Table S1 Results of two-way ANOVA for tomato growth, physiology, quality, yield and WUE

Index	Ph			St			RL			RS		
	sum.III	F-value	significance	sum.III	F-value	significance	sum.III	F-value	significance	sum.III	F-value	significance
W	2778.95	780.60	<0.01	20.38	21.98	<0.01	5290316.26	3112.79	<0.01	170236.82	1812.80	<0.01
Z	557.89	104.47	<0.01	3.09	2.22	0.112	348892.52	136.86	<0.01	16600.85	117.85	<0.01
W*Z	170.54	15.97	<0.01	0.54	0.20	0.975	157083.72	30.81	<0.01	3818.61	13.55	<0.01

Index	RV			LAI			Ci			Pn		
	sum.III	F-value	significance	sum.III	F-value	significance	sum.III	F-value	significance	sum.III	F-value	significance
W	28.87	167.69	<0.01	5.889	136.28	<0.01	7994.00	88.28	<0.01	127.48	100.69	<0.01
Z	1.54	5.95	<0.01	1.044	16.10	<0.01	2138.08	15.74	<0.01	28.14	14.82	<0.01
W*Z	0.55	1.07	0.410	0.511	3.94	0.021	812.00	2.99	0.025	4.19	1.10	0.39

Index	Tr			Gs			Ff			NC		
	sum.III	F-value	significance	sum.III	F-value	significance	sum.III	F-value	significance	sum.III	F-value	significance
W	20.14	177.56	<0.01	0.10	178.88	<0.01	1.36	103.96	<0.01	244.37	5675.74	<0.01
Z	4.58	26.95	<0.01	0.02	26.19	<0.01	0.13	6.58	<0.01	22.07	341.74	<0.01
W*Z	1.00	2.94	0.027	0.01	2.81	0.033	0.08	1.92	0.119	5.26	40.70	<0.01

Index	VC			SS			OA			Yield		
	sum.III	F-value	significance	sum.III	F-value	significance	sum.III	F-value	significance	sum.III	F-value	significance
W	44.32	1391.99	<0.01	10.20	367.04	<0.01	0.01	11.42	<0.01	2574.23	140.06	<0.01
Z	6.00	125.54	<0.01	1.15	27.59	<0.01	0.01	1.46	0.25	231.50	8.40	<0.01
W*Z	2.04	21.31	<0.01	0.58	6.93	<0.01	0.01	0.05	0.999	76.92	1.40	0.293

Index	WUE		
	sum.III	F-value	significance
W	57.05	11.75	<0.01
Z	830.44	114.06	<0.01
W*Z	11.44	0.59	0.59

Note: sum. III represent Class III sum of squares.

Table S2 Grey relational analysis calculation

	Ph	St	RL	RV	RS	LAI	Ci	Pn	Tr	Gs	Ff	NC	VC	SS	OA	Yield	WUE	Average
Ph	1.0000	0.5538	0.5098	0.5551	0.5662	0.5431	0.6799	0.6593	0.5614	0.5052	0.5174	0.5828	0.5420	0.5199	0.5028	0.8842	0.7235	0.6165
St	0.5538	1.0000	0.5010	0.9877	0.5071	0.9009	0.5193	0.6687	0.9377	0.5484	0.6622	0.8248	0.8906	0.6846	0.5265	0.5700	0.6203	0.6877
RL	0.5098	0.501	1.0000	0.5011	0.5738	0.5008	0.5271	0.5031	0.5012	0.5001	0.5003	0.5016	0.5008	0.5004	0.5001	0.5075	0.5044	0.5395
RV	0.5551	0.9877	0.5011	1.0000	0.5073	0.891	0.5198	0.6730	0.9488	0.5472	0.6581	0.8330	0.8809	0.6801	0.5258	0.5717	0.6233	0.6883
RS	0.5662	0.5071	0.5738	0.5073	1.0000	0.5057	0.6839	0.5211	0.5081	0.5007	0.5023	0.5110	0.5056	0.5026	0.5004	0.5509	0.5296	0.5607
LAI	0.5431	0.9009	0.5008	0.891	0.5057	1.0000	0.5155	0.6353	0.8509	0.5603	0.7002	0.7604	0.9871	0.7303	0.533	0.5561	0.5964	0.6922
Ci	0.6799	0.5193	0.5271	0.5198	0.6839	0.5155	1.0000	0.5573	0.5221	0.5019	0.5063	0.5298	0.5151	0.5071	0.5010	0.6382	0.5804	0.5806
Pn	0.6593	0.6687	0.5031	0.6730	0.5211	0.6353	0.5573	1.0000	0.6928	0.5163	0.5547	0.7597	0.6318	0.5623	0.5089	0.7073	0.8564	0.6483
Tr	0.5614	0.9377	0.5012	0.9488	0.5081	0.8509	0.5221	0.6928	1.0000	0.5423	0.6419	0.8711	0.8419	0.6616	0.5232	0.5799	0.6374	0.6857
Gs	0.5052	0.5484	0.5001	0.5472	0.5007	0.5603	0.5019	0.5163	0.5423	1.0000	0.6491	0.5314	0.5619	0.631	0.7739	0.5068	0.5116	0.5830
Ff	0.5174	0.6622	0.5003	0.6581	0.5023	0.7002	0.5063	0.5547	0.6419	0.6491	1.0000	0.6053	0.7076	0.9391	0.5817	0.5227	0.5390	0.6305
NC	0.5828	0.8248	0.5016	0.8330	0.5110	0.7604	0.5298	0.7597	0.8711	0.5314	0.6053	1.0000	0.7537	0.6199	0.5172	0.6077	0.6852	0.6709
VC	0.5420	0.8906	0.5008	0.8809	0.5056	0.9871	0.5151	0.6318	0.8419	0.5619	0.7076	0.7537	1.0000	0.7364	0.5339	0.5547	0.5940	0.6719
SS	0.5199	0.6846	0.5004	0.6801	0.5026	0.7303	0.5071	0.5623	0.6616	0.6310	0.9391	0.6199	0.7364	1.0000	0.5717	0.5258	0.5444	0.6367
OA	0.5028	0.5265	0.5001	0.5258	0.5004	0.533	0.5010	0.5089	0.5232	0.7739	0.5817	0.5172	0.5339	0.5717	1.0000	0.5037	0.5064	0.5673
Yield	0.8842	0.5700	0.5075	0.5717	0.5509	0.5561	0.6382	0.7073	0.5799	0.5068	0.5227	0.6077	0.5547	0.5258	0.5037	1.0000	0.7908	0.6264
WUE	0.7235	0.6203	0.5044	0.6233	0.5296	0.5964	0.5804	0.8564	0.6374	0.5116	0.5390	0.6852	0.5940	0.5444	0.5064	0.7908	1.0000	0.6404

Table S3 Eigenvalues and Cumulative Variance Contribution Rates of Tomato Evaluation Factors

Ingredient	Eigenvalues	variance contribution rate (%)	Cumulative variance contribution rate (%)
1	8.527	77.521	77.521
2	1.794	16.310	93.831
3	0.446	4.056	97.887
4	0.091	0.826	98.714
5	0.062	0.568	99.281
6	0.031	0.278	99.559
7	0.021	0.191	99.750
8	0.013	0.115	99.865
9	0.010	0.089	99.954
10	0.005	0.044	99.998
11	0.000	0.002	100.000

Table S4 Factor loading matrix of principal components on each index

Index	Main ingredient	
	1	2
RV	0.979	0.071
St	0.971	0.204
Tr	0.951	0.240
VC	-0.851	0.471
NC	-0.879	0.446
Pn	0.961	0.247
WUE	-0.136	0.884
SS	-0.857	0.487
Ff	-0.978	-0.113
Yield	0.836	0.378
Ph	0.945	0.180