

	430	440	450	460	470	480	490
KB1-K13	-	-	-	-	-	-	-
KB2-K13	-	-	-	-	-	-	-
KB3-K13	-	-	-	-	-	-	-
KB4-K13	-	-	-	-	-	-	-
KB5-K13	-	-	-	-	-	-	-
KB6-K13	-	-	-	-	-	-	-
KB7-K13	-	-	-	-	-	-	-
KB8-K13	-	-	-	-	-	-	-
KB9-K13	-	-	-	-	-	-	-
KB10-K13	-	-	-	-	-	-	-
KB11-K13	-	-	-	-	-	-	-
KB12-K13	-	-	-	-	-	-	-
KB13-K13	-	-	-	-	-	-	-
KB14-K13	-	-	-	-	-	-	-
KB15-K13	-	-	-	-	-	-	-
KB16-K13	-	-	-	-	-	-	-
KB17-K13	-	-	-	-	-	-	-
KB18-K13	-	-	-	-	-	-	-
KB19-K13	-	-	-	-	-	-	-
KB20-K13	-	-	-	-	-	-	-
KB21-K13	-	-	-	-	-	-	-
KM1-K13	-	-	-	-	-	-	-
KM2-K13	-	-	-	-	-	-	-
KM3-K13	-	-	-	-	-	-	-
KM4-K13	-	-	-	-	-	-	-
KM5-K13	-	-	-	-	-	-	-
KM6-K13	-	-	-	-	-	-	-
KM7-K13	-	-	-	-	-	-	-
KM8-K13	-	-	-	-	-	-	-
KM9-K13	-	-	-	-	-	-	-
KM10-K13	-	-	-	-	-	-	-
KM11-K13	-	-	-	-	-	-	-
KM12-K13	-	-	-	-	-	-	-
KM13-K13	-	-	-	-	-	-	-
KM14-K13	-	-	-	-	-	-	-
KM15-K13	-	-	-	-	-	-	-
KM16-K13	-	-	-	-	-	-	-
KM17-K13	-	-	-	-	-	-	-
KM18-K13	-	-	-	-	-	-	-
KM19-K13	-	-	-	-	-	-	-
KM20-K13	-	-	-	-	-	-	-
KM21-K13	-	-	-	-	-	-	-
KM22-K13	-	-	-	-	-	-	-
KM23-K13	-	-	-	-	-	-	-
KM24-K13	-	-	-	-	-	-	-
KM25-K13	-	-	-	-	-	-	-
KM26-K13	-	-	-	-	-	-	-
KM27-K13	-	-	-	-	-	-	-
KM28-K13	-	-	-	-	-	-	-
KM29-K13	-	-	-	-	-	-	-
K1-K13	-	-	-	-	-	-	-
3D7-K13	-	D L S E S E A L L K E A E F	Y G I K F L P F P L V F C I	G G F D G V E Y L N S M E L L D I	S Q Q C W R M C T P M S T K K A Y F G S A V L N N		

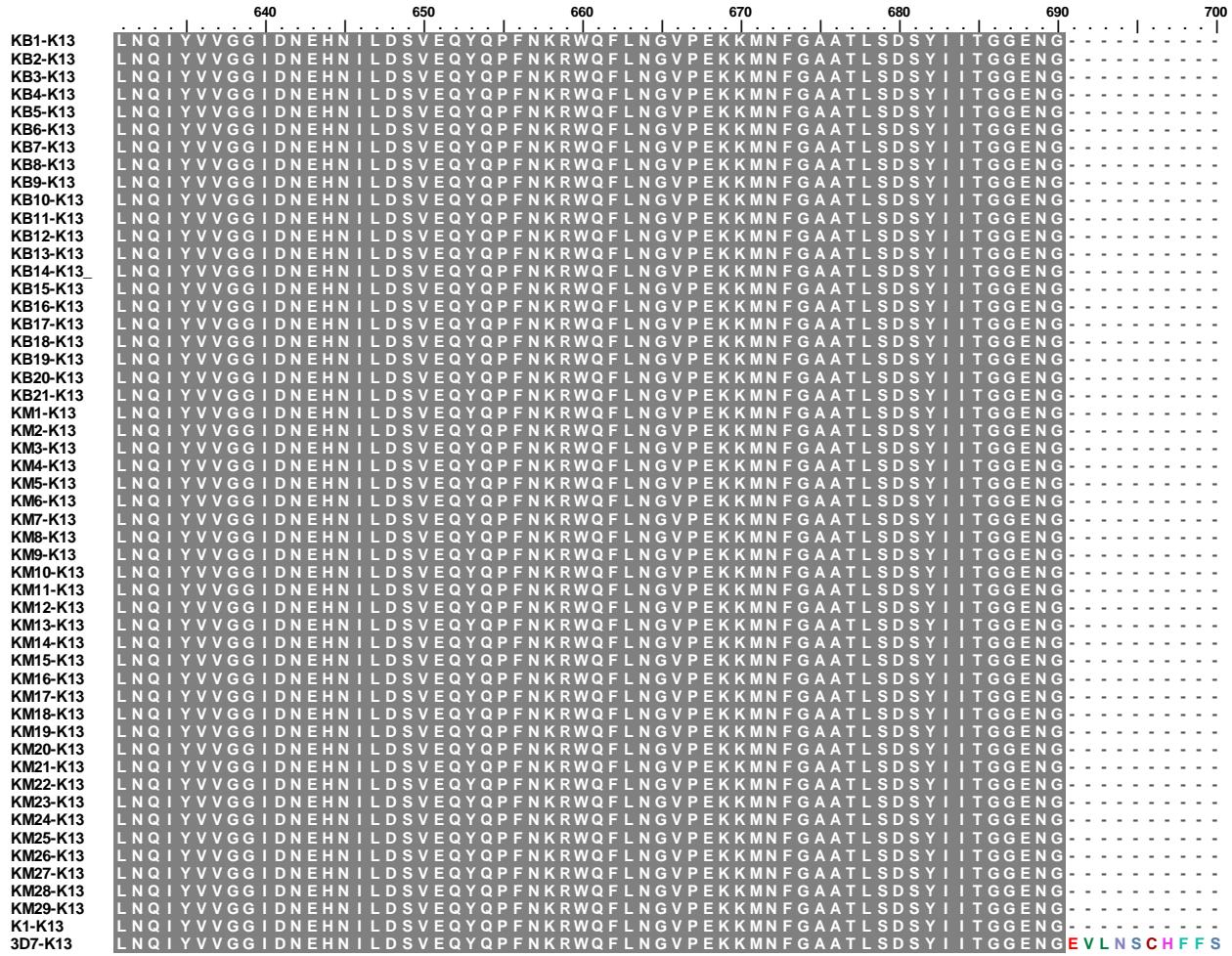
S1 Fig. Sequencing alignment of K13 propeller region at amino acid position 435-690. The *P. falciparum* 3D7 and K1 strains are the artemisinin sensitive control. KM, Kota Marudu isolate and KB, Kalabakan isolate.

	500	510	520	530	540	550	560
KB1-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB2-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB3-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB4-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB5-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB6-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB7-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB8-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB9-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB10-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB11-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB12-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB13-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB14-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB15-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB16-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB17-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB18-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB19-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB20-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KB21-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM1-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM2-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM3-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM4-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM5-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM6-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM7-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM8-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM9-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM10-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM11-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM12-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM13-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM14-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM15-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM16-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM17-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM18-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM19-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM20-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM21-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM22-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM23-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM24-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM25-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM26-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM27-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM28-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
KM29-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
K1-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						
3D7-K13	FLYVFGGNNYDYKALFETEVYDRLRDVWYVSSNLNIPRRNNNCGVTSNGRIYCIGGYDGSS PNVEAYDH						

S1 Fig. Sequencing alignment of K13 propeller region at amino acid position 435-690. The *P. falciparum* 3D7 and K1 strains are the artemisinin sensitive control. KM, Kota Marudu isolate and KB, Kalabakan isolate.

	570	580	590	600	610	620	630
KB1-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB2-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB3-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB4-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB5-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB6-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB7-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB8-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB9-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB10-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB11-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB12-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB13-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB14-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB15-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB16-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB17-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB18-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB19-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB20-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KB21-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM1-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM2-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM3-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM4-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM5-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM6-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM7-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM8-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM9-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM10-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM11-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM12-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM13-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM14-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM15-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM16-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM17-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM18-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM19-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM20-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM21-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM22-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM23-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM24-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM25-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM26-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM27-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM28-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
KM29-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
K1-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						
3D7-K13	R MK AWVEVAPLNTPRSSAMCVAFDNK YVIGGTNGERLNS EVYEEKMNKWEQFPYALLLEARSSGAAFN						

S1 Fig. Sequencing alignment of K13 propeller region at amino acid position 435-690. The *P. falciparum* 3D7 and K1 strains are the artemisinin sensitive control. KM, Kota Marudu isolate and KB, Kalabakan isolate.



S1 Fig. Sequencing alignment of K13 propeller region at amino acid position 435-690. The *P. falciparum* 3D7 and K1 strains are the artemisinin sensitive control. KM, Kota Marudu isolate and KB, Kalabakan isolate.