

**Table S1.** Brand information, production and expiration dates, and storage conditions prior to analysis for commercial black cumin oil samples.

Brand /Sample	Production date/expiration date		Storage conditions
Zade-A	01.05.2021/01.05.2023	 <p>The image shows the packaging for Zade Vital Black Cumin Oil. On the left is a purple and white cardboard box with the brand name 'ZADE VITAL' at the top and 'CÖREK OTU YAĞI' in the center. To the right is a dark glass bottle with a white cap and a matching purple and white label.</p>	+4°C
Hekimhan-B	10.03.2021/10.03.2023	 <p>The image shows the packaging for Hekimhan Black Cumin Oil. On the left is a black and gold cardboard box with 'Hekimhan' at the top and 'Cörekotu Yağı Black Cumin Oil' in the center. To the right is a dark glass bottle with a gold cap and a matching black and gold label.</p>	+4°C
Naturoid-C	15.02.2021/15.02.2023	 <p>The image shows the packaging for Naturoid yerli cörekotu yağı. On the left is a dark glass bottle with a white label featuring a blue water drop icon and the brand name 'naturoid'. To the right is a white cardboard box with a blue label and the brand name 'naturoid' at the top, with 'yerli cörekotu yağı black cumin seed oil' in the center.</p>	+4°C
Europevital-D	17.06.2021/17.06.2023	 <p>The image shows the packaging for Europe Vital Black Cumin Oil. On the left is a dark glass bottle with a gold cap and a blue and white label with the brand name 'Europe Vital'. To the right is a white cardboard box with a blue label and the brand name 'Europe Vital' at the top, with 'Cörekotu Yağı' in the center.</p>	+4°C

Meydan-E	7.04.2021/7.04.2023		+4°C
Balen-F	2.04.2021/2.04.2023		+4°C
Vitalhome-G	21.03.2021/21.03.2023		+4°C
Talya-H	12.04.2021/12.04.2023		+4°C
Bayvital -I	15.05.2021/15.05.2023		+4°C

Arifoğlu -K	11.03.2021/11.03.2023		+4°C
Cold-pressed black cumin seed oil produced in the laboratory -M	10.07.2021/2023		+4°C

**Table S2.** Analysis of variance (ANOVA) for peroxide value, free fatty acidity, and induction time of different black cumin oil samples

Source	df	Peroxide value (meq O <sub>2</sub> /kg)		Free fatty acidity		Induction time (h)	
		MS	F	MS	F	MS	F
Samples	11	17,709.3	587.72**	3,863.22	980.72**	642.584	476.46**
Error	22	66.3		8.67		2.967	
Total	32	17,775.6		3,871.88		645.551	

\*\* Indicates statistical significance at  $P < 0.01$ . Different letters within a column denote statistically significant differences.

**Table S3.** Analysis of variance (ANOVA) for thymoquinone content of different black cumin oil samples.

Source of variation	df	Mean square	F value
Samples	11	1632.21	4601.97**
Error	22	0.78	
Total	32	1632.99	

\*\* Indicates statistical significance at  $P < 0.01$ . Different letters denote statistically significant differences.

**Table S4.** Analysis of variance (ANOVA) for fatty acid composition of different black cumin oil samples.

Source	df	C16:0 MS	F	C18:0 MS	F	C18:1 MS	F	C18:2 MS	F
Samples	11	101.560	290.00**	38.5444	110.72**	598.073	525.23**	239.754	459.78**
Error	22	0.770		0.7659		2.505		1.147	
Total	32	102.331		39.3103		600.578		240.901	

Source	df	C18:3 MS	F	C20:0 MS	F	C20:1 MS	F	C20:2 MS	F	C22:1 MS	F
Samples	10	366.058	1,770,786.99**	1.49947	42.00**	0.979089	49,024.18**	51.2466	195.94**	6.59243	5,783.20**
Error	22	0.000		0.07855		0.000044		0.5754		0.00251	
Total	32	366.058		1.57802		0.979133		51.8220		6.59494	