Table S1. Band assignments for IR spectra of phospholipids; δ: bending vibration; δ_w: wagging bending; δ_r: rocking bending; v_s: symmetric stretching vibration; v_{as}: asymmetric stretching vibration. The assignments were done in agreement with Refs. [1-5]. Bold character indicates spectrum features that are distinctive of a single phospholipid among the examined ones.

Assignments	**PE peaks (cm^{-1})**	**PC peaks (cm^{-1})**	**PI peaks (cm^{-1})**	**PS peaks (cm^{-1})**
$\boldsymbol{v}_{as}$ (C−H), $\boldsymbol{v}$ (O−H)	-	3419	3370	3442
	-	3242	-	-
$\boldsymbol{v}$ (H−C=)	3005	3010	3012	3010
$\boldsymbol{v}_{as}$ (C−H_3)	-	-	2957	2959
$\boldsymbol{v}_{as}$ (C−H_2)	2924	2924	2923	2923
$\boldsymbol{v}_{s}$ (C−H_2)	2854	2854	2853	2853
$\boldsymbol{v}$ (C=O)	1740	1737	1733	1739
$\boldsymbol{v}$ (C= C), $\boldsymbol{v}$ (C=O) $\boldsymbol{v}$ (C−N)	1642	**1653**	1646	1646
δ (N−H)	1541	-	-	**1523**
δ (C−H_2), δ (C−H_3)	1465	1467	1467	1464
δ (O−H), δ (C−H)	-	-	-	**1417**
δ (C−H_3)	1377	1377	1378	1377
δ_w (C−H_2)	-	-	-	**1316**
$\boldsymbol{v_{as}}$ $(\boldsymbol{PO_2^-})$	-	-	-	1260
	1226	**1234**	**1212**	1222
$\boldsymbol{v}$ (C−O), $\boldsymbol{v_s}$(C−C−O)	1175	1173	**1148**	1170
$\boldsymbol{v_s}$ $(\boldsymbol{PO_2^-})$	1073	1088	**1103**	-
$\boldsymbol{v_{as}}$ (C−C−O), $\boldsymbol{v}$ (C−O−H)	-	1065	1062	-
$\boldsymbol{v}$ (C−O−P)	1032	-	1040	1035
δr (C−H)	-	-	**1007**	-
$\boldsymbol{v_{as}}$ ($N^+(CH_3)_3$), δ (C = C)	-	971	**944**	-
$\boldsymbol{v_s}$ ($N^+(CH_3)_3$), δ (C = C), δ (C−H)	**912**	928	895	-
δ (C− H), δ (C = C),	-	875	865	-
$\boldsymbol{v}$ (P−O)	824	830	**814**	-
δ (C = C), δ (C− H),	-	770	760	800
$\boldsymbol{\delta}_r$ (C−H)	723	722	720	721

Table S2. Band assignments for IR spectra of sphingolipids; δ: symmetric bending vibration; δ_w: wagging bending; δ_r: rocking bending; ν_s: symmetric stretching vibration; ν_{as}: asymmetric stretching vibration. The assignments were done in agreement with Refs. [1-5]. Bold character indicates spectrum features that are distinctive of a single sphingolipid among the examined ones.

Assignments	**CER peaks (cm^{-1})**	**SM peaks (cm^{-1})**	**C 1 P peaks (cm^{-1})**	**S 1 P peaks (cm^{-1})**
$\boldsymbol{\nu}$ (O–H), $\boldsymbol{\nu}$ (C–H)	-	-	3394	3438
	3292	3280	3294	-
$\boldsymbol{\nu}_{as}$ ($C–H_3$)	2956	2957	2957	
$\boldsymbol{\nu}_{as}$ ($C–H_2$)	2916	2917	2917	2919
$\boldsymbol{\nu}_{s}$ ($C–H_2$)	2849	2850	2849	2850
$\boldsymbol{\nu}$ (C=O) (AMIDE I)	1636	1642	1645	1636
$\boldsymbol{\delta}$ (N–H) (AMIDE II)	1548	1549	1550	1544
$\boldsymbol{\delta}$ ($C–H_2$), $\boldsymbol{\delta}$ ($C–H_3$)	1467	1468	1467	1464
$\boldsymbol{\delta}$ (O–H)	-	-	**1402**	**1411**
$\boldsymbol{\delta}$ ($C–H_2$), $\boldsymbol{\delta}$ ($C–H_3$)	1378	1378	1377	**1340**
$\boldsymbol{\nu}$ (C–N)	**1283**	-	**1291**	-
$\boldsymbol{\nu}_{as}$ ($\boldsymbol{PO_2^-}$)		**1225**	1261	**1253**
$\boldsymbol{\nu}$ (C–O), $\boldsymbol{\nu_s}$(C–C–O)	1147 1131	1137	-	**1189**
$\boldsymbol{\nu}_{s}$ ($\boldsymbol{PO_2^-}$)	1094	1087	1087	1092
$\boldsymbol{\nu_{as}}$ (C–C–O), $\boldsymbol{\nu}$ (C–O–H) $\boldsymbol{\nu}$ (C–O–P–O–C)	1068	1059	-	1068
$\boldsymbol{\nu}$ (C–O–P), $\boldsymbol{\nu}$ (C–O)	1038	-	**1018**	1035
$\boldsymbol{\nu}$ (C–O)	-	-	**997**	-
$\boldsymbol{\nu}_{as}$ ($N^+(CH_3)_3$), $\boldsymbol{\delta}$ (C=C)	972	968	963	966
$\boldsymbol{\nu_s}$ ($N^+(CH_3)_3$), δ (C = C), δ (C–H)	925	922	-	929
$\boldsymbol{\delta}$ (C–H), $\boldsymbol{\delta}$ (C=C),	898	875	866	864
	-	-	-	848
	-	835	-	834
	-	-	801	803
	-	-	-	776
	-	762	-	755
$\boldsymbol{\delta}_r$ (C–H)	721	721	721	721

Table S3. Band assignments for IR spectrum of cholesterol; δ: symmetric bending vibration; v_s: symmetric stretching vibration; v_{as}: asymmetric stretching vibration, δ_w: wagging bending. The assignments were done in agreement with [1-6].

Assignments	**Cholesterol peaks (cm^{-1})**
v(O−H), v(C−H)	3038
v_{as}(C−H_2), v_{as}(C−H_3)	2933
v_s(C−H_2)	2902
	2867
v_s(C−H_2), v_s(C−H_3)	2850
v_s (C=C), v_s (C=O)	1674
vδ (C−H_2), δ (C−H_3)	1464 1378 1365
δ (C−H_2)	1331 1218
v_s(C−C)	1191
δ (C − H) ring deformation δ (C−H)	1131 1108 1055
δ (C−H) in plane	1022
δ (=C−H)	985
δ (=C−H), δ_w (C−H_2)	956
δ (=C−H)	927
δ(C−H) δ(C=C)	885
v(C−C − C)	840
δ(C−H) δ(C=C)	800 759

Table S4. Band assignments for IR spectra of triolein δ: symmetric bending vibration; v_s: symmetric stretching vibration; v_{as}: asymmetric stretching vibration, δ_r: rocking bending, δsc: scissoring vibration. The assignments were done in agreement with [1,2,4,5,7].

Assignments	Triolein peaks (cm^{-1})
$\boldsymbol{v}$ (H−C=)	3005
v_{as}(C−H_2)	2923
v_s(C−H_2)	2854
v_s (C=O)	1745
δsc(C−H_2)	1464
δ (C−H_3)	1378
$\boldsymbol{v}$ (C−C) $\boldsymbol{v}$ (C=C−C−O)	1239 1162 1119 1095
δ_r (C−H_2)	724

References

1. Fringeli, U.P.; Gunthard, H.H. Infrared membrane spectroscopy. *Mol. Biol. Biochem. Biophys.* **1981**, *31*, 270-332, doi:10.1007/978-3-642-81537-9_6.
2. Tamm, L.K.; Tatulian, S.A. Infrared spectroscopy of proteins and peptides in lipid bilayers. *Q. Rev. Biophys.* **1997**, *30*, 365-429, doi:10.1017/s0033583597003375.
3. Dreissig, I.; Machill, S.; Salzer, R.; Krafft, C. Quantification of brain lipids by FTIR spectroscopy and partial least squares regression. *Spectrochim. Acta A Mol. Biomol. Spectrosc.* **2009**, *71*, 2069-2075.
4. Movasaghi, Z.; Rehman, S.; ur Rehman, D.I. Fourier transform infrared (FTIR) spectroscopy of biological tissues. *Appl. Spectrosc. Rev.* **2008**, *43*, 134-179.
5. Faramarzi, B.; Moggio, M.; Diano, N.; Portaccio, M.; Lepore, M. A Brief Review of FT-IR Spectroscopy Studies of Sphingolipids in Human Cells. *Biophysica* **2023**, *3*, 158-180.
6. Gupta, U.; Singh, V.K.; Kumar, V.; Khajuria, Y. Spectroscopic studies of cholesterol: fourier transform infra-red and vibrational frequency analysis. *Materials focus* **2014**, *3*, 211-217.
7. Albuquerque, M.; Guedes, I.; Alcantara Jr, P.; Moreira, S. Infrared absorption spectra of Buriti (Mauritia flexuosa L.) oil. *Vib. Spectrosc.* **2003**, *33*, 127-131.