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Supplementary Tables

Supplementary Table 1. Combine analysis of variance of irrigation regime and nitrogen levels on studied traits in medicinal *Calendula officinalis*

SOV	DF	MS												
		Plant height	Flower dry weight	Number of seeds per head	Thousand kernel weight	Bio-logical yield	Grain yield	Flower essence percentage	Essence yield	Prolin	Phenol	Catalase	Superoxide dismutase	Peroxidase
Year (Y)	1	20.86**	0.13^{ns}	0.31^{ns}	0.88^{ns}	185.50^{ns}	20386.7^{ns}	0.0016^{ns}	5.97^{ns}	2.67^{ns}	4.49**	2.88ns	14.09**	1.22^{ns}
Y× Repeat (R) (E_1)	4	9.08	0.28	0.92	0.48	426.4	86446.1	0.017	24.48	1.19	0.39	0.52	0.57	0.27
Irrigation (Ir)	1	280.71**	41.05**	600.85**	165.76**	56383.7**	15764212.2**	0.395**	541.25**	11.70**	0.85*	2.98**	2.70**	2.14**
Y× Ir	1	9.38^{ns}	0.70^{ns}	31.91^{ns}	0.20^{ns}	1675.6**	972839.2**	0.002^{ns}	16.75^{ns}	0.01^{ns}	0.69^{ns}	0.17^{ns}	0.65ns	0.55^{ns}
Y× Ir×R (E_2)	4	8.93	0.43^{ns}	7.07	0.41	768.3	1377.81	0.02	9.12	2.86	0.09	0.72	0.34ns	0.29^{ns}
Fertilizer (Fer)	3	43.62**	1.30**	8.90*	14.11**	7943.9**	1244683.1**	0.028**	36.44**	2.63**	1.49**	1.30**	1.30**	0.98**
Y× Fer	3	6.98^{ns}	0.31^{ns}	4.08^{ns}	0.99^{ns}	175.6^{ns}	89523.1^{ns}	0.007^{ns}	3.95^{ns}	0.24**	0.08^{ns}	0.41^{ns}	0.14^{ns}	0.39^{ns}
Ir × Fer	3	22.40**	0.13^{ns}	10.01**	0.44^{ns}	5068.9**	484017.5**	0.180**	6.74^{ns}	1.36**	0.52^{ns}	2.07**	2.12**	0.49^{ns}
Y×Ir×Fer	3	6.06ns	0.12^{ns}	1.50^{ns}	0.32^{ns}	120	36190.5	0.0066	5.10	0.05	0.17	0.10	0.37	0.36^{ns}
Bio-fertilizer (Bio)	2	26.13**	0.77**	22.81**	13.92**	5405.2**	409538.12**	0.059**	48.35**	3.64**	1.59**	1.79**	1.1.86**	4.51**
Y×Bio	2	2.02	0.10	0.39^{ns}	0.40^{ns}	3.2ns	3673.62ns	0.0023^{ns}	1.68^{ns}	0.09^{ns}	0.41^{ns}	0.27^{ns}	0.89^{ns}	0.003^{ns}
Ir×Bio	2	26.41**	0.76**	10.89*	0.87^{ns}	101.2^{ns}	239122.19*	0.0007^{ns}	0.49^{ns}	0.28**	0.23^{ns}	1.41**	1.33**	0.67*
Fer×Bio	6	7.87^{ns}	0.59**	8.00**	5.61**	1141.6**	220010.22**	0.005^{ns}	8.89**	1.05**	0.19^{ns}	0.73*	0.69*	0.24^{ns}
Y×IR×BIO	3	1.91^{ns}	0.07^{ns}	0.27^{ns}	0.34^{ns}	73.2^{ns}	21637.12^{ns}	0.0002^{ns}	1.13^{ns}	0.07^{ns}	0.19^{ns}	0.41^{ns}	0.49^{ns}	0.01^{ns}
Y×Fer×Bio	6	1.20^{ns}	0.020^{ns}	0.85^{ns}	0.77^{ns}	25.6^{ns}	39640.2^{ns}	0.0002^{ns}	2.96^{ns}	0.01^{ns}	0.07^{ns}	0.05^{ns}	0.12^{ns}	0.12^{ns}
Ir×Fer×Bio	6	2.59^{ns}	0.06^{ns}	0.66^{ns}	0.62^{ns}	83.05^{ns}	17136.4^{ns}	0.0009^{ns}	2.30^{ns}	0.009^{ns}	0.10^{ns}	0.46^{ns}	0.45^{ns}	0.05^{ns}
Y×Ir×Fer×Bio	6	0.71^{ns}	0.07^{ns}	2.26^{ns}	0.10^{ns}	35.5^{ns}	30770.9^{ns}	0.0003^{ns}	61.39^{ns}	0.03^{ns}	0.05^{ns}	0.12^{ns}	0.12^{ns}	0.11^{ns}
E_3	96	4.41	0.16	2.41	0.36	298.1	61390.4	0.0024	1.23	0.04	0.16	0.28	0.26	0.020
CV	-	6.55	7.67	7.42	6.59	12.35	14.29	11.92	9.12	5.01	23.69	19.23	16.79	18.07

ns, *, and ** were no significant, significant at level 1, and 5%, respectively.

Supplementary Table 2. Mean comparison of main effects of the year, irrigation, nitrogen fertilizer sources on studied traits of *Calendula officinalis*

	Plant height (cm)	**Flower dry weight (g m^2)**	**Number of seeds per head**	**Thousand kernels weight (g)**	**Biological yield (kg ha^{-1})**	**Grain yield (kg ha^{-1})**	**Flower Essence percentage**	**Essence yield (kg ha^{-1})**	**Prolin mmol/g FW**	**Catalase (ΔA240.mg^{-1} protein)**	**Superoxide dismutase (u.mg^{-1} protein)**	**Peroxidase (ΔA240.mg^{-1} protein)**
Year												
1	31.82	5.30	20.97	13.27	14097.21	1745.4	0.20	12.37	4.90	2.00	1.59a	1.55
2	32.58	5.24	20.88	13.42	13870.02	1721.6	0.21	11.97	5.22	1.79	2.20b	1.37
Irrigation												
Normal	33.60a	5.80a	22.97a	14.42a	15962.55a	2064.4a	0.18b	14.11a	4.79b	1.75b	1.75b	1.34b
stress	30.81b	4.74b	18.88b	12.27b	12004.17b	1402.6b	0.23a	10.23b	5.36a	2.04a	2.04a	1.58a
Chemical Fertilizer												
Control	31.44b	5.13b	20.53b	12.47c	12391.25b	1611.3bc	0.022a	10.68b	4.62c	1.87b	1.87b	1.26b
Nitrogen (N)	31.12b	5.11b	20.46b	13.33b	13054.19b	1599.6c	0.201bc	12.44a	5.30a	2.017a	2.17a	1.50a
Nano-Chelate Nitrogen (NC)	32.83a	5.32ab	21.28a	13.66a	15098.05a	1723.6b	0.20b	12.72a	5.27a	1.72b	1.72b	1.56a
N+ NC	33.45a	5.52a	21.42a	13.91a	15390.44a	1999.5a	0.190c	12.84a	5.13b	1.83b	1.83b	1.50a
Bio-fertilizer												
Control	31.69b	5.13b	20.15b	12.75c	12875.24c	1628.8b	0.186b	11.03b	4.76b	1.68b	1.68b	1.10b
Azotobacter	31.87b	5.38a	21.47a	13.79a	14083.14b	1803.5a	0.214a	12.93a	5.27a	2.06a	2.06a	1.63a
Azospirillum	33.05a	5.29ab	21.15a	13.49b	14991.81a	1768.2a	0.219a	12.45a	5.20a	1.94a	1.97a	1.64a

In each column, averages with same superscript letters do not have a significant difference at the 5% level

Supplementary Table 3. Mean comparison of the interactive effects of irrigation and nitrogen levels on studied traits of *Calendula officinalis*

Irrigation regimes	Fertilizer	Plant height (cm)	Flower dry weight (g m^2)	Number of seeds per head	Thousand kernels weight (g)	Grain yield (kg ha^{-1})	Biological yield (kg ha^{-1})	Flower Essence percentage	Essence yield (kg ha^{-1})	Prolin mmol/g FW	Catalase (ΔA240.mg^{-1} protein)	Superoxide dismutase (u.mg^{-1} protein)	Peroxidase (ΔA240.mg^{-1} protein)
Normal	Control	31.65bc	5.59	22.36b	13.56	1893.2b	12610c	0.200cd	12.77b	4.17e	1.85b	1.85b	0.98
	Nitrogen (N)	32.84b	5.67	22.7ab	14.25	1947.3b	15375b	0.187d	14.92a	4.85d	1.66b	1.66b	1.48
	Nano-Chelate Nitrogen (NC)	34.69a	5.83	23.34ab	14.76	2055.2b	17855a	0.167e	14.30a	5.13c	1.71b	1.71b	1.45
	N+ NC	35.20a	6.12	23.45a	15.11	2361.9a	18006a	0.163e	14.44a	5.04cd	1.77b	1.77b	1.43
stress	Control	31.22c	4.67	18.7cd	11.39	1329.3d	10733d	0.247a	8.59e	5.06c	1.88b	1.88b	1.56
	Nitrogen (N)	29.39d	4.55	18.22d	12.41	1252.0d	12171c	0.216bc	9.95d	5.76a	2.67a	2.67a	1.53
	Nano-Chelate Nitrogen (NC)	30.97c	4.8	19.22cd	12.57	1392.1d	12340c	0.251a	11.13c	5.41b	1.72b	1.72b	1.67
	N+ NC	31.64bc	4.92	19.39c	12.71	1637.1c	12773c	0.217b	11.25c	5.23bc	1.89b	1.89b	1.57

In each column, averages with same superscript letters do not have a significant difference at the 5% level

Supplementary Table 4. Mean comparison of the interactive effects of irrigation and bio- fertilizer sources on studied traits of *Calendula officinalis*

Irrigation regimes	Bio-fertilizer	Plant height (cm)	Flower dry weight (g m^2)	Number of seeds per head	Thousand kernels weight (g)	Grain yield (kg ha^{-1})	Biological yield (kg ha^{-1})	Flower Essence percentage	Essence yield (kg ha^{-1})	Prolin mmol/g FW	Catalase (ΔA240.mg^{-1} protein)	Superoxide dismutase (u.mg^{-1} protein)	Peroxidase (ΔA240.mg^{-1} protein)
Normal	Control	33.23ab	5.73a	22.07b	13.94	1960.1b	14989	0.159	12.89b	4.53d	1.59c	1.59c	1.02e
	Azotobacter	33.85a	5.91a	23.72a	14.44	2169.5a	16816	0.190	14.59a	4.90c	1.72bc	1.72bc	1.60bc
	Azospirillum	33.726a	5.77a	23.11a	14.84	2063.6ab	16081	0.190	14.84a	4.95c	1.93b	1.93b	1.39cd
stress	Control	29.542c	4.53c	18.23d	11.56	1297.5d	10762	0.212	9.18d	4.99c	1.77bc	1.77bc	1.19de
	Azotobacter	32.38b	4.68bc	18.58d	12.53	1366.9d	13166	0.238	10.49cd	5.65a	2.40a	2.40a	1.90a
	Azospirillum	30.51c	4.99b	19.83c	12.76	1543.4c	12085	0.248	11.02c	5.45b	1.95b	1.95b	1.65ab

In each column, averages with same superscript letters do not have a significant difference at the 5% level