

Table S 1. Percentage (mean  $\pm$  SD) of fatty acids, fat, protein and lactose in milk from Polish Holstein-Frisian cows during 1st and 2nd phase of lactation depending on AJ312201.1g.1488C>G (g.1488C>G) Single Nucleotide Polymorphism (SNP) in Acetyl-CoA Carboxylase  $\alpha$  (ACACA) gene.

Fatty acid (%)	ACACA gene polymorphism					
	CC		CG		GG	
	(n = 88)		(n = 50)		(n = 6)	
	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>
C4:0	0.75 $\pm$ 0.32	0.74 $\pm$ 0.25	0.72 $\pm$ 0.30	0.76 $\pm$ 0.26	0.67 $\pm$ 0.13	0.69 $\pm$ 0.17
C6:0	0.89 $\pm$ 0.22	0.92 $\pm$ 0.20	0.90 $\pm$ 0.24	0.93 $\pm$ 0.19	0.94 $\pm$ 0.16	0.92 $\pm$ 0.12
C8:0	0.71 <sup>A</sup> $\pm$ 0.16	0.78 <sup>A</sup> $\pm$ 0.13 $\uparrow$	0.75 $\pm$ 0.17	0.78 $\pm$ 0.13	0.82 $\pm$ 0.17	0.81 $\pm$ 0.07
C10:0	1.80 <sup>A</sup> $\pm$ 0.53	2.28 <sup>A</sup> $\pm$ 0.36 $\uparrow$	1.94 <sup>B</sup> $\pm$ 0.53	2.24 <sup>B</sup> $\pm$ 0.40 $\uparrow$	2.30 $\pm$ 0.59	2.37 $\pm$ 0.32
C12:0	2.12 <sup>A</sup> $\pm$ 0.68	3.15 <sup>A</sup> $\pm$ 0.45 $\uparrow$	2.24 <sup>B</sup> $\pm$ 0.69	3.00 <sup>B</sup> $\pm$ 0.69 $\uparrow$	2.82 $\pm$ 0.76	3.28 $\pm$ 0.47
C13:0	0.12 $\pm$ 0.17	0.11 $\pm$ 0.03	0.13 $\pm$ 0.17	0.12 $\pm$ 0.04	0.16 $\pm$ 0.13	0.14 $\pm$ 0.10
C14:0	7.71 <sup>A</sup> $\pm$ 1.64	11.04 <sup>A</sup> $\pm$ 0.88 $\uparrow$	8.25 <sup>B</sup> $\pm$ 1.61	10.93 <sup>B</sup> $\pm$ 1.08 $\uparrow$	9.27 <sup>C</sup> $\pm$ 1.26	11.38 <sup>C</sup> $\pm$ 0.93 $\uparrow$
C15:0	0.81 <sup>A</sup> $\pm$ 0.24	1.33 <sup>A</sup> $\pm$ 0.20 $\uparrow$	0.87 <sup>B</sup> $\pm$ 0.19	1.34 <sup>B</sup> $\pm$ 0.27 $\uparrow$	1.07 $\pm$ 0.29	1.53 $\pm$ 0.52 $\uparrow$
C16:0	27.48 <sup>A</sup> $\pm$ 2.12	30.64 <sup>A</sup> $\pm$ 2.57 $\uparrow$	28.02 <sup>B</sup> $\pm$ 2.19	30.67 <sup>B</sup> $\pm$ 2.99 $\uparrow$	29.26 $\pm$ 0.96	29.99 $\pm$ 2.60
C17:0	0.69 <sup>A</sup> $\pm$ 0.15	0.57 <sup>A</sup> $\pm$ 0.09 $\downarrow$	0.67 <sup>B</sup> $\pm$ 0.12	0.58 <sup>B</sup> $\pm$ 0.07 $\downarrow$	0.68 $\pm$ 0.10	0.61 $\pm$ 0.11
C18:0	11.75 <sup>A</sup> $\pm$ 1.65	8.40 <sup>A</sup> $\pm$ 1.38 $\downarrow$	11.67 <sup>B</sup> $\pm$ 1.67	8.48 <sup>B</sup> $\pm$ 1.60 $\downarrow$	11.75 <sup>a</sup> $\pm$ 1.54	7.67 <sup>a</sup> $\pm$ 1.92 $\downarrow$
C20:0	0.12 $\pm$ 0.03	0.12 $\pm$ 0.03	0.12 $\pm$ 0.04	0.12 $\pm$ 0.03	0.15 $\pm$ 0.04	0.12 $\pm$ 0.04
C14:1	0.79 <sup>A</sup> $\pm$ 0.26	1.59 <sup>A</sup> $\pm$ 0.32 $\uparrow$	0.84 <sup>B</sup> $\pm$ 0.28	1.54 <sup>B</sup> $\pm$ 0.31 $\uparrow$	0.71 <sup>C</sup> $\pm$ 0.31	1.65 <sup>C</sup> $\pm$ 0.36 $\uparrow$
DI C14	0.09 <sup>A</sup> $\pm$ 0.03	0.13 <sup>A</sup> $\pm$ 0.02 $\uparrow$	0.09 <sup>B</sup> $\pm$ 0.02	0.12 <sup>B</sup> $\pm$ 0.02 $\uparrow$	0.07 <sup>C</sup> $\pm$ 0.03	0.13 <sup>C</sup> $\pm$ 0.03 $\uparrow$
C16:1	4.46 <sup>A</sup> $\pm$ 1.46	5.67 <sup>A</sup> $\pm$ 1.15 $\uparrow$	4.26 <sup>B</sup> $\pm$ 1.38	5.76 <sup>B</sup> $\pm$ 1.35 $\uparrow$	4.15 $\pm$ 1.56	5.59 $\pm$ 1.30
DI C16	0.14 <sup>A</sup> $\pm$ 0.05	0.16 <sup>A</sup> $\pm$ 0.03 $\uparrow$	0.13 <sup>B</sup> $\pm$ 0.04	0.16 <sup>B</sup> $\pm$ 0.03 $\uparrow$	0.12 $\pm$ 0.04	0.16 $\pm$ 0.03
C17:1	0.52 <sup>A</sup> $\pm$ 0.14	0.29 <sup>A</sup> $\pm$ 0.09 $\downarrow$	0.47 <sup>B</sup> $\pm$ 0.14	0.20 <sup>B</sup> $\pm$ 0.09 $\downarrow$	0.43 $\pm$ 0.13	0.30 $\pm$ 0.12 $\downarrow$
C18:1 <i>cis</i> -9	27.81 <sup>A</sup> $\pm$ 4.06	19.21 <sup>A</sup> $\pm$ 2.06 $\downarrow$	29.86 <sup>B</sup> $\pm$ 4.06	19.03 <sup>B</sup> $\pm$ 2.39 $\downarrow$	24.12 $\pm$ 5.27	20.58 $\pm$ 2.58
C18:1 <i>cis</i> -8 ( <i>cis</i> -11)	1.27 <sup>A</sup> $\pm$ 0.20	0.92 <sup>A</sup> $\pm$ 0.21 $\downarrow$	1.26 <sup>B</sup> $\pm$ 0.19	0.98 <sup>B</sup> $\pm$ 0.25 $\downarrow$	1.11 $\pm$ 0.19	1.06 $\pm$ 0.26
DI C18	0.70 $\pm$ 0.04	0.71 $\pm$ 0.04	0.70 $\pm$ 0.04	0.70 $\pm$ 0.04	0.67 $\pm$ 0.04	0.74 $\pm$ 0.04

C18:1 <i>trans</i> -9	0.84 <sup>A</sup> ±0.63	1.08 <sup>A</sup> ±0.31↑	0.80 <sup>B</sup> ±0.57	1.15 <sup>B</sup> ±0.39↑	0.70±0.59	0.92±0.25
C18:1 <i>trans</i> -7 ( <i>trans</i> -11)	1.38 <sup>A</sup> ±0.46	1.22 <sup>A</sup> ±0.24↓	1.47 <sup>B</sup> ±0.60	1.22 <sup>B</sup> ±0.25↓	1.21±0.22	1.34±0.22
other <i>trans</i> 18:1	0.32±0.13	0.32±0.07	0.30±0.06	0.30±0.07	0.26 <sup>a</sup> ±0.05	0.32 <sup>a</sup> ±0.06↑
C18:2 <i>cis</i> -6	2.44 <sup>A</sup> ±0.37	2.11 <sup>A</sup> ±0.36↓	2.43 <sup>B</sup> ±0.37	2.06 <sup>B</sup> ±0.36↓	2.30±0.23	2.19±0.65
CLA	0.41 <sup>A</sup> ±0.09	0.50 <sup>A</sup> ±0.10↑	0.40 <sup>B</sup> ±0.08	0.46 <sup>B</sup> ±0.11↑	0.39±0.13	0.48±0.10
C18:3 $\omega$ 3	0.35 <sup>a</sup> ±0.06	0.32 <sup>a</sup> ±0.09↓	0.34±0.06	0.32±0.08	0.36±0.05	0.31±0.10
C20:1	0.15±0.06	0.15±0.07	0.13±0.06	0.15±0.07	0.12±0.08	0.16±0.07
C20:4 $\omega$ 6	0.15 <sup>A</sup> ±0.04	0.18 <sup>A</sup> ±0.03↑	0.15 <sup>B</sup> ±0.04	0.19 <sup>B</sup> ±0.03↑	0.17±0.04	0.19±0.02
SFA	54.95 <sup>A</sup> ±4.67	60.07 <sup>A</sup> ±3.01↑	56.37 <sup>B</sup> ±4.15	59.94 <sup>B</sup> ±3.50↑	59.85±3.16	59.50±3.52
MUFA	38.89 <sup>A</sup> ±4.27	30.28 <sup>A</sup> ±2.28↓	37.71 <sup>B</sup> ±4.08	30.26 <sup>B</sup> ±2.58↓	34.04±4.21	31.18±2.64
PUFA	3.38 <sup>A</sup> ±0.43	3.08 <sup>A</sup> ±0.48↓	3.36 <sup>B</sup> ±0.40	2.98 <sup>B</sup> ±0.45↓	3.24±0.33	3.16±0.81
UFA	42.28 <sup>A</sup> ±4.29	33.36 <sup>A</sup> ±2.39↓	41.07 <sup>B</sup> ±4.07	33.26 <sup>B</sup> ±2.68↓	37.28±4.52	34.33±3.31
SCFA	1.64±0.50	1.66±0.45	1.62±0.52	1.69±0.44	1.62±0.28	1.61±0.28
MCFA	46.01 <sup>A</sup> ±4.22	56.56 <sup>A</sup> ±3.16↑	47.38 <sup>B</sup> ±4.36	56.37 <sup>B</sup> ±3.92↑	50.52±4.72	56.74±4.50
LCFA	48.23 <sup>A</sup> ±4.67	35.37 <sup>A</sup> ±3.18↓	47.12 <sup>B</sup> ±5.01	35.28 <sup>B</sup> ±3.70↓	43.75±6.93	35.64±4.65
<i>trans</i> FA	2.53±0.66	2.63±0.45	2.58±0.74	2.67±0.51	2.17±0.43	2.58±0.27
DI	0.62 <sup>A</sup> ±0.10	0.35 <sup>A</sup> ±0.03↓	0.59 <sup>B</sup> ±0.09	0.35 <sup>B</sup> ±0.03↓	0.52 <sup>C</sup> ±0.10	0.36 <sup>C</sup> ±0.03↓
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Fat	4.10 <sup>a</sup> ±0.96	3.89 <sup>a</sup> ±0.60↓	4.21±1.01	4.10±0.76	3.65±0.35	3.78±0.81
Protein	3.12 <sup>A</sup> ±0.26	3.74 <sup>A</sup> ±0.32↑	3.14 <sup>B</sup> ±0.23	3.74 <sup>B</sup> ±0.29↑	3.25 <sup>C</sup> ±0.12	3.71 <sup>C</sup> ±0.18↑
Lactose	4.96 <sup>A</sup> ±0.23	4.76 <sup>A</sup> ±0.39↓	4.97 <sup>B</sup> ±0.22	4.82 <sup>B</sup> ±0.25↓	4.95±0.16	4.86±0.16

DI – Index of Desaturation; SFA – Saturated Fatty Acids; MUFA – Monounsaturated Fatty Acids; UFA – Unsaturated Fatty Acids; SCFA – Short Chain Fatty Acids; MCFA – Medium Chain Fatty Acids; LSFA – Long Chain Fatty Acids; n – number of animals; ↑ - indicates higher content of FA in 2nd phase of lactation comparing to 1st phase of lactation; ↓ - indicates lower content of FA in 2nd phase of lactation comparing to 1st phase of lactation; a, b, c, d – values differ significantly between polymorphisms within rows ( $P < 0.05$ ); A, B, C, D – values differ highly significantly between polymorphisms within rows ( $P < 0.01$ ).

Table S 2. Percentage (mean  $\pm$  SD) of fatty acids, fat, protein and lactose in milk from Polish Holstein-Frisian cows during 1st and 2nd phase of lactation depending on A293V Single Nucleotide Polymorphism (SNP) in Stearoyl-CoA Desaturase (*SCD1*) gene.

Fatty acid (%)	<i>SCD1</i> gene polymorphism					
	AA		VA		VV	
	(n = 82)		(n = 57)		(n = 5)	
	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>
C4:0	0.74 $\pm$ 0.33	0.72 $\pm$ 0.26	0.72 $\pm$ 0.27	0.79 $\pm$ 0.22	0.82 $\pm$ 0.38	0.63 $\pm$ 0.33
C6:0	0.89 $\pm$ 0.25	0.90 $\pm$ 0.20	0.89 <sup>a</sup> $\pm$ 0.18	0.97 <sup>a</sup> $\pm$ 0.17 $\uparrow$	0.88 $\pm$ 0.32	0.87 $\pm$ 0.24
C8:0	0.73 $\pm$ 0.16	0.76 $\pm$ 0.12	0.73 <sup>A</sup> $\pm$ 0.16	0.81 <sup>A</sup> $\pm$ 0.12 $\uparrow$	0.65 $\pm$ 0.27	0.76 $\pm$ 0.11
C10:0	1.88 <sup>A</sup> $\pm$ 0.48	2.19 <sup>A</sup> $\pm$ 0.35 $\uparrow$	1.89 <sup>B</sup> $\pm$ 0.60	2.38 <sup>B</sup> $\pm$ 0.38 $\uparrow$	1.54 $\pm$ 0.72	2.26 $\pm$ 0.30
C12:0	2.26 <sup>A</sup> $\pm$ 0.62	3.01 <sup>A</sup> $\pm$ 0.52 $\uparrow$	2.22 <sup>B</sup> $\pm$ 0.79	3.23 <sup>B</sup> $\pm$ 0.50 $\uparrow$	1.78 $\pm$ 0.88	3.23 $\pm$ 0.46
C13:0	0.12 $\pm$ 0.15	0.11 $\pm$ 0.03 $\downarrow$	0.13 $\pm$ 0.19	0.12 $\pm$ 0.04 $\downarrow$	0.08 $\pm$ 0.08	0.16 $\pm$ 0.09
C14:0	8.10 <sup>A</sup> $\pm$ 1.48	11.92 <sup>A</sup> $\pm$ 0.86 $\uparrow$	7.65 <sup>B</sup> $\pm$ 1.82	11.15 <sup>B</sup> $\pm$ 1.08 $\uparrow$	6.93 <sup>a</sup> $\pm$ 1.92	11.06 <sup>a</sup> $\pm$ 0.54 $\uparrow$
C15:0	0.87 <sup>A</sup> $\pm$ 0.22	1.35 <sup>A</sup> $\pm$ 0.19 $\uparrow$	0.80 <sup>B</sup> $\pm$ 0.25	1.32 <sup>B</sup> $\pm$ 0.28 $\uparrow$	0.75 <sup>a</sup> $\pm$ 0.26	1.50 <sup>a</sup> $\pm$ 0.59 $\uparrow$
C16:0	27.79 <sup>A</sup> $\pm$ 2.14	30.80 <sup>A</sup> $\pm$ 2.71 $\uparrow$	27.73 <sup>B</sup> $\pm$ 2.15	30.31 <sup>B</sup> $\pm$ 2.74 $\uparrow$	26.90 <sup>a</sup> $\pm$ 2.05	31.46 <sup>a</sup> $\pm$ 2.48 $\uparrow$
C17:0	0.69 <sup>A</sup> $\pm$ 0.15	0.57 <sup>A</sup> $\pm$ 0.08 $\downarrow$	0.67 <sup>B</sup> $\pm$ 0.12	0.58 <sup>B</sup> $\pm$ 0.07 $\downarrow$	0.80 <sup>a</sup> $\pm$ 0.19	0.56 <sup>a</sup> $\pm$ 0.11 $\downarrow$
C18:0	11.52 <sup>A</sup> $\pm$ 1.55	8.28 <sup>A</sup> $\pm$ 1.38 $\downarrow$	11.89 <sup>B</sup> $\pm$ 1.69	8.64 <sup>B</sup> $\pm$ 1.60 $\downarrow$	13.24 <sup>C</sup> $\pm$ 1.90	7.49 <sup>C</sup> $\pm$ 1.21 $\downarrow$
C20:0	0.12 $\pm$ 0.04	0.12 $\pm$ 0.03	0.12 $\pm$ 0.03	0.12 $\pm$ 0.03	0.13 $\pm$ 0.05	0.10 $\pm$ 0.02
C14:1	0.87 <sup>A</sup> $\pm$ 0.27	1.67 <sup>A</sup> $\pm$ 0.34 $\uparrow$	0.71 <sup>B</sup> $\pm$ 0.24	1.46 <sup>B</sup> $\pm$ 0.24 $\uparrow$	0.69 <sup>a</sup> $\pm$ 0.28	1.47 <sup>a</sup> $\pm$ 0.27 $\uparrow$
DI C14	0.10 <sup>A</sup> $\pm$ 0.02	0.13 <sup>A</sup> $\pm$ 0.02 $\uparrow$	0.08 <sup>B</sup> $\pm$ 0.02	0.12 <sup>B</sup> $\pm$ 0.02 $\uparrow$	0.09 <sup>a</sup> $\pm$ 0.02	0.12 <sup>a</sup> $\pm$ 0.02 $\uparrow$
C16:1	4.27 <sup>A</sup> $\pm$ 1.42	5.63 <sup>A</sup> $\pm$ 1.20 $\uparrow$	4.55 <sup>B</sup> $\pm$ 1.46	5.65 <sup>B</sup> $\pm$ 1.25 $\uparrow$	4.24 <sup>C</sup> $\pm$ 1.39	6.75 <sup>C</sup> $\pm$ 0.92 $\uparrow$
DI C16	0.13 <sup>A</sup> $\pm$ 0.04	0.15 <sup>A</sup> $\pm$ 0.03 $\uparrow$	0.14 <sup>a</sup> $\pm$ 0.04	0.16 <sup>a</sup> $\pm$ 0.03 $\uparrow$	0.14 <sup>b</sup> $\pm$ 0.05	0.18 <sup>b</sup> $\pm$ 0.02 $\uparrow$
C17:1	0.49 <sup>A</sup> $\pm$ 0.13	0.28 <sup>A</sup> $\pm$ 0.09 $\downarrow$	0.49 <sup>B</sup> $\pm$ 0.16	0.30 <sup>B</sup> $\pm$ 0.09 $\downarrow$	0.57 <sup>a</sup> $\pm$ 0.09	0.32 <sup>a</sup> $\pm$ 0.07 $\downarrow$
C18:1 <i>cis</i> -9	27.26 <sup>A</sup> $\pm$ 3.92	19.38 <sup>A</sup> $\pm$ 2.25 $\downarrow$	27.28 <sup>B</sup> $\pm$ 4.59	19.02 <sup>B</sup> $\pm$ 2.10 $\downarrow$	26.87 <sup>C</sup> $\pm$ 2.97	17.67 <sup>C</sup> $\pm$ 1.71 $\downarrow$
C18:1 <i>cis</i> -8 ( <i>cis</i> -11)	1.27 <sup>A</sup> $\pm$ 0.19	0.96 <sup>A</sup> $\pm$ 0.23 $\downarrow$	1.26 <sup>B</sup> $\pm$ 0.22	0.94 <sup>B</sup> $\pm$ 0.23 $\downarrow$	1.22 <sup>a</sup> $\pm$ 0.11	0.87 <sup>a</sup> $\pm$ 0.22 $\downarrow$
DI C18	0.70 $\pm$ 0.04	0.71 $\pm$ 0.04	0.69 $\pm$ 0.04	0.70 $\pm$ 0.04	0.69 $\pm$ 0.03	0.71 $\pm$ 0.02
C18:1 <i>trans</i> -9	0.80 <sup>A</sup> $\pm$ 0.62	1.07 <sup>A</sup> $\pm$ 0.32 $\uparrow$	0.86 <sup>B</sup> $\pm$ 0.58	1.13 <sup>B</sup> $\pm$ 0.36 $\uparrow$	0.70 $\pm$ 0.70	1.26 $\pm$ 0.29

C18:1 <i>trans</i> -7 ( <i>trans</i> -11)	1.48 <sup>A</sup> ±0.59	1.23 <sup>A</sup> ±0.24↓	1.28±0.36	1.22±0.25↓	1.59 <sup>B</sup> ±0.14	1.14 <sup>B</sup> ±0.15↓
other <i>trans</i> 18:1	0.30 <sup>a</sup> ±0.08	0.33 <sup>a</sup> ±0.08↑	0.30±0.09	0.30±0.06	0.52±0.41	0.28±0.07
C18:2 <i>cis</i> -6	2.48 <sup>A</sup> ±0.38	2.15 <sup>A</sup> ±0.39↓	2.36 <sup>B</sup> ±0.36	2.05 <sup>B</sup> ±0.34↓	2.41 <sup>a</sup> ±0.24	1.78 <sup>a</sup> ±0.16↓
CLA	0.41 <sup>A</sup> ±0.09	0.48 <sup>A</sup> ±0.11↑	2.36 <sup>B</sup> ±0.36	2.06 <sup>B</sup> ±0.34↓	0.42±0.07	0.46±0.06
C18:3 $\omega$ 3	0.35±0.06	0.33±0.10	0.34 <sup>a</sup> ±0.06	0.31 <sup>a</sup> ±0.06↓	0.36 <sup>b</sup> ±0.09	0.27 <sup>b</sup> ±0.05↓
C20:1	0.15±0.06	0.15±0.07	0.14±0.06	0.16±0.07	0.11±0.09	0.14±0.07
C20:4 $\omega$ 6	0.15 <sup>A</sup> ±0.04	0.19 <sup>A</sup> ±0.03↑	0.15 <sup>B</sup> ±0.04	0.18 <sup>B</sup> ±0.03↑	0.12±0.05	0.17±0.05
SFA	55.73 <sup>A</sup> ±4.38	59.71 <sup>A</sup> ±3.21↑	55.63 <sup>B</sup> ±4.84	60.41 <sup>B</sup> ±3.21↑	54.49±4.72	60.07±2.24
MUFA	38.24 <sup>A</sup> ±4.09	30.55 <sup>A</sup> ±2.46↓	38.21 <sup>B</sup> ±4.69	30.02 <sup>B</sup> ±2.34↓	39.75 <sup>C</sup> ±3.43	29.71 <sup>C</sup> ±1.44↓
PUFA	3.43 <sup>A</sup> ±0.42	3.12 <sup>A</sup> ±0.52↓	3.28 <sup>B</sup> ±0.40	2.99 <sup>B</sup> ±0.42↓	3.37 <sup>C</sup> ±0.32	2.63 <sup>C</sup> ±0.18↓
UFA	41.67 <sup>A</sup> ±4.15	33.67 <sup>A</sup> ±2.63↓	41.49 <sup>B</sup> ±4.70	33.01 <sup>B</sup> ±2.40↓	43.12 <sup>a</sup> ±3.37	32.34 <sup>a</sup> ±1.32↓
SCFA	1.64±0.55	1.62±0.46	1.61±0.39	1.76±0.38	1.69±0.68	1.49±0.57
MCFA	46.91 <sup>A</sup> ±4.11	56.43 <sup>A</sup> ±3.33↑	46.60 <sup>B</sup> ±4.68	56.42 <sup>B</sup> ±3.71↑	43.56 <sup>C</sup> ±4.88	58.66 <sup>C</sup> ±2.73↑
LCFA	47.51 <sup>A</sup> ±4.56	35.49 <sup>A</sup> ±3.30↓	47.57 <sup>B</sup> ±5.49	35.41 <sup>B</sup> ±3.53↓	51.02 <sup>C</sup> ±4.24	32.41 <sup>C</sup> ±3.18↓
<i>trans</i> FA	2.58±0.73	2.64±0.45	2.44 <sup>a</sup> ±0.60	2.65 <sup>a</sup> ±0.50↑	2.67±0.70	2.62±0.38
DI	0.61 <sup>A</sup> ±0.10	0.35 <sup>A</sup> ±0.03↓	0.61 <sup>B</sup> ±0.11	0.34 <sup>B</sup> ±0.03↓	0.64 <sup>C</sup> ±0.09	0.34 <sup>C</sup> ±0.01↓
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Fat	4.01±1.03	3.93±0.72	4.30 <sup>a</sup> ±0.88	4.02 <sup>a</sup> ±0.62↓	3.95±0.74	3.83±0.37
Protein	3.11 <sup>A</sup> ±0.26	3.72 <sup>A</sup> ±0.32↑	3.15 <sup>B</sup> ±0.24	3.76±0.29↑	3.13 <sup>C</sup> ±0.17	3.71 <sup>C</sup> ±0.16↑
Lactose	4.96 <sup>A</sup> ±0.24	4.81 <sup>A</sup> ±0.30↓	4.97 <sup>B</sup> ±0.20	4.75 <sup>B</sup> ±0.39↓	4.99±0.13	4.70±0.26

DI – Index of Desaturation; SFA – Saturated Fatty Acids; MUFA – Monounsaturated Fatty Acids; UFA – Unsaturated Fatty Acids; SCFA – Short Chain Fatty Acids; MCFA – Medium Chain Fatty Acids; LSFA – Long Chain Fatty Acids; n – number of animals; ↑ - indicates higher content of FA in 2nd phase of lactation comparing to 1st phase of lactation; ↓ - indicates lower content of FA in 2nd phase of lactation comparing to 1st phase of lactation; a, b, c, d – values differ significantly between polymorphisms within rows ( $P < 0.05$ ); A, B, C, D – values differ highly significantly between polymorphisms within rows ( $P < 0.01$ ).

Table S 3. Percentage (mean  $\pm$  SD) of fatty acids, fat, protein and lactose in milk from Polish Holstein-Frisian cows during 1st and 2nd phase of lactation depending on K232A Single Nucleotide Polymorphism (SNP) in Diglyceride Acyltransferase (*DGAT1*) gene.

Fatty acid (%)	<i>DGAT1</i> gene polymorphism					
	AA		KA		KK	
	(n = 73)		(n = 61)		(n = 10)	
	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>
C4:0	0.74 $\pm$ 0.32	0.73 $\pm$ 0.24	0.76 $\pm$ 0.27	0.74 $\pm$ 0.26	0.56 <sup>a</sup> $\pm$ 0.33	0.86 <sup>a</sup> $\pm$ 0.23 $\uparrow$
C6:0	0.86 $\pm$ 0.23	0.90 $\pm$ 0.18	0.94 $\pm$ 0.23	0.93 $\pm$ 0.20	0.80 <sup>a</sup> $\pm$ 0.15	1.06 <sup>a</sup> $\pm$ 0.18 $\uparrow$
C8:0	0.70 <sup>A</sup> $\pm$ 0.16	0.77 <sup>A</sup> $\pm$ 0.11 $\uparrow$	0.76 $\pm$ 0.17	0.79 $\pm$ 0.13	0.73 <sup>a</sup> $\pm$ 0.11	0.88 <sup>a</sup> $\pm$ 0.12 $\uparrow$
C10:0	1.81 <sup>A</sup> $\pm$ 0.52	2.25 <sup>A</sup> $\pm$ 0.36 $\uparrow$	1.92 <sup>B</sup> $\pm$ 0.56	2.26 <sup>B</sup> $\pm$ 0.39 $\uparrow$	1.98 <sup>a</sup> $\pm$ 0.48	2.46 <sup>a</sup> $\pm$ 0.35 $\uparrow$
C12:0	2.15 <sup>A</sup> $\pm$ 0.67	3.07 <sup>A</sup> $\pm$ 0.61 $\uparrow$	2.29 <sup>B</sup> $\pm$ 0.74	3.10 <sup>B</sup> $\pm$ 0.49 $\uparrow$	2.41 <sup>c</sup> $\pm$ 0.65	3.35 <sup>c</sup> $\pm$ 0.38 $\uparrow$
C13:0	0.13 $\pm$ 0.17	0.12 $\pm$ 0.05	0.12 $\pm$ 0.17	0.11 $\pm$ 0.03	0.08 $\pm$ 0.06	0.11 $\pm$ 0.03
C14:0	7.79 <sup>A</sup> $\pm$ 1.51	11.20 <sup>A</sup> $\pm$ 0.99 $\uparrow$	8.14 <sup>B</sup> $\pm$ 1.84	10.85 <sup>B</sup> $\pm$ 0.91 $\uparrow$	8.16 <sup>c</sup> $\pm$ 1.31	10.60 <sup>c</sup> $\pm$ 0.64 $\uparrow$
C15:0	0.84 <sup>A</sup> $\pm$ 0.22	1.37 <sup>A</sup> $\pm$ 0.29 $\uparrow$	0.83 <sup>B</sup> $\pm$ 0.21	1.32 <sup>B</sup> $\pm$ 0.19 $\uparrow$	0.89 <sup>a</sup> $\pm$ 0.38	1.24 <sup>a</sup> $\pm$ 0.21 $\uparrow$
C16:0	27.22 <sup>A</sup> $\pm$ 1.85	30.22 <sup>A</sup> $\pm$ 2.79 $\uparrow$	28.29 <sup>B</sup> $\pm$ 2.27	31.10 <sup>B</sup> $\pm$ 2.59 $\uparrow$	28.15 $\pm$ 2.54	30.66 $\pm$ 2.66 $\uparrow$
C17:0	0.69 <sup>A</sup> $\pm$ 0.12	0.59 <sup>A</sup> $\pm$ 0.07 $\downarrow$	0.67 <sup>B</sup> $\pm$ 0.12	0.55 <sup>B</sup> $\pm$ 0.09 $\downarrow$	0.73 $\pm$ 0.33	0.58 $\pm$ 0.06
C18:0	11.88 <sup>A</sup> $\pm$ 1.71	8.54 <sup>A</sup> $\pm$ 1.63 $\downarrow$	11.70 <sup>B</sup> $\pm$ 1.57	8.23 <sup>B</sup> $\pm$ 1.30 $\downarrow$	10.70 <sup>c</sup> $\pm$ 1.32	8.31 <sup>c</sup> $\pm$ 1.35 $\downarrow$
C20:0	0.13 $\pm$ 0.03	0.12 $\pm$ 0.03	0.12 $\pm$ 0.04	0.12 $\pm$ 0.02	0.12 $\pm$ 0.04	0.12 $\pm$ 0.03
C14:1	0.76 <sup>A</sup> $\pm$ 0.27	1.57 <sup>A</sup> $\pm$ 0.36 $\uparrow$	0.87 <sup>B</sup> $\pm$ 0.26	1.60 <sup>B</sup> $\pm$ 0.28 $\uparrow$	0.73 <sup>c</sup> $\pm$ 0.19	1.49 <sup>c</sup> $\pm$ 0.18 $\uparrow$
DI C14	0.09 <sup>A</sup> $\pm$ 0.03	0.12 <sup>A</sup> $\pm$ 0.02 $\uparrow$	0.10 <sup>B</sup> $\pm$ 0.02	0.13 <sup>B</sup> $\pm$ 0.02 $\uparrow$	0.08 <sup>c</sup> $\pm$ 0.02	0.12 <sup>c</sup> $\pm$ 0.01 $\uparrow$
C16:1	4.59 <sup>A</sup> $\pm$ 1.44	5.47 <sup>A</sup> $\pm$ 1.22 $\uparrow$	3.99 <sup>B</sup> $\pm$ 1.28	5.88 <sup>B</sup> $\pm$ 1.22 $\uparrow$	5.26 $\pm$ 1.68	5.90 $\pm$ 1.13
DI C16	0.14 $\pm$ 0.04	0.15 $\pm$ 0.03	0.12 <sup>A</sup> $\pm$ 0.04	0.16 <sup>A</sup> $\pm$ 0.03 $\uparrow$	0.16 $\pm$ 0.05	0.16 $\pm$ 0.03
C17:1	0.50 <sup>A</sup> $\pm$ 0.14	0.29 <sup>A</sup> $\pm$ 0.09 $\downarrow$	0.50 <sup>B</sup> $\pm$ 0.15	0.30 <sup>B</sup> $\pm$ 0.09 $\downarrow$	0.45 <sup>c</sup> $\pm$ 0.12	0.27 <sup>c</sup> $\pm$ 0.08 $\downarrow$
C18:1 <i>cis</i> -9	22.38 <sup>A</sup> $\pm$ 4.05	19.36 <sup>A</sup> $\pm$ 2.19 $\downarrow$	22.43 <sup>B</sup> $\pm$ 4.18	19.05 <sup>B</sup> $\pm$ 2.25 $\downarrow$	26.28 <sup>c</sup> $\pm$ 5.07	18.66 <sup>c</sup> $\pm$ 1.94 $\downarrow$
C18:1 <i>cis</i> -8 ( <i>cis</i> -11)	1.27 <sup>A</sup> $\pm$ 0.20	0.99 <sup>A</sup> $\pm$ 0.25 $\downarrow$	1.27 <sup>B</sup> $\pm$ 0.20	0.92 <sup>B</sup> $\pm$ 0.20 $\downarrow$	1.13 <sup>c</sup> $\pm$ 0.17	0.78 <sup>c</sup> $\pm$ 0.14 $\downarrow$
DI C18	0.70 $\pm$ 0.04	0.71 $\pm$ 0.04	0.70 $\pm$ 0.04	0.71 $\pm$ 0.04	0.71 $\pm$ 0.04	0.70 $\pm$ 0.03
C18:1 <i>trans</i> -9	0.92 <sup>a</sup> $\pm$ 0.63	1.09 <sup>a</sup> $\pm$ 0.36 $\uparrow$	0.67 <sup>A</sup> $\pm$ 0.52	1.11 <sup>A</sup> $\pm$ 0.32 $\uparrow$	1.08 $\pm$ 0.72	1.14 $\pm$ 0.35

C18:1 <i>trans</i> -7 ( <i>trans</i> -11)	1.45 <sup>a</sup> ±0.62	1.27 <sup>a</sup> ±0.25↓	1.40 <sup>A</sup> ±0.35	1.10 <sup>A</sup> ±0.23↓	1.10±0.23	1.17±0.16
other <i>trans</i> 18:1	0.31±0.13	0.31±0.07	0.31±0.09	0.33±0.07	0.28±0.08	0.29±0.05
C18:2 <i>cis</i> -6	2.42 <sup>A</sup> ±0.38	2.18 <sup>A</sup> ±0.37↓	2.49 <sup>B</sup> ±0.34	2.01 <sup>B</sup> ±0.37↓	2.12±0.27	2.00±0.31
CLA	0.41 <sup>A</sup> ±0.10	0.48 <sup>A</sup> ±0.10↑	0.42 <sup>B</sup> ±0.08	0.48 <sup>B</sup> ±0.12↑	0.35 <sup>C</sup> ±0.05	0.48 <sup>C</sup> ±0.09↑
C18:3 $\omega$ 3	0.35±0.06	0.35±0.09	0.34 <sup>A</sup> ±0.06	0.30 <sup>A</sup> ±0.07↓	0.31±0.07	0.28±0.07
C20:1	0.14±0.06	0.14±0.07	0.16±0.06	0.16±0.06	0.12±0.06	0.15±0.06
C20:4 $\omega$ 6	0.15 <sup>A</sup> ±0.04	0.19 <sup>A</sup> ±0.03↑	0.15 <sup>B</sup> ±0.04	0.18 <sup>B</sup> ±0.03↑	0.16±0.04	0.18±0.02
SFA	54.95 <sup>A</sup> ±4.28	59.88 <sup>A</sup> ±3.09↑	56.54 <sup>B</sup> ±4.82	60.11 <sup>B</sup> ±3.35↑	55.32 <sup>a</sup> ±4.27	60.21 <sup>a</sup> ±3.12↑
MUFA	38.63 <sup>A</sup> ±4.16	30.34 <sup>A</sup> ±2.31↓	37.95 <sup>B</sup> ±4.48	30.38 <sup>B</sup> ±2.57↓	37.75 <sup>C</sup> ±4.44	29.69 <sup>C</sup> ±2.20↓
PUFA	3.37 <sup>A</sup> ±0.42	3.16 <sup>A</sup> ±0.49↓	3.48 <sup>B</sup> ±0.39	2.94 <sup>B</sup> ±0.47↓	2.97±0.33	2.93±0.42↓
UFA	42.00 <sup>A</sup> ±4.26	33.50 <sup>A</sup> ±2.47↓	41.38 <sup>B</sup> ±4.43	33.32 <sup>B</sup> ±2.61↓	40.71 <sup>C</sup> ±4.40	32.62 <sup>C</sup> ±2.43↓
SCFA	1.60±0.52	1.63±0.42	1.71±0.47	1.67±0.46	1.36 <sup>a</sup> ±0.44	1.91 <sup>a</sup> ±0.41↑
MCFA	45.99 <sup>A</sup> ±3.85	56.04 <sup>A</sup> ±3.50↑	47.20 <sup>B</sup> ±4.85	57.03 <sup>B</sup> ±3.37↑	48.39 <sup>C</sup> ±4.49	56.68 <sup>C</sup> ±3.76↑
LCFA	48.01 <sup>A</sup> ±4.64	35.86 <sup>A</sup> ±3.49↓	47.67 <sup>B</sup> ±5.17	34.00 <sup>B</sup> ±3.25↓	44.95 <sup>C</sup> ±5.43	34.39 <sup>C</sup> ±3.51↓
<i>trans</i> FA	2.66±0.76	2.67±0.52	2.39 <sup>A</sup> ±0.55	2.62 <sup>A</sup> ±0.41↑	2.45±0.66	2.59±0.39
DI	0.62 <sup>A</sup> ±0.10	0.35 <sup>A</sup> ±0.03↓	0.60 <sup>B</sup> ±0.10	0.35 <sup>B</sup> ±0.03↓	0.60 <sup>C</sup> ±0.11	0.34 <sup>C</sup> ±0.02↓
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Fat	4.03 <sup>a</sup> ±1.00	3.77 <sup>a</sup> ±0.62↓	4.15±0.92	4.14±0.63	4.63±0.92	4.26±0.90
Protein	3.11 <sup>A</sup> ±0.27	3.67 <sup>A</sup> ±0.30↑	3.14 <sup>B</sup> ±0.22	3.78 <sup>B</sup> ±0.27↑	3.20 <sup>C</sup> ±0.22	3.96 <sup>C</sup> ±0.39↑
Lactose	4.96 <sup>A</sup> ±0.21	4.78 <sup>A</sup> ±0.34↓	4.98 <sup>B</sup> ±0.24	4.80 <sup>B</sup> ±0.32↓	4.91±0.24	4.74±0.45

DI – Index of Desaturation; SFA – Saturated Fatty Acids; MUFA – Monounsaturated Fatty Acids; UFA – Unsaturated Fatty Acids; SCFA – Short Chain Fatty Acids; MCFA – Medium Chain Fatty Acids; LSFA – Long Chain Fatty Acids; n – number of animals; ↑ - indicates higher content of FA in 2nd phase of lactation comparing to 1st phase of lactation; ↓ - indicates lower content of FA in 2nd phase of lactation comparing to 1st phase of lactation; a, b, c, d – values differ significantly between polymorphisms within rows ( $P < 0.05$ ); A, B, C, D – values differ highly significantly between polymorphisms within rows ( $P < 0.01$ ).