**SUPPLEMENTARY FILE 2**

**HPLC AND SQ-TLC RESULTS FOR ANTIMALARIAL SAMPLES**

Table Ia: Quality evaluation of antimalarial samples containing **Artesunate**, **Sulphadoxine** and **Pyrimethamine** active pharmaceutical ingredients (APIs) based on the quality of the individual API components

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Manufacturer’s**  **Label Claim (mg)** | SQ-TLC results | | | |  | HPLC results | | | |
| Quality of individual API components | | | Quality of sample as a whole | Quality of individual API components | | | Quality of sample as a whole |
| **ATS** | **SDX** | **PYR** | **ATS** | **SDX** | **PYR** |
| \*24Y13 | ATS/SDX/PYR:100/500/25 | BLC | NC | C | **NC** | C | NC | C | **NC** |
| \*4Y13 | ATS/SDX/PYR:100/500/25 | C | NC | BLC | **NC** | C | BLC | C | **BLC** |
| \*34Y13 | ATS/SDX/PYR:100/500/25 | C | NC | NC | **NC** | C | NC | NC | **NC** |
| \*32Y13 | ATS/SDX/PYR:100/500/25 | C | NC | NC | **NC** | C | NC | NC | **NC** |

**L62.5)antial portion (72ant – 6** For the combination therapies, a sample was considered compliant (C) if all component APIs were compliant; noncompliant (NC) if one or more of the API components was NC and borderline compliant (BLC) if all components were BLC or there was one or more BLC component among C components.

Table Ib: Summary of results for quality evaluation of antimalarial samples containing **Artesunate**, **Sulphadoxine** and **Pyrimethamine** APIs by TLC and HPLC

|  |  |  |  |
| --- | --- | --- | --- |
| **ATS/SDX/PYR (4 samples)** | **C** | **BLC** | **NC** |
| **SQ-TLC** | 0 | 0 | 4 (100%) |
| **HPLC** | 0 | 1 (25%) | 3 (75%) |

75% (3/4) samples gave same results for both assays

Table IIa: Quality evaluation of the antimalarial samples containing **Artesunate**, **Sulphamethoxypyridazine** and **Pyrimethamine** active pharmaceutical ingredients (APIs) based on the quality of the individual API components

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Manufacturer’s**  **Label Claim (mg)** | SQ-TLC results | | | |  | HPLC results | | | |
| Quality of individual API components | | | Quality of sample as a whole | Quality of individual API components | | | Quality of sample as a whole |
| **ATS** | **SM** | **PYR** | **ATS** | **SM** | **PYR** |
| 44Y12 | ATS/SM/PYR:100/250/12 | C | - | BLC | **BLC** | C | C | NC | **NC** |
| 42Y12 | ATS/SM/PYR:200/500/25 | C | - | C | **C** | C | BLC | NC | **NC** |
| 43Y12 | ATS/SM/PYR:100/250/12.5 | NC | - | BLC | **NC** | NC | NC | NC | **NC** |
| 41Y12 | ATS/SM/PYR:200/500/25 | C | - | C | **C** | NC | BLC | C | **NC** |
| 31Y12 | ATS/SM/PYR:200/500/25 | NC | - | C | **NC** | BLC | NC | C | **NC** |

**L62.5)antial portion (72ant – 6**SM = sulphamethoxypyridazine. On TLC, it gave a spot with the same retention time as sulphadoxine, but it failed to stain well with I2/KI for SQ-TLC analysis. However, HPLC analysis was successful.

Table IIb: Summary of results for antimalarial samples containing **Artesunate**, **Sulphamethoxypyridazine** and **Pyrimethamine** APIs by TLC and HPLC

|  |  |  |  |
| --- | --- | --- | --- |
| **ATS/SM/PYR (5 samples)** | **C** | **BLC** | **NC** |
| **\*SQ-TLC** | 2 (40%) | 1 (20%) | 2 (40%) |
| **HPLC** | 0 | 0 | 5 (100%) |

\*these results are based on only 2 APIs instead of 3

40% (2/5) samples gave same results for both assays

Table IIIa: Quality evaluation of the antimalarial samples containing **Artemether** and **Lumefantrine** active pharmaceutical ingredients (APIs) based on the quality of the individual API components

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Manufacturer’s**  **Label Claim (mg)** | SQ-TLC results | | |  | HPLC results | | |
| Quality of individual API components | | Quality of sample as a whole | Quality of individual API components | | Quality of sample as a whole |
| **ATM** | **LUM** | **ATM** | **LUM** |
| 2X15 | ATM/LUM:20/120 | NC | C | **NC** | NC | C | **NC** |
| 4X20 | ATM/LUM:20/120 | C | NC | **NC** | C | NC | **NC** |
| 11X1 | ATM/LUM:20/120 | NC | C | **NC** | NC | NC | **NC** |
| 11X11 | ATM/LUM:180/1080 | C | NC | **NC** | C | NC | **NC** |
| 11X14 | ATM/LUM:20/120 | NC | NC | **NC** | NC | NC | **NC** |
| 11X17 | ATM/LUM:80/480 | NC | C | **NC** | NC | C | **NC** |
| 11X18 | ATM/LUM:40/240 | NC | C | **NC** | NC | C | **NC** |
| 11X20 | ATM/LUM:20/120 | NC | BLC | **NC** | NC | NC | **NC** |
| 12X1 | ATM/LUM:20/120 | NC | C | **NC** | NC | NC | **NC** |
| 12X11 | ATM/LUM:180/1080 | C | NC | **NC** | C | NC | **NC** |
| 12X14 | ATM/LUM:20/120 | NC | C | **NC** | NC | C | **NC** |
| 13X1 | ATM/LUM:40/240 | C | NC | **NC** | C | NC | **NC** |
| 13X11 | ATM/LUM:80/480 | NC | NC | **NC** | NC | NC | **NC** |
| 14X1 | ATM/LUM:40/240 | NC | C | **NC** | NC | NC | **NC** |
| 14X11 | ATM/LUM:40/240 | NC | C | **NC** | NC | NC | **NC** |
| 15X1 | ATM/LUM:80/480 | NC | C | **NC** | NC | BLC | **NC** |
| 15X11 | ATM/LUM:20/120 | NC | C | **NC** | NC | C | **NC** |
| 16X1 | ATM/LUM:40/240 | NC | NC | **NC** | NC | NC | **NC** |
| 17X1 | ATM/LUM:80/480 | BLC | NC | **NC** | NC | NC | **NC** |
| 18X1 | ATM/LUM:20/120 | NC | NC | **NC** | NC | NC | **NC** |
| 19X1 | ATM/LUM:80/480 | C | BLC | **BLC** | C | NC | **NC** |
| 21X1 | ATM/LUM:20/120 | C | BLC | **BLC** | C | NC | **NC** |
| 22X1 | ATM/LUM:80/480 | NC | NC | **NC** | NC | NC | **NC** |
| 23X1 | ATM/LUM:20/120 | NC | C | **NC** | NC | C | **NC** |
| 24X14 | ATM/LUM:20/120 | NC | NC | **NC** | NC | NC | **NC** |
| 25X11 | ATM/LUM:80/480 | BLC | C | **BLC** | NC | NC | **NC** |
| 31X1 | ATM/LUM:20/120 | BLC | NC | **NC** | C | NC | **NC** |
| 32X1 | ATM/LUM:20/120 | C | NC | **NC** | C | NC | **NC** |
| 31X11 | ATM/LUM:80/480 | NC | C | **NC** | NC | NC | **NC** |
| 33X1 | ATM/LUM:40/240 | NC | C | **NC** | NC | C | **NC** |
| 34X1 | ATM/LUM:80/480 | C | C | **C** | C | BLC | **BLC** |
| 36X1 | ATM/LUM:80/480 | C | C | **C** | C | C | **C** |
| 41X11 | ATM/LUM:20/120 | C | NC | **NC** | C | NC | **NC** |
| 42X11 | ATM/LUM:20/120 | NC | C | **NC** | NC | BLC | **NC** |
| 43X1 | ATM/LUM:40/240 | NC | NC | **NC** | NC | NC | **NC** |
| 44X1 | ATM/LUM:80/480 | NC | C | **NC** | NC | C | **NC** |
| 45X12 | ATM/LUM:180/1080 | C | NC | **NC** | C | NC | **NC** |
| 110X1 | ATM/LUM:80/480 | NC | NC | **NC** | NC | NC | **NC** |
| 16X11 | ATM/LUM:180/1080 | C | BLC | **BLC** | C | NC | **NC** |
| 112X1 | ATM/LUM:80/480 | NC | C | **NC** | C | C | **C** |
| 113X1 | ATM/LUM:80/480 | NC | C | **NC** | NC | C | **NC** |

Table IIIb: Summary of results for antimalarial samples containing **Artemether** and **Lumefantrine** APIs by TLC and HPLC

|  |  |  |  |
| --- | --- | --- | --- |
| **ATM/LUM (41 samples)** | **C** | **BLC** | **NC** |
| **SQ-TLC** | 2 (4.88%) | 4 (9.76%) | 35 (85.36%) |
| **HPLC** | 2 (4.88) | 1 (2.44%) | 38 (92.68%) |

85.36% (35/41) samples gave same results for both assays

Table IVa: Quality evaluation of the antimalarial samples containing **Dihydroartemisinin,** **Sulphadoxine** and **Pyrimethamine** active pharmaceutical ingredients (APIs) based on the quality of the individual API components

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Manufacturer’s**  **Label Claim (mg)** | SQ-TLC results | | | |  | HPLC results | | | |
| Quality of individual API components | | | Quality of sample as a whole | Quality of individual API components | | | Quality of sample as a whole |
| **DHA** | **SDX** | **PYR** | **DHA** | **SDX** | **PYR** |
| 15Z1 | DHA/SDX/PYR:60/500/25 | **NC** | **C** | **C** | **NC** | **NC** | **NC** | **C** | **NC** |
| 13Z1 | DHA/SDX/PYR:60/500/25 | **NC** | **BLC** | **C** | **NC** | **NC** | **NC** | **C** | **NC** |
| 12Z1 | DHA/SDX/PYR:60/500/25 | **NC** | **NC** | **C** | **NC** | **NC** | **NC** | **C** | **NC** |
| 14Z1 | DHA/SDX/PYR:60/500/25 | **NC** | **NC** | **C** | **NC** | **NC** | **NC** | **C** | **NC** |
| 21Z1 | DHA/SDX/PYR:60/500/25 | **NC** | **NC** | **C** | **NC** | **NC** | **NC** | **C** | **NC** |
| 23Z1 | DHA/SDX/PYR:60/500/25 | **NC** | **C** | **C** | **NC** | **N C** | **C** | **C** | **NC** |
| 24Z1 | DHA/SDX/PYR:60/500/25 | **NC** | **NC** | **C** | **NC** | **NC** | **NC** | **C** | **NC** |
| 25Z1 | DHA/SDX/PYR:60/500/25 | **NC** | **NC** | **C** | **NC** | **NC** | **NC** | **C** | **NC** |
| 34Z1 | DHA/SDX/PYR:60/500/25 | **NC** | **NC** | **C** | **NC** | **NC** | **NC** | **C** | **NC** |
| 35Z1 | DHA/SDX/PYR:60/500/25 | **NC** | **BLC** | **C** | **NC** | **NC** | **NC** | **C** | **NC** |
| 45Z1 | DHA/SDX/PYR:60/500/25 | **NC** | **NC** | **C** | **NC** | **NC** | **NC** | **C** | **NC** |
| 46Z1 | DHA/SDX/PYR:60/500/25 | **NC** | **NC** | **C** | **NC** | **NC** | **NC** | **C** | **NC** |

Table IVb: Summary of results for antimalarial samples containing **Dihydroartemisinin,** **Sulphadoxine** and **Pyrimethamine** APIs by TLC and HPLC

|  |  |  |  |
| --- | --- | --- | --- |
| **DHA/SDX/PYR (12 samples)** | **C** | **BLC** | **NC** |
| **SQ-TLC** | 0 | 0 | 12 (100%) |
| **HPLC** | 0 | 0 | 12 (100%) |

100% (12/12) samples gave same results for both assays

Table Va: Quality evaluation of the antimalarial samples containing **Sulphadoxine** and **Pyrimethamine** active pharmaceutical ingredients (APIs) based on the quality of the individual API components

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Manufacturer’s**  **Label Claim (mg)** | SQ-TLC results | | |  | HPLC results | | |
| Quality of individual API components | | Quality of sample as a whole | Quality of individual API components | | Quality of sample as a whole |
| **SDX** | **PYR** | **SDX** | **PYR** |
| 11P10 | **SDX**/PYR:**500**/25 | NC | C | **NC** |  | NC | C | **NC** |
| 11P2 | **SDX**/PYR:**500**/25 | BLC | BLC | **BLC** | NC | NC | **NC** |
| 12P2 | **SDX**/PYR:**500**/25 | NC | NC | **NC** | NC | NC | **NC** |
| 14P10 | **SDX**/PYR:**500**/25 | NC | C | **NC** | NC | C | **NC** |
| 14P2 | **SDX**/PYR:**500**/25 | NC | C | **NC** | NC | C | **NC** |
| 16P10 | **SDX**/PYR:**500**/25 | BLC | C | **BLC** | NC | C | **NC** |
| 21P15 | **SDX**/PYR:**500**/25 | NC | C | **NC** | NC | C | **NC** |
| 21P2 | **SDX**/PYR:**500**/25 | BLC | C | **BLC** | NC | BLC | **NC** |
| 22P2 | **SDX**/PYR:**500**/25 | BLC | NC | **NC** | NC | NC | **NC** |
| 23P2 | **SDX**/PYR:**500**/25 | C | BLC | **BLC** | C | NC | **NC** |
| 31P10 | **SDX**/PYR:**500**/25 | C | BLC | **BLC** | NC | NC | **NC** |
| 31P2 | **SDX**/PYR:**500**/25 | C | C | **C** | C | C | **C** |
| 32P10 | **SDX**/PYR:**500**/25 | BLC | BLC | **BLC** | NC | C | **NC** |
| 32P2 | **SDX**/PYR:**500**/25 | BLC | NC | **NC** | NC | C | **NC** |
| 33P10 | **SDX**/PYR:**500**/25 | NC | BLC | **NC** | NC | NC | **NC** |
| 35P2 | **SDX**/PYR:**500**/25 | NC | NC | **NC** | NC | NC | **NC** |
| 37P15 | **SDX**/PYR:**500**/25 | NC | NC | **NC** | NC | NC | **NC** |
| 38P15 | **SDX**/PYR:**500**/25 | C | C | **C** | C | C | **C** |
| 41P2 | **SDX**/PYR:**500**/25 | BLC | BLC | **BLC** | BLC | NC | **NC** |
| 42P2 | **SDX**/PYR:**500**/25 | NC | NC | **NC** | NC | NC | **NC** |
| 44P2 | **SDX**/PYR:**500**/25 | NC | NC | **NC** | NC | C | **NC** |
| 45P2 | **SDX**/PYR:**500**/25 | BLC | C | **BLC** | NC | C | **NC** |
| 48P5 | **SDX**/PYR:**500**/25 | C | C | **C** | NC | C | **NC** |

Table Vb: Summary of results for antimalarial samples containing **Sulphadoxine** and **Pyrimethamine** APIs by TLC and HPLC

|  |  |  |  |
| --- | --- | --- | --- |
| **SDX/PYR (23 samples)** | **C** | **BLC** | **NC** |
| **SQ-TLC** | 3 (13.04%) | 8 (34.78%) | 12 (52.17%) |
| **HPLC** | 2 (8.70%) | 0 | 21 (91.30%) |

53.84% (14/23) samples gave same results for both assays

Table VIa: Quality evaluation of the antimalarial samples containing **Dihydroartemisinin** and **Piperaquine** active pharmaceutical ingredients (APIs) based on the quality of the individual API components

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Manufacturer’s**  **Label Claim (mg)** | SQ-TLC results based on DHA API | HPLC results based on DHA API |
| 11Z3 | **DHA**/PPQ:**40**/320 | **C** | **C** |
| 12Z3 | **DHA**/PPQ:**40**/320 | **BLC** | **NC** |
| 14Z3 | **DHA**/PPQ:**40**/320 | **NC** | **NC** |
| 16Z1 | **DHA**/PPQ:**40**/320 | **C** | **C** |
| 17Z1 | **DHA**/PPQ:**40**/320 | **C** | **NC** |
| 26Z1 | **DHA**/PPQ:**40**/320 | **C** | **C** |
| 27Z1 | **DHA**/PPQ:**40**/320 | **C** | **BLC** |
| 32Z3 | **DHA**/PPQ:**40**/320 | **NC** | **NC** |
| 33Z3 | **DHA**/PPQ:**40**/320 | **NC** | **NC** |
| 37Z1 | **DHA**/PPQ:**40**/320 | **C** | **C** |
| 41Z3 | **DHA**/PPQ:**40**/320 | **NC** | **NC** |
| 42Z3 | **DHA**/PPQ:**40**/320 | **C** | **NC** |
| 43Z3 | **DHA**/PPQ:**40**/320 | **NC** | **NC** |
| 44Z3 | **DHA**/PPQ:**40**/320 | **C** | **BLC** |

The piperaquine component could not be analysed due to the absence of a reference substance. Thus the quality evaluation was based only on dihydroartemisinin API.

Table VIb: Summary of results for antimalarial samples containing **Dihydroartemisinin** and **Piperaquine** APIs by TLC and HPLC

|  |  |  |  |
| --- | --- | --- | --- |
| **DHA**/PPQ **(14 samples)** | **C** | **BLC** | **NC** |
| **SQ-TLC** | 8 (57.14%) | 1 (7.14%) | 5 (35.71%) |
| **HPLC** | 4 (28.57%) | 2 (14.29%) | 8 (57.14%) |

64.28% (9/14) samples gave same results for both assays

Table VIIa: Quality evaluation of the antimalarial samples containing **Quinine** API

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Manufacturer’s**  **Label Claim (mg)** | SQ-TLC results | HPLC results |
| 11V5 | **QUN:50mg/5ml** | **C** | **C** |
| 12V5 | **QUN:50mg/5ml** | **BLC** | **NC** |
| 13V5 | **QUN:50mg/5ml** | **C** | **BLC** |
| 4V5 | **QUN:50mg/5ml** | **BLC** | **BLC** |
| 41R8 | **QUN:100mg/5ml** | **NC** | **NC** |
| 42R4 | **QUN:100mg/5ml** | **NC** | **NC** |
| 43R4 | **QUN:100mg/5ml** | **NC** | **NC** |
| \*41Q6 | **QUN:50mg/5ml** | **-** | **C** |
| \*42Q6 | **QUN:50mg/5ml** | **-** | **NC** |
| \*43Q6 | **QUN:50mg/5ml** | **-** | **C** |
| \*31Q6 | **QUN:150mg** | **-** | **C** |
| \*32Q6 | **QUN:150mg** | **-** | **C** |
| \*33Q6 | **QUN:150mg** | **-** | **NC** |

\* These samples could not be analysed by TLC for technical reasons

Table VIIb: Summary of results for antimalarial samples containing **Quinine** API by TLC and HPLC

|  |  |  |  |
| --- | --- | --- | --- |
| **QN (7 out of 13 samples)** | **C** | **BLC** | **NC** |
| **SQ-TLC** | 2 (28.57%) | 2 (28.57%) | 3 (42.86%) |
| **HPLC** | 1 (14.28%) | 2 (28.57%) | 4 (57.14%) |

71.43% (5/7) samples gave same results for both assays