

Table S1

MS assignment for Apremilast and its impurities

Mode	Apremilast	Imp-A	Imp-B	Imp-C	Imp-D	Imp-E	Imp-F
ESI ⁺	483.1	316.2	429.0	-	471.1	441.1	628.0
	[M+Na] ⁺	[M+H] ⁺	[M+H] ⁺	-	[M+Na] ⁺	[M+Na] ⁺	[M+Na] ⁺
ESI ⁻	459.1	314.4	427.3	222.0	191.0	417.1	604.2
	[M-H] ⁻	[M-H] ⁻	[M-H] ⁻	[M-H] ⁻	[M-H] ⁻	[M-H] ⁻	[M-H] ⁻

Table S2

¹H NMR assignment for Apremilast and its impurities

Position	Apremilast	Imp-C	Imp-D	Imp-E	Imp-F
1	3.73 (s,3H)	2.04 (s,3H)	3.73 (s,3H)	3.73 (s,3H)	3.73 (s,3H)
2	-	-	-	-	-
3	6.94-6.92 (d,1H)	9.97 (s,1H)	6.95-6.92 (d,1H)	6.99-6.93 (m,4H)	6.93 (s,2H)
4	7.08 (d,1H)	-	7.10 (s,1H)	6.99-6.93 (m,4H)	7.06 (s,1H)
5	-	7.91-7.89 (d,1H)	-	-	-
6	7.00-6.97 (s,1H)	7.49-7.43 (t,1H)	7.03-7.00 (d,1H)	7.07 (s,1H)	6.93 (s,2H)
7	-	7.56-7.54 (d,1H)	-	-	-
8	4.04-4.00 (q,2H)	-	4.05-3.99 (q,2H)	4.10-3.97 (m,3H)	4.04-3.97 (q,2H)
9	1.33-1.30 (t,3H)	-	1.34-1.29 (t,3H)	1.25-1.23 (dd,3H)	1.33-1.27 (m,3H)
10	5.80-5.77 (dd,1H)	11.99 (s,1H)	5.84-5.79 (q,1H)	5.74-5.71 (dd,1H)	5.72-5.70 (t,1H)
11	4.38-4.33 (dd,1H)	11.99 (s,1H)	4.35-4.17 (m,2H)	4.40-4.32 (d,1H)	4.30-4.27 (d,1H)
	4.16-4.12 (dd,1H)				4.13-4.09 (m,1H)
12	3.02 (s,3H)		3.00 (s,3H)	2.99 (s,3H)	2.94 (s,3H)
13	-		-	-	-
14	-		-	-	-
15	-		-	-	-
16	-		-	-	-
17	7.56-7.55 (d,1H)		8.09-8.04 (d,1H)	6.99-6.93 (m,4H)	7.73-7.69 (q,1H)

18	7.79-7.76 (dd,1H)	8.20-8.18 (dd,1H)	7.45-7.40 (t,1H)	7.93-7.88 (t,2H)
19	8.45-8.43 (d,1H)	8.31-8.28 (d,1H)	6.99-6.93 (m,4H)	8.55-8.51 (dd,1H)
20	-	-	-	-
21	9.69 (s,1H)		6.47 (s,2H)	-
22	-			-
23	2.19 (s,3H)			-
24				8.05-8.04 (d,2H)
25				7.93-7.88 (t,2H)
26				8.05-8.04 (d,2H)
27				-
28				-
29				9.77-9.75 (d,1H)
30				-
31				2.19 (s,3H)

Table S3
¹³C NMR assignment for Apremilast and its impurities

position	Apremilast		Imp-C		Imp-D		Imp-E		Imp-F	
	δc	DEPT	δc	DEPT	δc	DEPT	δc	DEPT	δc	DEPT
1	55.49	CH ₃	23.75	CH ₃	55.43	CH ₃	55.52	CH ₃	55.44	CH ₃
2	148.95	C	168.81	C	148.99	C	148.86	C	148.95	C
3	111.84	CH	-	-	111.69	CH	110.90	CH	111.79	CH
4	112.50	CH	136.12	C	112.62	CH	111.91	CH	112.35-112.30	CH
5	129.48	C	127.87	CH	128.82	C	130.21	C	129.36-129.33	C
6	119.72	CH	132.33	CH	127.09	CH	119.68	CH	119.88-119.73	CH
7	147.88	C	125.28	C	147.81	C	147.86	C	147.84	C
8	63.89	CH ₂	127.43	C	63.81	CH ₂	63.89	CH ₂	63.74	CH ₂
9	14.61	CH ₃	125.29	CH	14.56	CH ₃	14.65	CH ₃	14.55	CH ₃
10	47.18	CH	168.47	C	47.85	CH	46.89	CH	47.69-47.61	CH
11	52.91	CH ₂	168.07	C	52.85	CH ₂	53.30	CH ₂	53.07-52.96	CH ₂
12	41.04	CH ₃			41.08	CH ₃	41.06	CH ₃	41.07-40.99	CH ₃
13	166.88	C			162.67	C	167.57	C	166.40	C
14	167.82	C			165.41	C	168.85	C	166.40	C
15	116.59	C			122.37	C	108.53	C	127.54	C

16	131.30	C	132.91	C	131.91	C	132.35	C
17	118.11	CH	120.01	CH	112.48	CH	118.71	CH
18	135.85	CH	136.60	CH	135.29	CH	136.28	CH
19	125.99	CH	128.64	CH	121.59	CH	126.49	CH
20	136.50	C	144.37	C	146.67	C	131.63	C
21	-	-					165.14	C
22	169.18	C					165.14	C
23	24.14	CH ₃					132.30	C
24							124.09	CH
25							135.97	CH
26							126.61	CH
27							136.88-136.86	C
28							126.84	C
29							-	-
30							169.26-169.22	C
31							24.12	CH ₃

Figure 1

