

International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
 ISSN Online: 2617-4707
 NAAS Rating (2026): 5.29
 Indexing: Embase
 IJABR 2026; SP 10(10): 779-783
www.biochemjournal.com
 Received: 16-08-2026
 Accepted: 24-09-2026
 Published: 09-10-2026

PV Waikar

M.Sc. Scholar, Department of
 Seed Science and Technology,
 VNMKV, Parbhani,
 Maharashtra, India

AM Misal

Assistant Professor,
 Department of Agricultural
 Botany, College of Agriculture,
 Latur, Maharashtra, India

AH Rathod

Assistant Professor and Office
 Incharge BSP Unit, VNMKV,
 Parbhani, Maharashtra, India

SN Devkule

Seed Research Officer, STR &
 QSP Unit, VNMKV, Parbhani,
 Maharashtra, India

SM Umate

Soybean Breeder, AICRP on
 Soybean, VNMKV, Parbhani,
 Maharashtra, India

MP Wankhade

Assistant Seed Research
 Officer, STR & QSP Unit,
 VNMKV, Parbhani,
 Maharashtra, India

AR Gaikwad

Assistant Breeder, STR & QSP
 Unit, VNMKV, Parbhani,
 Maharashtra, India

PS Kadam

M.Sc. Scholar, Department of
 Agricultural Meteorology,
 VNMKV, Parbhani,
 Maharashtra, India

Corresponding Author:**PV Waikar**

M.Sc. Scholar, Department
 of Seed Science and
 Technology, VNMKV,
 Parbhani, Maharashtra,
 India

Correlation and path coefficient analysis of seed yield and its component traits in micronutrient-sprayed safflower (*Carthamus Tinctorius* L.)

PV Waikar¹, AM Misal², AH Rathod³, SN Devkule⁴, SM Umate⁵, MP Wankhade⁶, AR Gaikwad⁷, PS Kadam⁸

DOI: <https://www.doi.org/10.33545/26174693.2026.v10.i10Sj.10379>

ABSTRACT

A field cum laboratory experiment was conducted at the Quality Seed Production (QSP) Unit, Khanapur-A, Vasantrao Naik Marathwada Krishi Vidyapeeth (VNMKV), Parbhani during the Rabi season of 2025-26 to work out the correlation and path coefficients of seed yield and its component traits in safflower (*Carthamus tinctorius* L.) grown under foliar micronutrients spray. The experiment was laid out in a Randomized Block Design (RBD) with nine treatments (individual and combined micronutrients sprays of Fe, Zn, B and Mn) and three replications using safflower variety 'PBNS-154'. Correlation studies revealed that plant height, number of primary branches per plant, number of capitulum per plant, number of seeds per capitulum, 1000-seed weight, biological yield per plant, harvest index, seedling vigour index-I, seedling vigour index-II and oil content were positively and significantly correlated with seed yield per plant whereas days to 50 per cent flowering and days to maturity showed a negative, non-significant association and germination percentage a positive, non-significant association with seed yield. Harvest index ($r = 0.835^{**}$), seedling vigour index-II ($r = 0.781^{**}$) and number of seeds per capitulum ($r = 0.723^{**}$) exhibited the strongest positive association with seed yield. Path coefficient analysis indicated that seedling vigour index-I (0.259), number of seeds per capitulum (0.250) and harvest index (0.219) exerted the highest positive direct effects on seed yield per plant with a residual effect of 0.364 indicating that the thirteen characters together accounted for nearly 87 per cent of the total variation in seed yield. It was concluded that harvest index, number of seeds per capitulum and the seedling vigour indices combining a high direct effect with a high and significant correlation with seed yield are the most reliable component traits for indirect selection of superior micronutrients spray treatments for improving seed yield in safflower.

Keywords: Safflower (*Carthamus tinctorius* L.), Correlation coefficient, Path coefficient analysis, Direct effect, Indirect effect, Seed yield

1. Introduction

Safflower (*Carthamus tinctorius* L.), an important rainfed oilseed crop of the family Asteraceae is valued for its drought tolerance, wide adaptability and the high proportion of unsaturated fatty acids in its seed oil (Singh *et al.*, 2006; Hussain *et al.*, 2016) [2, 1]. Seed yield being a complex quantitative trait resulting from the combined expression of several component characters has comparatively low heritability and direct selection for yield alone is therefore often inefficient. Correlation coefficient analysis quantifies the degree and direction of association between seed yield and its component characters indicating which traits could serve as indirect selection criteria. However a component character may appear highly correlated with yield merely through its association with other more influential characters without exerting any real influence of its own.

Path coefficient analysis, first proposed by Wright (1921) [3] and later adapted for crop plants by Dewey *et al.* (1959) [4] overcomes this limitation by partitioning the correlation of each component character with yield into direct and indirect effects thereby permitting more precise identification of the true contributors to yield. Correlation and path analyses have been extensively used to identify effective selection criteria in safflower (Mokhtassi Bidgoli *et al.*, 2006 [5]; Mahasi *et al.*, 2006 [6]; Roopa and Ravikumar, 2008 [7]; Arslan, 2007 [8]; Golkar *et al.*, 2011 [9]; Topal *et al.*, 2010 [10]; Katar, 2013 [11]; Dambal and Patil, 2016 [12]; Perveen *et al.*, 2026) [13] but information on the pattern of character association under micronutrients spray specifically remains limited. The present investigation was therefore undertaken to estimate correlation coefficients and to partition them through path coefficient analysis for thirteen morpho-physiological, yield-attributing and seed quality characters in relation to seed yield per plant in micronutrient-sprayed safflower.

2. Materials and Methods

2.1 Experimental site

The field experiment was conducted at the experimental farm of the Quality Seed Production (QSP) Unit, Khanapur-A, Vasantrao Naik Marathwada Krishi Vidyapeeth (VNMKV), Parbhani, Maharashtra during the *Rabi* season of 2025-26. Parbhani is situated at 19°26' N latitude and 76°47' E longitude at an elevation of 357 m above mean sea level (MSL).

The region has a tropical climate with a mean annual rainfall of 888.5 mm, maximum temperature ranging from 28.6 to 42.4°C and minimum temperature from 13.4 to 32.2 °C. The experimental site consisted of uniform, well-ploughed and levelled black cotton soil (vertisol) of uniform fertility status.

2.2 Experimental design and treatments

The experiment was laid out in a Randomized Block Design (RBD) with nine treatments and three replications. The safflower variety PBNS-154 was used as the seed material and sown by dibbling. A recommended fertilizer dose of 60:30:00 kg NPK/ha was applied as basal dose. The nine treatments were: T₁ - Control; T₂ - Fe (FeSO₄) @ 4 mg/lit; T₃ - Zn (ZnSO₄) @ 3 mg/lit; T₄ - B (H₃BO₃) @ 3 mg/lit; T₅ - Mn (MnSO₄) @ 2 mg/lit; T₆ - Fe + B (4 mg + 3 mg/lit); T₇ - Fe + Mn (4 mg + 2 mg/lit); T₈ - Fe + Zn (4 mg + 3 mg/lit) and T₉ - Zn + B (3 mg + 3 mg/lit each). Each net plot measured 1.8 x 3.0 m with row-to-row spacing of 45 cm and plant-to-plant spacing of 20 cm.

2.3 Characters studied

Observations were recorded on thirteen morpho-physiological, yield-attributing and seed quality characters viz., days to 50 per cent flowering (DFF), days to maturity (DM), plant height (PH), number of primary branches per plant (NPB), number of capitulum per plant (NCPP), number of seeds per capitulum (NSPC), 1000-seed weight / Test Weight (TW), biological yield per plant (BY), harvest index (HI), germination percentage (GP), seedling vigour index-I (SVI-I), seedling vigour index-II (SVI-II) and oil content (OC) in relation to seed yield per plant (SY). Seedling vigour index-I and II were computed as germination% x seedling length (cm) and germination% x seedling dry weight (g) respectively following Baki *et al.* (1973) [14] while harvest index as (seed yield / biological yield) x 100 and oil content (%) was estimated from a 25 g clean seed sample per plot using the Nuclear Magnetic Resonance (NMR) method.

2.4 Statistical analysis

The data recorded on the thirteen component characters and seed yield per plant were subjected to correlation and path coefficient analysis following the standard procedures of Panse *et al.* (1985) [15], Wright (1921) [3] and Dewey *et al.* (1959) [4] as detailed below.

$$R = 1 - \sqrt{a^2 + b^2 + c^2 + \dots + n^2 + 2abr_{12} + 2acr_{13} + \dots}$$

The residual effect so obtained is depicted at the base of the phenotypic path diagram (Figure 1).

3. Results and Discussion

Correlation coefficients were worked out for thirteen morpho-physiological, yield-attributing and seed quality characters in relation to seed yield per plant, as well as amongst themselves, and are presented in Table 1.

* and ** Significant at 5% and 1% level, respectively. DFF = Days to 50% flowering; DM = Days to maturity; PH = Plant height; NPB = No. of primary branches/plant; NCPP = No. of capitulum/plant; NSPC = No. of seeds/capitulum; TW = 1000-seed weight; BY = Biological yield/plant; HI = Harvest index; GP = Germination %; SVI-I/II = Seedling vigour index-I/II; OC = Oil content; SY = Seed yield/plant.

2.4.1 Character association

The correlation coefficients were worked out to determine the degree of association of each character with seed yield and also among the component characters themselves. The treatment mean values were used to compute phenotypic correlation coefficients as per the standard procedure of Panse *et al.* (1985) [15]:

$$r = \frac{\text{Cov}(xy)}{\sqrt{\text{Var}(x) \times \text{Var}(y)}}$$

Where,

r = phenotypic correlation coefficient

$\text{Cov}(xy)$ = covariance between characters x and y

$\text{Var}(x)$ and $\text{Var}(y)$ = variance of characters x and y respectively.

The correlation coefficients so obtained were tested for significance at the error degrees of freedom at the 5 and 1 per cent probability levels.

2.4.2 Path analysis

Path analysis was carried out using the phenotypic correlation coefficients to determine the direct and indirect effects of the component characters on seed yield as suggested by Wright (1921) [3] and illustrated by Dewey *et al.* (1959) [4]. Path coefficients were obtained by solving the simultaneous equations expressing the basic relationship between correlations and path coefficients:

$$r_{1y} = a + r_{12}b + r_{13}c + \dots + r_{1n}n$$

$$r_{2y} = r_{21}a + b + r_{23}c + \dots + r_{2n}n$$

$$r_{ny} = r_{n1}a + r_{n2}b + r_{n3}c + \dots + n$$

Where,

r_{1y} to r_{ny} = correlation coefficients between causal factors 1 to n and seed yield (y);

r_{12} to r_{n-1} , n = correlation coefficients among causal factors

$a, b, c \dots n$ = direct effects of the respective characters on seed yield.

This procedure partitions the phenotypic correlation coefficient of each component character with seed yield into a direct effect and indirect effects transmitted through the other component characters.

2.4.3 Calculation of residual effect (R)

The residual effect measures the contribution of other possible components of yield not included in the present study together with unexplained error and was computed as follows (Dewey *et al.*, 1959) [4]:

Path coefficient analysis was carried out at the phenotypic level for the thirteen characters, keeping seed yield per plant as the dependent variable, and the direct and indirect effects are presented in Table 2. The residual effect was estimated at 0.364, indicating that the thirteen characters together accounted for nearly 87 per cent of the total variation in seed yield per plant.

Diagonal values represent direct effects of each character on seed yield; off-diagonal values represent indirect effects transmitted via the respective character. Character abbreviations as in Table 1.

3.1 Correlation among seed yield and component traits

Days to 50 per cent flowering and days to maturity exhibited a negative, non-significant correlation with seed yield per plant ($r = -0.375$ and -0.218 respectively) indicating that an early-flowering and early-maturing habit tended to favour higher seed yield although the association was not statistically significant. Plant height, number of primary

branches per plant, number of capitulum per plant and number of seeds per capitulum each recorded a highly significant positive correlation with seed yield ($r = 0.721^{**}$, 0.608^{**} , 0.699^{**} and 0.723^{**} respectively) and were also significantly inter-correlated with one another and with 1000-seed weight, biological yield, harvest index and oil content. Among all the characters studied harvest index recorded the strongest positive correlation with seed yield ($r = 0.835^{**}$) followed by seedling vigour index-II ($r = 0.781^{**}$) and number of seeds per capitulum ($r = 0.723^{**}$). Germination percentage alone showed a positive but non-significant association with seed yield ($r = 0.328$).

These trends are broadly consistent with the correlation studies reported for safflower by Mokhtassi Bidgoli *et al.* (2006) [5], Mahasi *et al.* (2006) [6], Roopa *et al.* (2008) [7], Golkar *et al.* (2011) [9], Dambal *et al.* (2016) [12], Katar (2013) [11] and Perveen *et al.* (2026) [13] and are further supported by the reports of Bagheri *et al.* (2001) [16] and Omid *et al.* (2009) [17] who also recorded significant positive association of seed yield with plant height, capitula per plant and seed weight in safflower and of Moghaddasi *et al.* (2010) [18] who observed similar trait relationships among exotic and native safflower genotypes evaluated through multivariate analysis.

Table 1. Phenotypic Correlation Coefficients among Morpho-Physiological Characters and Seed Yield per Plant in Micronutrient-Sprayed Safflower

Char.	DFF	DM	PH	NPB	NCPP	NSPC	TW	BY	HI	GP	SVI-I	SVI-II	OC	SY
DFF	1.000	0.723**	-0.250	-0.371	-0.417*	-0.412*	-0.098	-0.297	-0.374	-0.365	-0.376	-0.304	-0.372	-0.375
DM		1.000	-0.320	-0.372	-0.402*	-0.279	-0.160	-0.245	-0.196	-0.387*	-0.506**	-0.202	-0.297	-0.218
PH			1.000	0.547**	0.743**	0.595**	0.678**	0.592**	0.726**	0.271	0.243	0.716**	0.525**	0.721**
NPB				1.000	0.756**	0.661**	0.542**	0.575**	0.541**	0.410*	0.470**	0.589**	0.701**	0.608**
NCPP					1.000	0.646**	0.636**	0.618**	0.663**	0.382*	0.270	0.686**	0.698**	0.699**
NSPC						1.000	0.630**	0.525**	0.661**	0.407*	0.280	0.478*	0.642**	0.723**
TW							1.000	0.423*	0.635**	0.297	0.310	0.446*	0.466*	0.671**
BY								1.000	0.520**	0.346	0.420*	0.762**	0.596**	0.683**
HI									1.000	0.317	0.354	0.731**	0.628**	0.835**
GP										1.000	0.346	0.323	0.367	0.328
SVI-I											1.000	0.426*	0.357	0.492**
SVI-II												1.000	0.587**	0.781**
OC													1.000	0.656**
SY														1.000

Table 2. Path Coefficient Analysis Showing Direct (Diagonal) and Indirect Effects of Component Characters on Seed Yield per Plant in Micronutrient-Sprayed Safflower (Residual Effect = 0.364)

Char.	DFF	DM	PH	NPB	NCPP	NSPC	TW	BY	HI	GP	SVI-I	SVI-II	OC	r with SY
DFF	-0.143	0.159	-0.022	0.058	-0.045	-0.103	-0.013	-0.024	-0.082	0.020	-0.098	-0.065	-0.018	-0.375
DM	-0.104	0.220	-0.028	0.058	-0.043	-0.070	-0.022	-0.020	-0.043	0.022	-0.131	-0.043	-0.015	-0.218
PH	0.036	-0.071	0.087	-0.085	0.080	0.149	0.092	0.047	0.159	-0.015	0.063	0.154	0.026	0.721
NPB	0.053	-0.082	0.047	-0.155	0.081	0.165	0.074	0.046	0.119	-0.023	0.122	0.127	0.034	0.608
NCPP	0.060	-0.089	0.064	-0.117	0.107	0.162	0.087	0.049	0.145	-0.021	0.070	0.147	0.034	0.699
NSPC	0.059	-0.061	0.052	-0.102	0.069	0.250	0.086	0.042	0.145	-0.023	0.073	0.103	0.032	0.723
TW	0.014	-0.035	0.059	-0.084	0.068	0.158	0.136	0.034	0.139	-0.017	0.081	0.096	0.023	0.671
BY	0.043	-0.054	0.051	-0.089	0.066	0.131	0.058	0.080	0.114	-0.019	0.109	0.164	0.029	0.683
HI	0.054	-0.043	0.063	-0.084	0.071	0.166	0.086	0.042	0.219	-0.018	0.092	0.157	0.031	0.835
GP	0.052	-0.085	0.024	-0.064	0.041	0.102	0.040	0.028	0.070	-0.056	0.090	0.069	0.018	0.328
SVI-I	0.054	-0.112	0.021	-0.073	0.029	0.070	0.042	0.034	0.078	-0.019	0.259	0.092	0.018	0.492
SVI-II	0.044	-0.045	0.062	-0.091	0.073	0.120	0.061	0.061	0.160	-0.018	0.111	0.215	0.029	0.781
OC	0.053	-0.065	0.046	-0.109	0.075	0.161	0.063	0.048	0.138	-0.021	0.093	0.126	0.049	0.656

3.2 Direct and indirect effects (path analysis)

Seedling vigour index-I recorded the highest positive direct effect on seed yield per plant (0.259) followed by number of seeds per capitulum (0.250) and harvest index (0.219) and in each case the high direct effect was reinforced by favourable positive indirect effects resulting in high and highly significant correlations with seed yield ($r = 0.492^{**}$, 0.723^{**} and 0.835^{**} respectively). These three characters can therefore be considered reliable for direct selection. In contrast plant height, biological yield and oil content despite recording high and significant correlations with seed yield exerted comparatively low direct effects (0.087, 0.080 and 0.049 respectively) and influenced yield largely indirectly through their association with harvest index and the seedling vigour indices. Simple correlation coefficients for

these traits would therefore have overestimated their direct contribution. Number of primary branches per plant showed a negative direct effect (-0.155) that was more than compensated by strong positive indirect effects again resulting in a high positive correlation with yield ($r = 0.608^{**}$) driven mainly by indirect pathways while days to 50 per cent flowering and days to maturity exerted direct effects (-0.143 and 0.220) that were largely cancelled out by their indirect effects leaving neither as a dependable direct selection criterion. This pattern of direct and indirect effects is in agreement with the path-analysis framework of Wright (1921) [3] and Dewey *et al.* (1959) [4] and its application to safflower by Mokhtassi Bidgoli *et al.* (2006) [5], Mahasi *et al.* (2006) [6], Arslan (2007) [8], Topal *et al.* (2010) [10], Katar (2013) [11] and Perveen *et al.* (2026) [13] and is further corroborated by Behnam *et al.* (2012) [19] and Golparvar (2011) [20] who also

reported a predominance of indirect over direct effects for several yield-contributing traits in safflower grown under contrasting moisture regimes as well as by Lucy-Kumari *et al.* (2010) [21] who recorded comparable direct-effect patterns for yield components in segregating safflower populations.

3.3 Implications for selection

Harvest index, number of seeds per capitulum and the seedling vigour indices combined a high direct effect with a high and significant correlation with seed yield and therefore emerged as the most reliable component traits for indirect selection of superior micronutrient treatments and by inference of superior safflower genotypes aimed at improving seed yield. The residual effect of 0.364 (Figure 1) indicates that the thirteen characters studied together accounted for nearly 87 per cent of the total variation in seed yield per plant, the remaining variation being attributable to characters not included in the present study or to error.

4. Conclusion

Correlation studies revealed that plant height, number of primary branches per plant, number of capitulum per plant, number of seeds per capitulum, 1000-seed weight, biological yield per plant, harvest index, seedling vigour index-I, seedling vigour index-II and oil content were positively and significantly associated with seed yield per plant in micronutrient-sprayed safflower whereas days to 50 per cent flowering and days to maturity showed a negative, non-significant association and germination percentage a positive, non-significant association with seed yield. Path coefficient analysis indicated that seedling vigour index-I, number of seeds per capitulum and harvest index exerted the highest positive direct effects on seed yield with a residual effect of 0.364. Harvest index, number of seeds per capitulum and the seedling vigour indices which combined a high direct effect with a high and significant correlation with seed yield may therefore be recommended as the most reliable component characters for indirect selection of superior micronutrient treatments for improving seed yield and seed quality of safflower under the agro-climatic conditions of Marathwada.

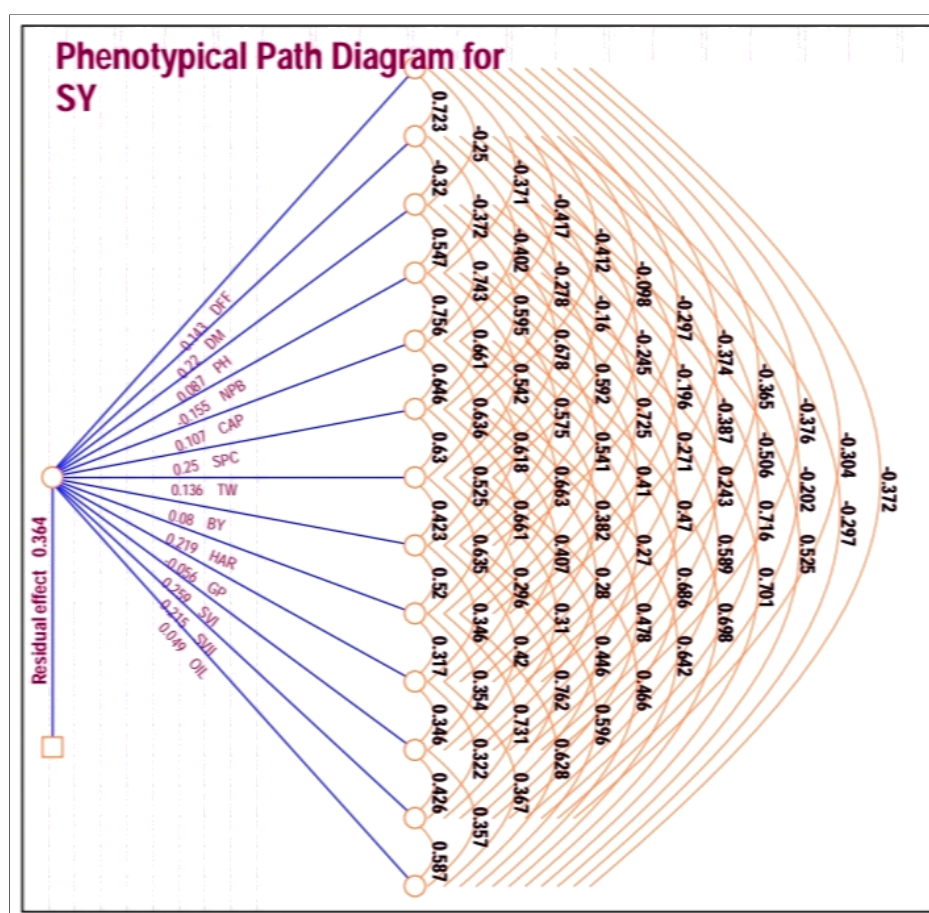


Figure 1. Phenotypical path diagram showing the direct (radial values beside each character) and indirect (arc values between character pairs) effects of thirteen morpho-physiological and seed quality characters on seed yield per plant (SY) in micronutrient-sprayed safflower.

The central node represents seed yield; the square node denotes the residual effect (0.364).

References

- Hussain MI, Lyra DA, Farooq M, Nikoloudakis N, Khalid N. Salt and drought stresses in safflower: A review. *Agronomy for Sustainable Development*. 2016;36(1):Article 4.
- Singh V, Nimbkar N. Safflower (*Carthamus tinctorius* L.). In *Genetic resources, chromosome engineering and crop improvement*. 2006:168.
- Wright S. Correlation and causation. *Journal of Agricultural Research*. 1921;20(7):557-585.
- Dewey DR, Lu KH. A correlation and path-coefficient analysis of components of crested wheatgrass seed production. *Agronomy Journal*. 1959;51(9):515-518.
- Mokhtassi Bidgoli A, Akbari GA, Mirhadi MJ, Zand E, Soufizadeh S. Path analysis of the relationships between seed yield and some morphological and phenological traits in safflower (*Carthamus tinctorius* L.). *Euphytica*. 2006;148(3):261-268.
- Mahasi MJ, Pathak RS, Wachira FN, Riungu TC, Kinyua MG. Correlations and path coefficient analysis in exotic safflower (*Carthamus tinctorius* L.) genotypes tested in the arid and semi-arid lands (ASALs) of Kenya. *Asian Journal of Plant Sciences*. 2006;5(6):1035-1038.

7. Roopa VK, Ravikumar RL. Correlation and path analysis studies in safflower (*Carthamus tinctorius* L.) germplasm. *Karnataka Journal of Agricultural Sciences*. 2008;21(3):436-437.
8. Arslan B. The path analysis of yield and its components in safflower (*Carthamus tinctorius* L.). *Journal of Biological Sciences*. 2007;7(4):668-672.
9. Golkar P, Arzani A, Rezaei AM. Determining relationships among seed yield, yield components and morpho-phenological traits using multivariate analyses in safflower (*Carthamus tinctorius* L.). *Annals of Biological Research*. 2011;2(2):162-169.
10. Topal M, Ozturk E, Polat T. Path analysis of seed yield components using different correlation coefficients in safflower (*Carthamus tinctorius* L.). *Bulgarian Journal of Agricultural Science*. 2010;16(4):429-434.
11. Katar D. Determination of efficiency of yield components on oil yield per plant in safflower breeding by different statistical methods. *Global Journal of Science Frontier Research: Agriculture and Veterinary*. 2013;13(6):11-20.
12. Dambal GI, Patil RS. Character association and path analysis in safflower germplasm (*Carthamus tinctorius* L.). *Research Journal of Agricultural Sciences*. 2016;7(1):155-158.
13. Perveen N, Kumar S, Ratnakar TJ, Ghanghas R, Chinir J, Santhini V, Imtiyaz Md. A study of the correlation and path coefficient analysis of morphological traits for seed yield and oil content in safflower (*Carthamus tinctorius* L.) under late sown condition. *Journal of Advances in Biology and Biotechnology*. 2026;29(4):491-498.
14. Baki AAA, Anderson JD. Vigor determination in soybean seed by multiple criteria. *Crop Science*. 1973;13:630-633.
15. Panse VG, Sukhatme PV. Statistical methods for agricultural workers (4th enl. ed.). Indian Council of Agricultural Research; 1985.
16. Bagheri A, Yazdi-Samadi B, Taeb M, Ahmadi MR. Study of correlations and relations between plant yield and quantitative and qualitative traits in safflower. *Iranian Journal of Agricultural Sciences*. 2001;32(2):295-307.
17. Omid AR, Khazaei H, Hongbo S. Variation for some important agronomic traits in 100 spring safflower (*Carthamus tinctorius* L.) genotypes. *American-Eurasian Journal of Agriculture and Environmental Science*. 2009;5(6):791-795.
18. Moghaddasi SM, Omid AH. Study of some morphological and phonological traits in exotic and native safflower genotypes using multivariate statistical methods. *Advances in Environmental Biology*. 2010;4(3):350-352.
19. Behnam T, Aharizad S, Mohamadreza S, Babazad BA, Gafari G. Path analysis of seed and oil yield in safflower. *Communications in Plant Sciences*. 2012;2(2):15-20.
20. Golparvar AR. Genetic improvement of oil yield in spring safflower cultivars under drought and non-drought conditions. *Electronic Journal of Biology*. 2011;7(2):40-43.
21. Lucy-Kumari, Ravikumar RL. Character association and path analysis in early segregating generations of interspecific crosses of safflower. *Karnataka Journal of Agricultural Sciences*. 2010;23(3):487-490.

How to cite this article: Waikar P, Misal A, Rathod A, Devkule S, Umate S, Wankhade M, et al. Correlation and path coefficient analysis of seed yield and its component traits in micronutrient-sprayed safflower (*Carthamus Tinctorius* L.). *International Journal of Advanced Biochemistry Research*. 2026;SP-10(10):779-783. doi: <https://www.doi.org/10.33545/26174693.2026.v10.i10Sj.10379>