“Pre-SowingSeedTreatmentsWithSelectedOrganicsonGrowth,YieldandYieldAttributingTraitsinChickpeavarDesiHimmat”

ABSTRACT

The present study entitled, **“Pre-Sowing Seed Treatments With Suitable Organics onGrowth,Yield,Yield attributing Traits in Chickpea (*Cicer arietinum* L.) var Desi Himmat”**was carried outwith Panchagavya,Neem Leaf Extract,Vermiwash,Tulsi Leaf Extracts ofvarying concentrates at the duration of 12hrs. To assess thesetreatments' effects on Chickpea andfindtheoptimalpre-sowingtreatment.Theresultsdepictedthatseed treatment showed significant variation for all the recorded characters and performed well comparedto the untreated control.Seed treatment with T_2-Panchagavyaat10%for12hrs.recordedfieldemergenceof92.33%andplantheightatmaturity71.33 cms,days to 50% flowering is 63.67 days,and days to 50% pod setting 71.67 days,days tomaturity is 106.33 days,32.99 pods per plant,1.91 seeds per pod,14.33gm seed yield perplant,23.66gm of 100 seed weight,35.80gm of biological yield per plant and 39.11% of harvestindex.At par treatment, T_4-Vermiwash at 8% for 12 hrs. performed well with 13.66gm seedyield per plant, and the 36.52% harvest index was promising.Thus, treating T_2.Panchagavya at 10% for 12 hrs. was so productive and can be suggested for cultivation on acommercialscale.

Keywords:**Panchagavya,Vermiwash,NeemLeafExtract,TulsiLeafExtract**

UNDER PEER REVIEW

1. INTRODUCTION

Chickpeawiththechromosomenumber(2n=2x=16)andisthethirdmostfrequently cultivated legume crop afterdrybean (*Phaseolus vulgaris* L.) and Field pea(*Pisum sativum* L.).Chickpea is the mostsignificant self-pollinated pulse crop for theRabi season (Akansha et al., 2018). It isdivided into Desi and Kabuli chickpeas andhas Eastern Turkey as its main region oforigin.However,thedesiformismorepreva lentandmakesuproughly80-85percentofglobalproduction,whileKabuli type makes up about 15-20 percent(Dhima*etal.*,2018).Chickpeasupplied49.3%ofallpulsesproducedin2020-21,withtheremainderpulsesreceivingcontributionsfrompigeonpea(16.2%),mungbean(10.3%), urdbean(9.3%),lentil(4.9%)andotherpulses9.9%.Legumes are the richest source of protein for humans and livestock in underdeveloped areas.In addition,they are employed asgreenmanuresandfeedforlivestock.Theyaremostlyusedtofixatmosphericnitrogentoenhancesoil's chemical and physical characteristics(Mannivan*etal.*,2019).Inadditiontoincreasingsoilfertility,certainlegumes can solubilize phosphatethat would otherwise be in accessible byexcreting organic acids from their roots andimprovingsoilfertility(*Rayet al*.,2017).Whengrowninarotationwithnon-legumionouscrops,legumes alsoaidinrecoveryofsoilorganicmatterandthereduction ofpest and disease issues(Devi*etal*.,2019).Temperaturesbetween24ºCto30ºC,alongwithappropriatemoisturelevels,areidealforchickpeacropgrowth.Itiswintercropthatdoeswellinbothrainfedandirrigatedenvironments.Itisfrequentlygrown inheavysoiltypesbecause itstotoleratecoldclimates,andtheappropriatepHrangeof5.5to7.0forgreatergrowthandyield(Farijan*etal*.,2018).Chickpeasare rich in dietary fibre, particularlyraffinose,asolublefibre.Accordingto(Munirathnam*etal.*,2015),the plantsseedisprimarilyediblecomponentandrichestsource of protein (23.3-28.9%), carbs(61.5%), lipids (4.5%) andminerals(phosphorous,calcium,magnesium,iron,zinc).Legumesarebeneficial asfoodnotonlyforhumans butalsoforcattle because oftheirhighproteincontent.Despitechickpeas' high yielding potential and several benefits,Indiahasalowcrop yield per unit area.From2000-01to2018-19,India’schickpeaoutputclimbedfrom 38.55 to 122.29 lakh tonnes,while the acreageincreasedfrom53.85to122.29lakhha,andtheyieldincreasedconsistentlyfrom 744kg/ha to1077kg/ha (Pooniya *et al.*,2019).Overthepastthreedecades,thearea and production of chickpeas have steadilydecreasedinUttar

UNDER PEER REVIEW

Pradesh.Theproduction

UNDER PEER REVIEW

has reduced from 12.50 lakh tonnes eventhough the area has decreased from 17.26lakhhain1975-76to7.40lakhhain2005-06.However, productivityhas increasedfrom724to 893kg/ha.

2. MATERIALS ANDMETHODS

The experiment was conducted at the SeedTesting Laboratory of the Department ofGeneticsandPlantBreeding,NainiAgriculturalInstitute,SamHigginbottomUniversity of Agricultural Technology andSciences.Prayagraj(U.P.)2022.TheChickpeavarDesiHimmatseedsweretreatedwith organicstoevaluategrowth,yield and yield attributing traits.Theseedsaresubjectedtodifferentsoakingconcentrationsfor 12hours.The seeds are treated organically with T1-Panchagavya8%,T2-Panchagavya10%, T3-Panchagavya15%,T4-Vermiwash8%, T5-Vermiwsh 10%, T6-Vermiwash 15%,T7-NeemLeafExtract5%,T-8NeemLeafExtract 10%, T9-Neem Leaf Extract 15%,T10-TulsiLeafExtract5%,T11-TulsiLeafExtract 10%, T12-Tulsi Leaf Extract 15%for12hoursrespectively.The Experimentwas laid out in RBD,with 13 treatments withthreereplications.Intheperiodfromgermination to harvest, growth parameterswererecordedatfrequentintervalsandafterharvestyieldparameterswererecorded,includingFieldEmergence,Plant

UNDER PEER REVIEW

height,Daysto50%Flowering,Daysto50% pod setting ,Days to Maturity,No.ofpods per plant,No.of seeds per pod,Seedyield per plant,Seed Index,Biological yieldper plant, and Harvest Index were recorded andstatisticallyanalysedusingANOVAasa pplicableto RBD.

METHODOLOGY

ForthepreparationofsolutionofPanchagavy aandVermiwash toprepare8% solution take 80ml of each solutions inaseparatebeakereachandtheywereaddedi n 1000ml. of distilled water with constantstirring.Then the solution volume will finally constitutetoonelitre,becoming an 8%stocksolutionofPanchagavyaandVermi wash.

To prepare of plant leaf extract,thefreshleavesofconcernedplantsw erecollectedseparatelyanddriedundershad e.Thedriedleaveswerepowderedusing amotorandpistil.Topreparea 5%solution,5gofleafextractpowderwasadd edto100mldistilledwater,andleafextractsol utionswereprepared.The leaf extracts were filtered byusingmuslincloth toremoveunwantedmaterialandplantdebris .

After the preparation of solutions,chickpeaseeds were soaked in respective solutionsfor12hrsat25ºCtemperature.Untr eatedseedsiscalledControl.After12hrsof

UNDER PEER REVIEW

soaking the solutions were drained from the beaker and pre-soaked air dried to theoriginal weight.After seed treatment, seedsweresowninthe fieldforfieldobservations.

3. RESULTS AND DISCUSSION3.1.GROWTHATTRIBUTES

(i).FIELDEMERGENCE

ThemeanperformanceofFieldEmergence (%) ranged from 83.33 to 92.33,witha grandmeanof88.18.Table1indicates that maximum field emergence(92.33%)was recorded in T2-Panchagavyaat 10% for 12hrs. and least in T0-Control(83.33%).Alltreatmentswerefounds ignificantlyincomparisonto thecontrol.Amongthesignificanttreatments, TreatmentT12-Panchagavyaat10%for12hrs.washigherinc omparisontocontrolaswellasothertreatment s.

(ii).PLANTHEIGHT

ThemeanperformanceofPlantheight (cms)ranged from62.34 to 71.33with agrandmeanof67.21.Maximumplant height was recorded (71.33 cms) inT2-Panchagavya at 10% for 12hrs. and least(62.34cms)inT0-Control.Alltreatments were found significantly in comprison tothe control.Amongthesetreatments,T2-Panchagavya at 10% for 12hrs. was foundsignificantlyhigherincomparisontoco ntrol andothertreatments.

(iii). DAYSTO50%FLOWERING

ThemeanperformanceofDaysto50%fl oweringrangedfrom63.67to 70.33 with a grand mean of 66.13.Among thetreatments,T2-Panchagavyaat10%for12hrs. waslowest(66.13 days)andhighestwasfoundinT0-Control(70.33days).Amongthesignificanttr eatments,TreatmentT2-Panchagavyaat10%for12hrs.wassignifican tlylowerascomparedtocontrolandothertreat ments.

(iv). DAYSTO50%PODSETTING

ThemeanperformanceofDaysto50%p odsettingwas rangedfrom 71.67to 78.33 with grand mean ranged from 73.79.Among these treatments T2-Panchagavyaat10% for 12hrs. was lowest (71.67 days)andhighestfoundinT0-Control(78.33days).Amongthesignificanttr eatments,TreatmentsT2-Panchagavyaat10%for12hrs.wassignifican tlylowerascomparedtocontrolandothertreat ments.

UNDER PEER REVIEW

Table1.

Meanperformanceeffectofseedtreatmentsongrowth,yieldandyieldattributingtraitsinchickpea

Treatments	Field Emergence	Plant Height	Daysto50% Flowering	Daysto50% PodSetting	Days to Maturity
T_0	83.33	62.34	70.33	78.33	111.33
T_1	86.33	67.33	66.67	75.00	108.00
T_2	92.33	71.33	63.67	71.67	106.33
T_3	89.33	63.67	69.33	74.67	108.33
T_4	91.33	70.33	64.67	72.00	107.33
T_5	86.67	68.00	69.00	75.33	111.00
T_6	88.33	64.66	67.33	73.33	110.33
T_7	89.67	65.67	64.33	76.67	109.67
T_8	86.67	68.67	64.67	74.00	107.67
T_9	86.33	69.67	64.33	74.67	107.67
T_{10}	87.67	66.67	66.00	72.67	109.33
T_{11}	89.67	67.67	65.33	73.33	108.33
T_{12}	90.33	68.33	64.67	73.67	108.67
Grand Mean	88.30	67.25	66.17	74.25	108.76
F-Test	**S**	**S**	**S**	**S**	**S**
S.Em	0.53	0.97	0.88	0.89	0.92
S.Ed	0.76	1.27	1.24	1.25	1.25
C.V	1.08	2.50	2.64	2.09	1.47
T.value	2.06	2.06	2.06	2.06	2.06
C.D.at5%	1.56	2.83	3.17	2.59	2.69

UNDER PEER REVIEW

Table 2 : Mean performance effect of seed yield and biological yield in chickpea

Treatments	No.of Pods per Plant	No.of Seeds per Pod	Seed Yield per Plant(g)	SeedIndex(g)	BiologicalYield(g/plant)	HarvestIndex(%)
T_0	25.67	1.55	7.33	20.33	22.67	31.82
T_1	28.67	1.22	9.67	21.33	29.67	30.33
T_2	32.99	1.91	14.33	23.66	35.80	39.11
T_3	27..66	1.40	7.33	20.34	22.07	33.23
T_4	32.00	1.78	13.67	23.34	35.60	36.52
T_5	30.33	1.29	11.67	22.00	30.93	36.64
T_6	28.67	1.53	7.67	20.67	22.27	34.44
T_7	28.33	1.67	8.33	22.67	22.60	35.41
T_8	30.67	1.28	12.33	22.67	33.47	35.86
T_9	28.33	1.32	12.67	21.33	33.60	37.71
T_{10}	29.34	1.35	9.33	21.67	24.80	36.29
T_{11}	29.67	1.62	10.33	22.33	30.40	32.91
T_{12}	29.67	1.77	11.67	21.33	28.74	36.29
Grand Mean	29.52	1.51	10.48	21.82	28.66	35.12
F-Test	**S**	**S**	**S**	**S**	**S**	**S**
S.Em	0.59	0.03	0.18	0.29	0.47	0.55
S.Ed	0.59	0.05	0.38	0.33	0.90	1.01
C.V	3.51	3.09	3.01	2.30	2.83	2.72
T-value	2.06	3.06	2.06	2.06	2.06	2.06
C.D.at5%	1.74	0.07	0.52	0.84	1.37	1.61

UNDER PEER REVIEW

(v). DAYSTOMATURITY

The mean performance of days to maturityranged from 106.33 to 111.33, with a grandmean of 108.51. For Days to Maturity, allthe treatments were significantly lower than thecontrol.Amongthetreatments,T2-Panchagavyaat10%for12hrs. was found lowest (106.33 days) comparedtocontrolandothertreatments.

3.2.YIELDATTRIBUTES

(vi). PODSPERPLANT

The mean number ofpods per plant ranged from 25.67 to 32.99,with a grand mean of 29.67.All the treatments were significantly higher for the number of pods per plantcomparedto thecontrol.Amongthetreatments,T2-Panchagavya at 10% for 12hrs. (32.99) wasfound significantly higher in comparison tocontrol andothertreatments.

(vii). SEEDSPERPOD

The mean performance of the Number ofSeeds per pod ranged from 1.15 to 1.91,with agrandmean of1.64.Among thetreatments,no.of seeds per pod treatmentT2-Panchagavya at 10% for 12hrs. (1.91)wasfoundsignificantlyhighercomparedtocontrolandothertreatments.

(ix).SEEDYIELDPERPLANT(g)

ThemeanperformanceofSeedyieldper plant(g) was ranged from 7.33 (g) to14.67(g) with a grand mean of 10.15(g).All the treatments were significantly higher for seed yield per plant (g)comparedto the control.Amongthetreatments,seedyieldper plant(g) treatment T2-Panchagavya at10 % for 12hrs. (14.67 g) was found to behigher in comparison to control and othertreatments.

(x). SEEDINDEX(g)

Themeanperformanceof theSeedIndex(g)wasrangedfrom20.33(g)to 23.66(g), with a grand mean of 21.72(g).Among the treatments,seed index treatmentT2-Panchagavya at 10% for 12hrs. (23.66g) was found to be highest in comparisontocontrolandothertreatments.

(xi). BIOLOGICALYIELD(g)

The mean performance of Biologicalyield(g)wasrangedfrom22.67(g) to35.87(g) with a grand mean of 28.74(g).Forbiologicalyield(g),allthetreatmentsweresignificantlyhigherincomparisiontocontrol.Amongthetreatments,forbiological yield treatmentT2-Panchagavyaat10%for12hrs.(35.87g)wasfoundsignificantlyhigherincomparisontocontrol andothertreatments.

UNDER PEER REVIEW

(xii). HARVESTINDEX(%)

Themeanperformanceofthe HarvestIndex(%) ranged from 31.82 to 39.11,with a grand mean of 35.21. ForHarvestIndex, all the treatments were significantlyhigher than the control. Amongthetreatments,forharvestindexT2-Panchagavya at 10% for 12 hrs. (39.11%)wasfoundsignificantlyhighercomparedtocontrolandothertreatments.

CONCLUSION

Itisconcludedfromthepresentexperimentationofseedtreatmentswithdifferentkindsofseedtreatmentswerefound toaffectsignificantlydifferentcharacteristics ofgrowth, and yieldinchickpeas.Treating with T2-Panchagavya at 10% for12hrs. was found superior affecting all the growth and yield parameters in chickpea comparedwithcontrolandothertreatments.ThusseedtreatingwithT2-Panchagavya with 10% for 12hrs. is helpfulinimprovingthe yieldinchickpeas.

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