut water and custard apple leaf extract have anti-oxidant property that reduce lipid peroxidation, protein degradation and chromosomal aberrations and thereby, control the seed deterioration process [14-16]. From this study it is concluded that soaking of seeds in 12.5 % coconut water + 3 % custard apple leaf extract for 16 h improves the longevity of paddy seeds.

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