

Table 1. Studies published since 2013 investigating the effect of proportion of palmitic acid at sn-2 position on outcomes in human infants.

Subjects	Design	Intervention	Timing and duration of intervention	Outcomes	Conclusions and comments	Reference
Term Chinese infants (n=171)	Multi-centre, randomized, double-blind, controlled study plus non-randomized human milk-fed group	sn-2 palmitate: 43% of PA at sn-2 position (n=57) Control: 13% of PA at sn-2 position (n=57) Breast-fed group as comparator (n=57)	Started \leq 14 days of birth, supplemented for 6 weeks	<ul style="list-style-type: none"> • Stool dry weight lower for sn-2 palmitate vs control group (4.25 g vs 7.28 g). • Stool fat content lower for sn-2 palmitate vs control group (0.8 g vs 1.2 g). • Stool PA, representing ~50% of the saponified fatty acids, lower for sn-2 palmitate vs control group (0.3 g vs 0.7 g). 	<p>Infants consuming high sn-2 palmitate formula compared with lower sn-2 palmitate formula had reduced calcium-saponified fat excretion.</p> <p>Breast-fed infants had a significantly lower stool dry weight, fat content, and saponified fat excretion compared with both formula-fed infant groups.</p>	Bar-Yoseph <i>et al.</i> [14]

Israeli infants (n=83)	Single-centre, randomized, double-blind, controlled study plus non-randomized human milk fed group	sn-2 palmitate: High sn-2 palmitate formula (43% of PA at sn-2 position) (n=30) Control: Low sn-2 palmitate formula (14% of PA at sn-2 position) (n=30) Breast-fed group as comparator (n=25)	Started \leq 14 days of birth, supplemented for 12 weeks	<ul style="list-style-type: none"> Mean bone speed of sound, used to assess bone strength, was higher in sn-2 palmitate group vs control group ($2,896 \pm 133$ vs. $2,825 \pm 79$ m/s), and comparable with breast-fed group ($2,875 \pm 85$ m/s). 	Infants consuming high sn-2 palmitate formula had changes in bone speed of sound that were comparable to those of infants consuming breast milk and favourable compared to infants consuming low sn-2 palmitate formula.	Litmanovitz <i>et al.</i> [15]
Israeli infants (n=83)	Single-centre, randomized, double-blind, placebo-controlled study plus non-randomized human milk-fed group	sn-2 palmitate: High sn-2 palmitate formula (43% of PA at sn-2 position) (n=21) Control: Low sn-2 palmitate formula (14% of PA at sn-2 position) (n=21) Breast-fed group as	Started \leq 14 days of birth, supplemented for 12 weeks	<ul style="list-style-type: none"> No differences in stool frequency or consistency for sn-2 palmitate and control groups at 6 and 12 weeks. Both formula groups showed lower stool frequency and harder stool consistency than for breast-fed infants. At 12 weeks fewer infants in the sn-2 palmitate group had hard stools (0% vs 24%). 	Infants consuming high sn-2 palmitate formula had reduced crying duration and frequency, primarily during the afternoon and evening hours, comparable to those of infants consuming breast milk. Both formula groups showed lower stool	Litmanovitz <i>et al.</i> [16]

		comparator (n=21)		<ul style="list-style-type: none"> Percentage of crying infants in control group higher than in sn-2 palmitate and breast fed groups during the evening at 6 weeks (88.2% vs. 56.3% and 55.6%) and afternoon at 12 weeks (91.7% vs. 50.0% and 40%). 	frequency and harder stool consistency than seen for the breast fed infants.	
Term Taiwanese infants (n=165)	Multi-centre, double-blind, randomized, controlled trial plus non-randomized human milk-fed group	sn-2 palmitate: High sn-2 palmitate formula (39% of PA at sn-2) (n=56) sn-2 palmitate+OF: High sn-2 palmitate formula plus 3 g/L OF (39% of PA at sn-2) (n=56) Control: Low sn-2 palmitate (13% of PA at sn-2) (n=56) HM - human milk-fed group (n=55)	Started 25-45 days old supplemented for 28 days	<ul style="list-style-type: none"> sn-2 palmitate groups had lower stool palmitate soaps than control group. sn-2 palmitate+OF group had lower stool palmitate soaps than control and sn-2 palmitate groups. Stool total soaps and calcium were lower sn-2 palmitate+OF group than in control and sn-2 palmitate groups. HM-fed group had lower stool palmitate soaps, total soaps and calcium vs all formula-fed groups. 	Increasing sn-2 palmitate in infant formula reduces stool palmitate soaps. A combination of high sn-2 palmitate and the prebiotic oligofructose reduces stool palmitate soaps, total soaps and calcium, while promoting softer stools. Human milk-fed group had lower stool palmitate soaps, total soaps and calcium than all formula	Nowacki <i>et al.</i> [17]

				<ul style="list-style-type: none"> • Stool consistency score of sn-2+OF group lower than control and sn-2, but higher than the HM-fed group. • No difference in parental reported gastrointestinal tolerance. 		
Term Filipino infants (n=300)	Double-blind, randomized, controlled trial plus non-randomized human milk-fed group	sn-2 palmitate: High sn-2 palmitate formula (36% of PA at sn-2) (n=74) sn-2 palmitate+3 g/L OF: High sn-2 palmitate formula (36% of PA at sn-2) plus 3 g/L OF (n=76) sn-2 palmitate+5 g/L OF: High sn-2 palmitate (36% of PA at sn-2) formula plus 5 g/L OF	Started 7-14 days old supplemented for 8 weeks	<ul style="list-style-type: none"> • sn-2 vs control group had 46% less stool soap palmitate. • sn-2 vs control group had softer stools and fewer formed stools. • sn-2 OF groups had fewer formed stools versus control and sn-2 group. • sn-2 and sn-2 with OF groups had significantly higher fecal bifidobacteria concentrations than control at week 8, not differing from HM-fed infants. 	High sn-2 palmitate formulas led to lower stool soaps, softer stools, and increased bifidobacteria compared with the control low sn-2-palmitate formula. High sn-2 palmitate formula may promote a healthier gut microbiota compared with low sn-2 palmitate formula.	Yao <i>et al.</i> [18]

		(n=75)				
		Control: Low sn-2 palmitate formula (12% of PA at sn-2) (n=75)				
		HM: human milk-fed group (n=75)				
Term Israeli infants (n=36)	Two-centre, double-blind, randomized, controlled trial plus non- randomized human milk- fed group	Sn-2 palmitate: High sn-2-palmitate formula (44% of PA at sn-2 position) (n=14) Control: Low sn-2- palmitate formula (14% of PA at sn-2 position) (n=8) BF: Breast-fed group as comparator (n=14)	Started ≤ 7 days old supplemented for 6 weeks	<ul style="list-style-type: none"> • sn-2 palmitate and BF groups had higher Lactobacillus and bifidobacteria counts than control group. • Lactobacillus counts at 6 weeks were not significantly different between the sn-2 palmitate and BF groups. 	High sn-2 palmitate formula beneficially affected infant gut microbiota by increasing the Lactobacillus and bifidobacteria counts in fecal stools	Yaron <i>et al.</i> [19]

BF, breast fed; HM, human milk; OF, oligofructose; PA, palmitic acid