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Effect of Coating on Seed Quality of Quality Protein Maize Hybrid and Storability under Hill Conditions

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ABSTRACT: A laboratory experiment was conducted at Seed Technology Laboratory, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur during 2014-15 to study the effect of seed coating on seed quality in HQPM 1 hybrid maize. The seeds were coated with polymer, fungicides, insecticide, polymer-fungicides and polymer-insecticide combinations and stored under ambient conditions in HDPE (high density polyethylene) inter woven bags for 12 months. Seed deteriorated and the vigour declined with increased fungal infection and insect infestation after twelve months of seed storage, irrespective of seed coating treatments. Seed coated with polymer @ 3 ml per kg of seed and vitavax 200 @ 2 g per kg of seed recorded the highest germination percentage (90.30 %), seedling length (30.83 cm), field emergence (79.00 %), seedling dry weight (0.696 g) and seedling vigour index (2785) up to 12 months over the untreated control and lowest seed infection (4.99 %) at the end of 12 months of storage. Seed coated with Imidacloprid @ 6 ml per kg of seed had lowest insect infestation (0.50 %) and seed coated with polymer @ 3 ml per kg of seed and vitavax 200 @ 2 g per kg of seed.

Keywords: High quality protein maize hybrid, Seed coating, Seed quality, Storability

Maize (*Zea mays* L.) is one of the most important cereals of the world. It has worldwide significance as human food, animal feed and as a raw material for large number of industrial products. In India, maize occupies an area of 9.19 million hectares with a total production of 20.63 million tonnes and an average yield of 24.17 quintals/hectare [1]. In Himachal Pradesh, it is grown in an area of 300.0 thousand hectares contributing 752.7 thousand tonnes of production with a productivity of 25.09 quintals/hectare [2]. Maize is termed as nutricereal as it contains high carbohydrates, fats, proteins, some of vitamins and minerals. However, the protein quality of maize is considered poor due to the presence of large concentrations of an alcohol soluble protein fraction called 'prolamine" also known as 'Zein' in the endosperm [3]. Zein, deficient in two essential amino acids, *viz.*, lysine and tryptophan [4], contributes 50-70 % of the total protein, due to this obvious reason the protein of maize grain is low in lysine and tryptophan. On the other hand, quality protein maize (QPM) has nearly twice the amount of lysine and tryptophan which make the protein of QPM equivalent to 90% of milk protein [5]. QPM is utilized for diversified purposes in food and nutritional security as infant food, health food/mixes, convenience foods, speciality foods and emergency ration. It is also useful in fulfilling the protein requirements of different sections of society *viz.*, infants, lactating mothers, convalescing patients, Kwashiorkor diseased, old persons and infirm, etc. to prevent malnutrition.

Seed deterioration is an irreversible and inexorable process. However, the rate of seed

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deterioration could be slowed down either by storing the seeds under controlled conditions or by imposing certain treatments with either chemicals or any other protectants. Seed coating with polymer is one such pre-storage treatment that can be used either singly or in combination with other pesticides to protect seeds against pests and diseases. Since the controlled condition involves huge cost, the seed coating could be one of the best alternative approaches to maintain seed quality during storage. Further, it is stipulated that 80 percent of seeds produced in India require storage for one planting season and 20 percent of seed is carried over for a subsequent sowing [6]. However, if the awareness and infrastructure developed substantially, quality seeds can be stored for few planting season as a safeguard against monsoon failure and as a precaution against poor quality seed being supplied to the farmers. Besides, for effective QPM cultivation, the availability of good quality seed remains one of the major constraints as QPM hybrids exhibit general vulnerability to storage pest attack. Keeping in view the above, the present study was undertaken to investigate the utility of coating of seed with polymer alone, in combination with fungicides and insecticide for improving the storability and to know the effect of these treatments on seed quality during storage under mid hill regions of Himachal Pradesh.

MATERIALS AND METHODS

The laboratory experiment was carried out during 2014-15 in the Seed Technology Laboratory of Department of Seed Science and Technology, CSKHPKV, Palampur. Freshly harvested seed produce of quality protein maize hybrid HQPM 1, procured from CSKHPKV, Regional Research Station, Bajaura (Kullu) were dried to about 10% moisture content, graded to uniform size and used for the present study. Ten treatments *viz.*; T_0 - control (untreated seeds), T_1 - polymer coating (polykote @ 3 ml per kg of seed, diluted with 5 ml of water), T_2 - flowable thiram (Royal flow 40 SC) @ 2.4 ml per kg of seed, T_3 - polymer + flowable thiram (Royal flow 40 SC) @ 2.4 ml per kg of seed, T_4 - vitavax 200 (containing thiram 37.5% and carboxyl 37.5%) @ 2 g per kg of seed, T_5 - polymer + vitavax 200 @ 2 g per kg of seed, T_6 - imidacloprid (17.8% SL) @ 6 ml per kg of seed, T_7 - polymer + imidacloprid (17.8% SL) @ 6 ml per kg of seed, T_8 - polymer + flowable thiram (Royal flow 40 SC) @ 2.4 ml per kg of seed + imidacloprid (17.8% SL) @ 6 ml per kg of seed and T_9 - polymer + vitavax 200 (containing thiram, 37.5% and carboxyl, 37.5%) @ 2 g per kg of seed + imidacloprid (17.8% SL) @ 6 ml per kg of seed were evaluated and analysed [8] in completely randomized design (CRD) with three replications. After shade drying, the coated seeds were packed in HDPE (high density polyethylene) inter woven bags and stored in the month of December, 2014 for twelve months under ambient condition (Table 1) in Seed Technology Laboratory of Department of Seed Science and Technology, CSKHPKV, Palampur.

Table 1. Prevailing temperature and relative humidity during storage period

Month	Temperature (C)		RH (%)
	Mean Max.	Mean Min.	
December 2014	13.4	11.8	47.0
January 2015	11.8	10.8	55.2
February 2015	13.7	12.2	63.1
March 2015	16.5	15.2	54.8
April 2015	21.1	19.5	52.1
May 2015	26.5	24.3	39.8
June 2015	26.0	23.6	44.6
July 2015	26.1	23.4	74.7
August 2015	24.6	22.5	80.8
September 2015	24.1	21.9	69.0
October 2015	24.2	20.7	55.2
November 2015	21.5	19.8	50.2
December 2015	14.7	13.1	50.7

Source: Seed Technology Laboratory of Department of Seed Science and Technology, College of Agriculture, CSK HPKV, Palampur (H.P.)

Evaluation of seed quality parameters [9, 10]; germination (%), seedling length (cm), field emergence (%), seedling dry weight (g), seedling vigour index, seed moisture content (%) and seed health status *i.e.*, insect infestation (%) and fungal infection (%) were made initially and subsequently at bimonthly interval in order to identify the suitable polymer-chemical combination(s) for better storage of HQPM 1 maize hybrid.

RESULTS AND DESCUSSION

Seed coating gave significant variation in all the seed quality parameters evaluated in the laboratory. Germination percentage declined in all the treatments gradually from 90.3 to 81.3 at the end of 12 months of storage (Table 2). Seed coated with polymer @ 3 ml per kg of seed and vitavax 200 @ 2 g per kg of seed (T_5) exhibited significantly higher germination (90.30 %) which was at par (89.00 %) with vitavax 200 @ 2 g per kg of seed (T_4). The decline in germination percentage over the storage period may be attributed to ageing effect leading to depletion of food reserves, fungal invasion, insect attack, fluctuating temperature, relative humidity and storage container. The results are in accordance with the findings of Baig *et al.* [7] and in soybean [11] and in tomato [12]. Significantly higher seedling length (30.83 cm) was recorded for seed coated with polymer @ 3 ml per kg of seed and vitavax 200 @ 2 g per kg of seed (T_5), followed by T_4 - vitavax 200 @ 2 g per kg of seed (9.92 cm) at the end of 12 months of storage (Table 2). It can be due to higher percentage of germination and better initial growth of seedlings in seed coated with polymer and fungicide, as it protects fungal invasion and leads to better germination and subsequently higher seedling length. Similar results were reported in sunflower [13] and in soybean [11].

Field emergence decreased progressively with the advancement of storage period, irrespective of seed coating treatments (Table 3). Significantly higher field emergence (79.00 %) was recorded in polymer @ 3 ml per kg of seed and vitavax 200 @ 2 g per kg of seed (T_5) which was at par (78.00 %) with vitavax 200 @ 2 g per kg of seed (T_4) at the end of 12 months of storage. The polymer coating and fungicidal treatment kept the seed intact and avoided rapid water uptake and imbibitions injury, as it acts as binding material, covered the minor cracks and aberration on the seed coat, thus blocking the fungal invasion and resulted in rapid emergence of seed from the soil. The results recorded for field emergence are similar to the findings by [14] and in soybean [15] and in hybrid rice [16]. The seedling dry weight varied significantly throughout the storage period (Table 3). Significantly higher seedling dry weight (0.696 g) was recorded in polymer @ 3 ml per kg of seed and vitavax 200 @ 2 g per kg of seed (T_5), followed by T_4 - vitavax 200 @ 2 g per kg of seed (0.681 g) at the end of 12 months of storage. Seeds treated with polymer, fungicide and insecticide showed higher seedling dry weight due to advantage of polymer seed coating. This is essentially a physiological phenomenon influenced by the reserve metabolites, enzyme activities and growth regulators. These results are in conformity with the findings in maize [17] and in soybean [7].

Gradual decrease in seedling vigour index (germination percentage x seedling length) was recorded with increase in storage period, irrespective of seed coating treatments (Table 4). Seeds coated with polymer @ 3 ml per kg of seed and vitavax 200 @ 2 g per kg of seed (T_5) recorded significantly higher (2785) vigour index, followed by T_4 - vitavax 200 @ 2g per kg of seed (2663) at the end of 12 months of storage. The decrease in the vigour index may be due to age induced decline in germination, decrease in seedling length and seedling dry weight. Higher vigour index in polymer coating along with fungicide may be due to more germination, seedling length, and lesser infection by storage fungi and very low infestation by insects. These results are in conformity with the findings in maize [17] and in tomato [12]. The moisture content (%) increased and decreased gradually during storage period as per fluctuations in the prevalent temperature and relative humidity (Table 4). It increased after second month of storage and then reduced till six months, but thereafter seeds gained moisture as the ambient RH was more during that period and then again started to decrease with decrease in RH. The moisture content of seed due to seed coating treatments recorded non-significant differences during the initial month of storage period; however, it varied significantly after second month of storage period. Among the different treatments, seed coated with polymer @ 3 ml per kg of seed and vitavax 200@ 2 g per kg of seed (T_5) and imidacloprid @ 6 ml per kg of seed (T_9) resulted in significantly lower moisture content (9.57 %) at the end of 12 months of storage. The results are in accordance with the findings of West *et al.* [18].

Irrespective of seed coating treatments, the insect infestation (%) increased gradually with advancing storage period (Table 5). The insects

Table 2. Effect of seed coating treatments on germination (%) and seedling length (cm) during storage of HQPM 1 maize hybrid

Treatments	Months after storage													
	Germination (%)							Seedling length (cm)						
	0	2	4	6	8	10	12	0	2	4	6	8	10	12
T_0	92.0 (73.56)*	91.0 (72.53)	90.0 (71.54)	89.3 (70.91)	88.0 (69.70)	86.3 (68.28)	81.3 (64.38)	36.50	34.24	33.49	30.29	29.05	27.42	24.50
T_1	94.0 (75.82)	91.7 (73.23)	90.3 (71.86)	89.7 (71.24)	89.0 (70.61)	87.7 (69.43)	83.3 (65.88)	37.17	35.57	34.66	31.55	30.12	27.83	24.80
T_2	96.3 (78.95)	95.3 (77.51)	94.0 (75.82)	93.0 (74.65)	91.7 (73.20)	90.0 (71.55)	86.7 (68.58)	39.53	38.54	37.70	33.82	32.93	30.76	27.60
T_3	96.0 (78.43)	95.0 (77.09)	93.7 (75.46)	92.7 (74.31)	91.3 (72.86)	89.7 (71.22)	86.0 (68.00)	39.25	38.19	37.25	33.55	32.75	30.12	27.30
T_4	97.0 (80.09)	95.7 (78.03)	94.7 (76.63)	93.7 (75.43)	92.7 (74.27)	90.7 (72.22)	89.0 (70.61)	40.10	39.05	38.45	35.25	34.71	32.67	29.92
T_5	97.7 (81.22)	96.3 (78.95)	95.3 (77.51)	93.7 (75.40)	93.3 (75.02)	91.3 (72.86)	90.3 (71.89)	40.37	39.76	38.72	36.68	35.70	33.52	30.83
T_6	95.7 (77.97)	94.3 (76.21)	92.3 (73.98)	91.0 (72.53)	89.7 (71.25)	88.3 (70.03)	85.0 (67.19)	38.49	37.20	36.39	32.62	31.15	29.21	26.05
T_7	94.7 (76.70)	93.3 (75.04)	91.0 (72.53)	90.3 (71.86)	89.3 (70.91)	88.3 (70.01)	85.0 (67.19)	37.63	36.17	35.45	32.25	30.46	28.35	25.72
T_8	95.7 (77.97)	94.3 (76.21)	92.7 (74.31)	91.7 (73.20)	89.7 (71.22)	89.3 (70.94)	85.3 (67.46)	38.84	37.65	36.76	33.13	31.85	29.54	26.40
T_9	96.7 (79.47)	95.3 (77.51)	94.3 (76.21)	93.0 (74.65)	92.3 (73.90)	90.0 (71.55)	88.0 (69.70)	39.76	38.87	38.17	34.30	33.15	31.48	28.20
Mean	95.58 (78.02)	94.22 (76.23)	92.83 (74.58)	91.81 (73.42)	90.70 (72.29)	89.16 (70.81)	85.99 (68.09)	38.76	37.52	36.70	33.70	32.19	30.09	27.13
SEm(±)	0.66	0.66	0.71	0.60	0.42	0.60	0.47	0.04	0.03	0.03	0.03	0.03	0.03	0.02
CD (p=0.05)	1.96	1.93	2.10	1.78	1.25	1.78	1.39	0.11	0.09	0.08	0.09	0.08	0.08	0.06

*Figures in parenthesis indicates arcsine values

Table 3. Effect of seed coating treatments on field emergence (%) and seedling dry weight (g) during storage of HQPM 1 maize hybrid

Treatments	Months after storage													
	Field emergence (%)							Seedling dry weight (g)						
	0	2	4	6	8	10	12	0	2	4	6	8	10	12
T_0	83.0 (65.63)*	81.7 (64.62)	80.3 (63.65)	79.0 (62.73)	75.7 (60.43)	74.7 (59.76)	69.0 (56.15)	0.740	0.730	0.683	0.670	0.644	0.609	0.596
T_1	84.3 (66.66)	82.0 (64.89)	81.0 (64.15)	80.3 (63.65)	77.3 (61.55)	75.0 (59.98)	71.0 (57.40)	0.745	0.737	0.691	0.682	0.656	0.623	0.604
T_2	88.7 (70.31)	87.0 (68.85)	86.7 (68.56)	84.7 (66.99)	81.3 (64.39)	79.7 (63.17)	76.3 (60.87)	0.776	0.765	0.737	0.716	0.707	0.680	0.656
T_3	87.0 (68.91)	86.3 (68.28)	85.3 (67.46)	84.3 (66.66)	80.7 (63.89)	78.0 (62.02)	75.0 (59.98)	0.770	0.760	0.730	0.709	0.700	0.670	0.646
T_4	89.3 (70.92)	88.7 (70.30)	88.0 (69.75)	86.3 (68.30)	83.0 (65.63)	81.3 (64.38)	78.0 (62.02)	0.788	0.781	0.756	0.732	0.723	0.705	0.681
T_5	90.7 (72.20)	89.0 (70.65)	88.3 (70.00)	87.0 (68.87)	84.0 (66.41)	82.0 (64.89)	79.0 (62.71)	0.796	0.789	0.765	0.749	0.734	0.714	0.696
T_6	85.7 (67.73)	84.3 (66.66)	83.3 (65.88)	82.0 (64.89)	79.0 (62.70)	77.0 (61.32)	73.0 (58.67)	0.759	0.750	0.711	0.694	0.678	0.645	0.618
T_7	85.0 (67.22)	83.3 (65.89)	82.7 (65.38)	81.3 (64.38)	78.0 (62.02)	76.3 (60.87)	72.3 (58.24)	0.750	0.741	0.705	0.687	0.665	0.633	0.610
T_8	86.3 (68.28)	85.0 (67.25)	84.0 (66.40)	83.3 (65.88)	80.0 (63.41)	77.7 (61.77)	74.7 (59.76)	0.764	0.753	0.721	0.700	0.691	0.657	0.633
T_9	89.3 (70.96)	88.0 (69.73)	87.3 (69.13)	85.7 (67.76)	82.0 (64.87)	80.0 (63.43)	77.3 (61.55)	0.782	0.771	0.746	0.722	0.717	0.699	0.669
Mean	86.93 (68.88)	85.53 (67.71)	84.69 (67.03)	83.39 (66.01)	80.10 (63.53)	78.17 (62.16)	74.56 (59.73)	0.767	0.758	0.725	0.706	0.691	0.664	0.641
SEm(±)	0.74	0.75	0.50	0.81	0.56	0.51	0.48	0.003	0.003	0.002	0.003	0.002	0.002	0.002
CD (p=0.05)	2.18	2.20	1.48	2.38	1.65	1.51	1.41	0.009	0.008	0.007	0.008	0.006	0.007	0.006

*Figures in parenthesis indicates arcsine values

Table 4. Effect of seed coating treatments on seedling vigour index and moisture content (%) during storage of HQPM 1 maize hybrid

Treatments	Months after storage													
	Seedling vigour index							Moisture content (%)						
	0	2	4	6	8	10	12	0	2	4	6	8	10	12
T_0	3358	3116	3014	2706	2557	2368	1993	10.17	10.37	10.20	10.10	10.40	10.20	10.07
T_1	3494	3261	3131	2829	2680	2440	2067	10.07	10.30	10.13	10.00	10.30	10.20	10.00
T_2	3808	3674	3544	3145	3019	2768	2392	10.10	10.10	9.93	9.90	10.27	10.13	9.90
T_3	3768	3628	3489	3106	2991	2701	2348	9.93	10.07	10.07	9.83	10.23	10.13	9.87
T_4	3890	3726	3642	3301	3216	2962	2663	10.10	10.27	10.17	9.70	10.13	10.00	9.70
T_5	3943	3830	3692	3425	3332	3061	2785	10.03	10.20	10.10	9.80	10.20	10.07	9.80
T_6	3682	3509	3360	2968	2793	2580	2215	10.00	10.13	10.00	9.53	10.07	9.93	9.63
T_7	3563	3376	3226	2913	2721	2504	2186	10.10	10.27	10.03	9.60	10.10	9.97	9.67
T_8	3716	3551	3406	3037	2856	2639	2253	9.97	10.03	9.97	9.50	10.03	9.87	9.60
T_9	3843	3706	3601	3190	3061	2833	2481	10.00	10.20	10.00	9.50	10.00	9.60	9.57
Mean	3706	3539	3410	3063	2923	2686	2338	10.05	10.19	10.06	9.75	10.17	10.01	9.78
SEm(±)	19.27	19.93	23.82	18.56	14.60	19.16	15.45	0.07	0.04	0.04	0.06	0.04	0.04	0.04
CD (p=0.05)	56.84	58.80	70.26	54.74	43.08	56.52	45.58	NS	0.11	0.11	0.18	0.13	0.13	0.13

Table 5. Effect of seed coating treatments on field emergence (%) and seedling dry weight (g) during storage of HQPM 1 maize hybrid

Treatments	Months after storage													
	Insect infestation (%)							Fungal infection (%)						
	0	2	4	6	8	10	12	0	2	4	6	8	10	12
T_0	0.00 (1.00)*	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	2.30 (1.82)	2.83 (1.96)	9.68 (3.27)	10.37 (3.37)	11.07 (3.47)	13.33 (3.78)	15.23 (4.03)	19.13 (4.49)	22.00 (4.79)
T_1	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	1.83 (1.68)	2.33 (1.82)	7.41 (2.89)	8.15 (3.02)	9.63 (3.26)	11.00 (3.46)	13.93 (3.86)	17.22 (4.27)	20.93 (4.68)
T_2	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	1.17 (1.47)	1.50 (1.58)	3.70 (2.17)	4.44 (2.33)	5.16 (2.48)	7.63 (2.94)	9.63 (3.26)	12.00 (3.60)	14.67 (3.95)
T_3	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	1.50 (1.58)	2.00 (1.73)	4.43 (2.3)	5.93 (2.63)	6.70 (2.77)	8.22 (3.04)	11.10 (3.49)	13.93 (3.86)	16.93 (4.23)
T_4	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	1.00 (1.41)	1.33 (1.53)	0.00 (1.00)	0.73 (1.31)	1.00 (1.41)	3.00 (2.00)	5.22 (2.49)	7.12 (2.85)	9.13 (3.18)
T_5	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	1.33 (1.53)	1.70 (1.64)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.73 (1.31)	2.93 (1.98)	3.96 (2.23)	4.99 (2.45)
T_6	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.50 (1.21)	5.90 (2.63)	6.93 (2.82)	7.40 (2.90)	10.20 (3.35)	12.42 (3.66)	15.13 (4.01)	19.00 (4.47)
T_7	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.33 (1.14)	0.83 (1.33)	6.67 (2.77)	7.41 (2.90)	8.00 (3.00)	10.92 (3.45)	13.00 (3.74)	16.93 (4.23)	20.00 (4.58)
T_8	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.67 (1.28)	1.00 (1.41)	5.17 (2.48)	6.67 (2.77)	7.23 (2.87)	9.00 (3.15)	11.67 (3.55)	14.13 (3.89)	17.22 (4.27)
T_9	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.83 (1.35)	1.17 (1.47)	0.00 (1.00)	2.93 (1.98)	4.43 (2.33)	6.00 (2.64)	8.23 (3.03)	10.93 (3.45)	12.99 (3.74)
Mean	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	1.10 (1.42)	1.52 (1.57)	4.30 (2.15)	5.36 (2.41)	6.06 (2.55)	6.91 (2.91)	10.35 (3.31)	13.05 (3.69)	15.79 (4.04)
SEm(±)	0.00	0.00	0.00	0.00	0.00	0.08	0.09	0.04	0.03	0.03	0.10	0.05	0.04	0.06
CD (p=0.05)	NS	NS	NS	NS	NS	0.23	0.25	0.12	0.10	0.09	0.29	0.14	0.12	0.17

*Figures in parenthesis indicates arcsine values

which were predominately found in the seeds were weevil (*Sitophilus zeamis*) and Angoumois moth (*Sitotroga ceralella*). Significantly lower infestation (0.50%) was recorded in seed coated with imidacloprid @ 6 ml per kg of seed (T_6), followed by 0.83% in T_7 (polymer @ 3 ml per kg of seed and imidacloprid @ 6 ml per kg of seed at the end of 12 months of storage period. These results are in conformity with findings in cotton [19] and in soybean [20]. The fungal infection increased throughout the storage period, irrespective of seed coating treatments (Table 5). The storage fungi, infecting the seeds were identified as *Aspergillus flavus, A. niger, Penicillium* spp., *Fusarium moniliforme, Rhizopus* spp. Significantly lower (4.99%) seed infection was recorded for seed coated with polymer @ 3 ml per kg of seed and vitavax 200 @ 2 g per kg of seed (T_5) at the end of 12 months of storage period. Seed coated with polymer and vitavax exerted a significant influence on total fungal colonies of the maize hybrid seeds when stored for a period of twelve months. This might be due to inhibition of seed borne pathogens and thus preventing seed deterioration and loss of membrane integrity. Similar findings were reported by [7] and [18] in soybean and [21] in hybrid rice. Hence, it was concluded that maize hybrid HQPM 1 seed coating with polymer @ 3 ml per kg of seed and vitavax 200 @ 2 g per kg of seed and packed in high density polyethylene (HDPE) inter woven bag maintained the seed quality for more than 12 months of storage.

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