

Table 1A. Results of chromatographic analysis of rowan extract (2021–2025)

№	Retention time, min	Compound	Peak area	2021	2022	2023	2024	2025
				Percentage content *, %				
1	11,19	2-Furancarboxaldehyde, 5-methyl-	39844605	0,16	0,22	0,19	0,18	0,17
2	11,5	Butyrolactone	19595270	0,07	0,07	0,07	0,11	0,09
3	11,73	2(5H)-Furanone	50148352	0,23	0,25	0,16	0,28	0,22
4	14,44	Sorbic Acid	4,39E+08	2,29	1,58	1,55	1,55	1,91
5	14,6	2,5-Dimethyl-4-hydroxy-3(2H)-furanone	2,23E+08	0,86	0,99	0,94	0,86	0,98
6	16,97	Dihydro-3-methylene-5-methyl-2-furanone	6,96E+09	32,43	23,82	26,6	27,95	30,39
7	17,13	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-	4,53E+08	1,93	2,32	1,62	2	1,98
8	17,7	Cyclopropyl carbinol	1,5E+08	0,7	0,48	0,7	0,53	0,66
9	18,67	2-Propanamine, N-methyl-N-nitroso-	1,12E+08	0,36	0,62	0,63	0,58	0,49

10	18,94	Benzofuran, 2,3-dihydro-	33416260	0,13	0,11	0,17	0,14	0,15
11	19,11	2(3H)-Furanone, 5-acetyldihydro-	46544462	0,15	0,2	0,14	0,25	0,2
12	19,39	2-Hexenoic acid, 5-hydroxy-	1,87E+08	0,7	0,9	0,73	0,83	0,82
13	19,97	Piperidine, 1-nitroso-	7786075	0,03	0,02	0,04	0,03	0,03
14	21,58	5-Hydroxymethylfurfural	3,19E+09	17,6	17,23	14,75	17,46	13,93
15	21,7	2-Methoxy-4-vinylphenol	29877679	0,1	0,11	0,09	0,12	0,13
16	21,86	1,1,3,3-Tetramethyl-1,3-disilaphenalanone	31647754	0,13	0,12	0,17	0,13	0,14
17	22,01	Hydroquinone	25922792	0,1	0,11	0,09	0,13	0,11
18	22,85	Isosorbide	2,46E+08	0,8	1,38	1,24	0,88	1,07
19	24,68	Isovaleraldehyde	1,57E+08	0,49	0,82	0,78	0,78	0,69
20	29,27	d-Mannitol, 1,4-anhydro-	1,59E+09	8,08	5,17	6,36	5,35	6,95
21	33,36	n-Hexadecanoic acid	2,88E+08	1,53	1,35	1,13	0,93	1,26

2 2	34,64	1,4-Anhydro-d-galactitol	1,07E+09	4,16	4,2	5,34	5,08	4,69
2 3	37,03	Oleic Acid	3,91E+08	2,11	1,68	1,32	1,93	1,71
2 4	37,41	9,12-Octadecadienoic acid (Z,Z)-	9,77E+08	4,93	4,42	4,95	4,24	4,26
2 5	37,85	9,12,15-Octadecatrienoic acid, (Z,Z,Z)-	5,44E+08	2,4	2,27	1,7	1,81	2,37
2 6	39,17	Sorbitol	3,09E+09	9,7	14,59	11,99	13,56	13,49
2 7	43,44	Docosanoic acid	17355904	0,1	0,07	0,08	0,09	0,08
2 8	44,44	Hexadecanoic acid, 2-hydroxy-1-(hydroxymethyl)ethyl ester	2,34E+08	0,85	0,76	0,89	0,81	1,02
2 9	44,74	Benzyl β -d-glucoside	49831876	0,28	0,26	0,24	0,27	0,22
3 0	47,08	Squalene	15847374	0,08	0,06	0,09	0,07	0,07
3 1	47,47	9-Octadecenoic acid (Z)-, 2,3-dihydroxypropyl ester	1,32E+08	0,68	0,71	0,51	0,44	0,57

3 2	47,81	9,12-Octadecadienoic acid (Z,Z)-, 2-hydroxy-1-(hydroxymethyl)ethyl ester	4,44E+08	1,62	1,86	2,31	2,36	1,94
3 3	48,53	9-Octadecenoic acid (Z)-, 2-hydroxyethyl ester	80649759	0,25	0,35	0,33	0,29	0,35
3 4	48,83	9,12-Octadecadienoic acid (Z,Z)-, 2-hydroxy-1-(hydroxymethyl)ethyl ester	88839046	0,3	0,35	0,49	0,35	0,39
3 5	49,96	10-Nonadecanol	4,69E+08	2,07	2,3	1,88	2,63	2,05
3 6	50,77	Phytol, acetate	86244850	0,49	0,32	0,38	0,33	0,38
3 7	51,97	γ-Tocopherol	14901496	0,06	0,05	0,07	0,07	0,07
3 8	52,97	Vitamin E	2,16E+08	0,69	0,82	1,17	0,79	0,94
3 9	55,05	Campesterol	19957556	0,07	0,09	0,12	0,08	0,09
4 0	55,49	Stigmasterol	8281417	0,04	0,05	0,03	0,05	0,04

4 1	56,44	γ -Sitosterol	3,56E+08	1,43	1,67	1,67	1,58	1,55
4 2	58,44	β -Amyrin	24318071	0,08	0,13	0,1	0,09	0,11
4 3	59,96	α -Amyrin	2,27E+08	0,72	1,04	1,1	0,7	0,99
4 4	62,27	3-(1,5-Dimethylhexyl)- 3a,10,10,12b-tetramethyl- 1,2,3,3a,4,6,8,9,10, 10a,11,12,12a,12b-tetradecahydro- benzo[4,5]cyclohepta[1,2-E]indene	66218171	0,29	0,24	0,32	0,23	0,29

Table 2B. Results of chromatographic analysis of rowan extract (summer, 2025)

№	Retention time, min	Compound	Peak area	Percentage content *, %
1	11.19	2-Furancarboxaldehyde, 5-methyl-	39844605	0.17
2	11.50	Butyrolactone	19595270	0.09
3	11.73	2(5H)-Furanone	50148352	0.22
4	14.44	Sorbic Acid	438581397	1.91

5	14.60	2,5-Dimethyl-4-hydroxy-3(2H)-furanone	223405424	0.98
6	16.97	Dihydro-3-methylene-5-methyl-2-furanone	6963356928	30.39
7	17.13	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-	453207311	1.98
8	17.70	Cyclopropyl carbinol	150491942	0.66
9	18.67	2-Propanamine, N-methyl-N-nitroso-	112031527	0.49
10	18.94	Benzofuran, 2,3-dihydro-	33416260	0.15
11	19.11	2(3H)-Furanone, 5-acetyldihydro-	46544462	0.20
12	19.39	2-Hexenoic acid, 5-hydroxy-	186785136	0.82
13	19.97	Piperidine, 1-nitroso-	7786075	0.03
14	21.58	5-Hydroxymethylfurfural	3190626211	13.93
15	21.70	2-Methoxy-4-vinylphenol	29877679	0.13
16	21.86	1,1,3,3-Tetramethyl-1,3-disilaphenalanane	31647754	0.14
17	22.01	Hydroquinone	25922792	0.11
18	22.85	Isosorbide	246034415	1.07
19	24.68	Isovaleraldehyde	157499571	0.69
20	29.27	d-Mannitol, 1,4-anhydro-	1591290748	6.95
21	33.36	n-Hexadecanoic acid	288400768	1.26
22	34.64	1,4-Anhydro-d-galactitol	1074446259	4.69
23	37.03	Oleic Acid	391307891	1.71
24	37.41	9,12-Octadecadienoic acid (Z,Z)-	976673339	4.26

25	37.85	9,12,15-Octadecatrienoic acid, (Z,Z,Z)-	543645711	2.37
26	39.17	Sorbitol	3089864874	13.49
27	43.44	Docosanoic acid	17355904	0.08
28	44.44	Hexadecanoic acid, 2-hydroxy-1-(hydroxymethyl)ethyl ester	234415023	1.02
29	44.74	Benzyl β -D-glucoside	49831876	0.22
30	47.08	Squalene	15847374	0.07
31	47.47	9-Octadecenoic acid (Z)-, 2,3-dihydroxypropyl ester	131660353	0.57
32	47.81	9,12-Octadecadienoic acid (Z,Z)-, 2-hydroxy-1-(hydroxymethyl)ethyl ester	444238555	1.94
33	48.53	9-Octadecenoic acid (Z)-, 2-hydroxyethyl ester	80649759	0.35
34	48.83	9,12-Octadecadienoic acid (Z,Z)-, 2-hydroxy-1-(hydroxymethyl)ethyl ester	88839046	0.39
35	49.96	10-Nonadecanol	468627946	2.05
36	50.77	Phytol, acetate	86244850	0.38
37	51.97	γ -Tocopherol	14901496	0.07
38	52.97	Vitamin E	216054349	0.94
39	55.05	Campesterol	19957556	0.09
40	55.49	Stigmasterol	8281417	0.04
41	56.44	γ -Sitosterol	355675654	1.55
42	58.44	β -Amyrin	24318071	0.11
43	59.96	α -Amyrin	227042589	0.99

44	62.27	3-(1,5-Dimethyl-hexyl)-3a,10,10,12b-tetramethyl-1,2,3,3a,4,6,8,9,10,10a,11,12,12a,12b-tetradecahydro-benzo[4,5]cyclohepta[1,2-E]indene	66218171	0.29
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Table 3B. Results of chromatographic analysis of rowan extract (autumn, 2025)

№	Retention time, min	Compound	Peak area	Percentage content *, %
1	14.32	Sorbic Acid	1937869531	4.58
2	14.51	2,5-Dimethyl-4-hydroxy-3(2H)-furanone	318611600	0.75
3	16.85	Dihydro-3-methylene-5-methyl-2-furanone	4490240724	10.61
4	17.01	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-	284673361	0.67
5	17.13	2H-Pyran-2-one, tetrahydro-6-methyl-	120201380	0.28
6	17.67	Cyclopropyl carbinol	137483492	0.32
7	18.93	Benzofuran, 2,3-dihydro-	33717237	0.08
8	19.10	2(3H)-Furanone, 5-acetyldihydro-	29634807	0.07
9	19.96	Piperidine, 1-nitroso-	8342183	0.02
10	21.44	5-Hydroxymethylfurfural	1555613646	3.67
11	21.70	2-Methoxy-4-vinylphenol	30750076	0.07

12	21.83	1,1,3,3-Tetramethyl-1,3-disilaphenalanane	35951250	0.08
13	22.10	Hydroquinone	31488307	0.07
14	22.96	Isosorbide	602786120	1.42
15	24.72	Isovaleraldehyde	251383835	0.59
16	24.97	Dianhydromannitol	95849594	0.23
17	26.47	Cyclopropanecarboxylic acid,dodecyl ester	113773717	0.27
18	29.61	d-Mannitol, 1,4-anhydro-	4323789102	10.21
19	33.37	n-Hexadecanoic acid	4652158407	10.99
20	34.48	1,4-Anhydro-d-galactitol	7890256729	18.64
21	37.09	Oleic Acid	661364652	1.56
22	37.47	9,12-Octadecadienoic acid (Z,Z)-	1322441413	3.12
23	37.87	9,12,15-Octadecatrienoic acid, (Z,Z,Z)-	344541887	0.81
24	40.94	Sorbitol	9167955236	21.66
25	41.91	1-Eicosanol	116621048	0.28
26	43.46	Docosanoic acid	47299136	0.11
27	44.45	Hexadecanoic acid, 2-hydroxy-1-(hydroxymethyl)ethyl ester	241550986	0.57
28	47.09	Squalene	25616471	0.06
29	47.50	9-Octadecenoic acid (Z)-, 2,3-dihydroxypropyl ester	470693336	1.11
30	47.85	9,12-Octadecadienoic acid (Z,Z)-, 2-hydroxy-1-(hydroxymethyl)ethyl ester	998197941	2.36

31	48.54	9-Octadecenoic acid (Z)-, 2,3-dihydroxypropyl ester	195789558	0.46
32	48.85	9,12-Octadecadienoic acid (Z,Z)-, 2-hydroxy-1-(hydroxymethyl)ethyl ester	313863596	0.74
33	49.97	10-Nonadecanol	708211533	1.67
34	51.97	γ -Tocopherol	23629833	0.06
35	52.99	Vitamin E	61216268	0.14
36	55.12	Campesterol	28047333	0.07
37	56.44	γ -Sitosterol	281885617	0.67
38	58.45	β -Amyrin	19399063	0.05
39	59.96	α -Amyrin	220064940	0.52
40	62.29	3-(1,5-Dimethyl-hexyl)-3a,10,10,12b-tetramethyl-1,2,3,3a,4,6,8,9,10,10a,11,12,12a,12b-tetradecahydro-benzo[4,5]cyclohepta[1,2-E]indene	141122570	0.33

* – percentage content was calculated based on peak area values and represents a relative value.

