

Polymorphic transformation of artemisinin by high temperature extrusion

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Supplementary information:

The PXRD patterns of artemisinin polymorphs:

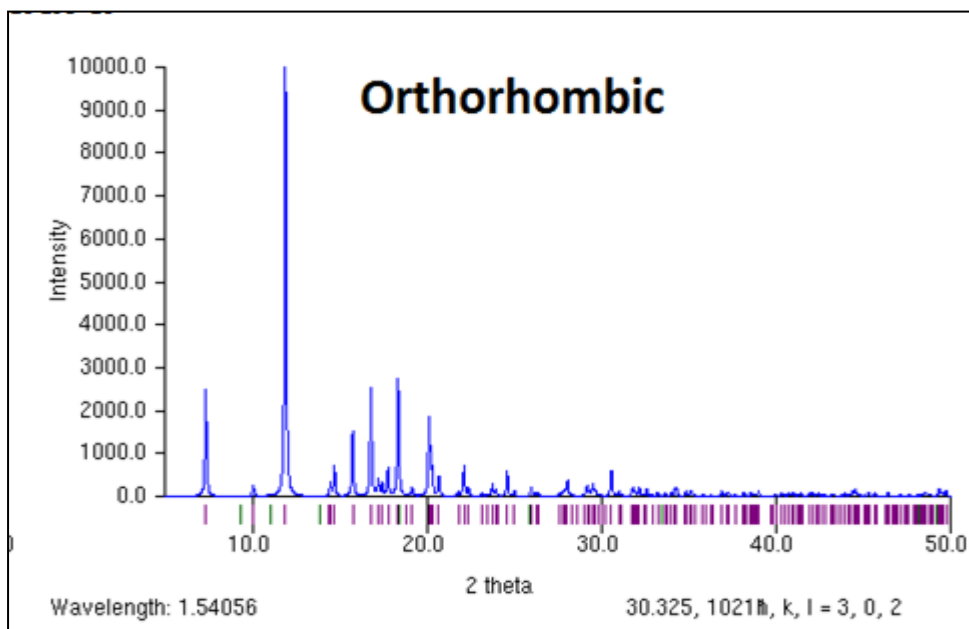


Fig. 1. PXRD pattern of orthorhombic artemisinin adapted from crystallographic database. Characteristic peak at $2\theta=7.80$

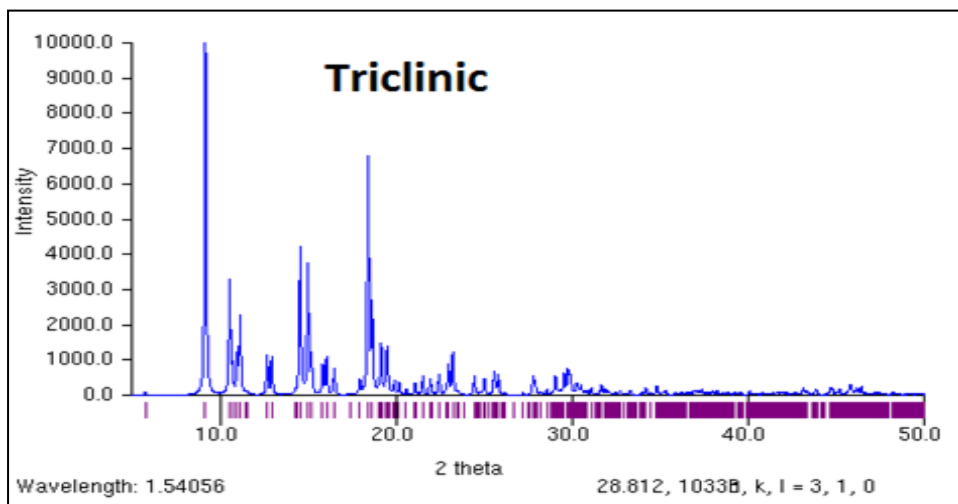


Fig. 2. PXRD pattern of triclinic artemisinin adapted from crystallographic database Characteristic peak at $2\theta=9.95$

The DSC thermograms of artemisinin polymorphs:

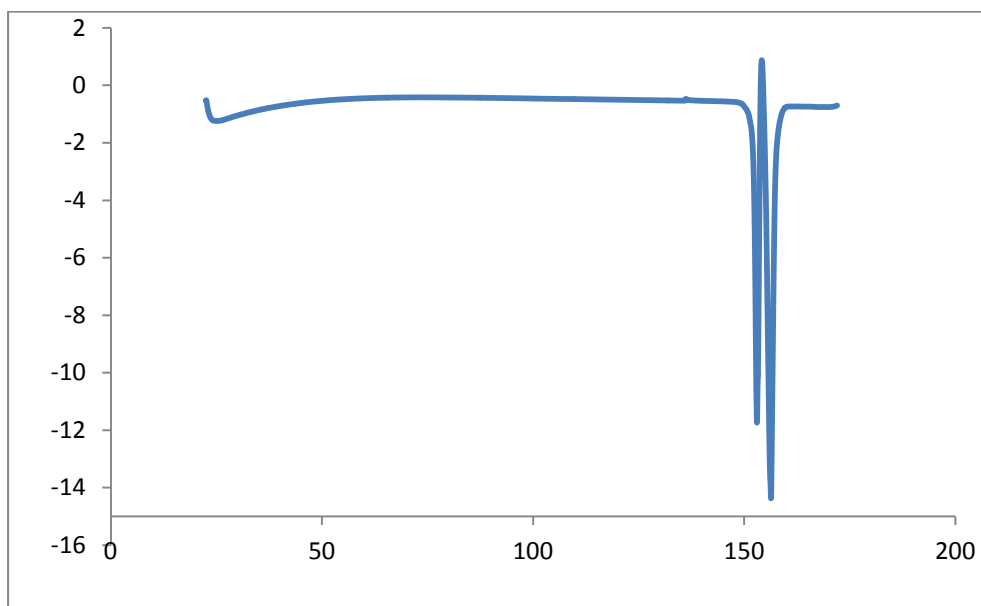


Fig.3. DSC thermogram of the orthorhombic

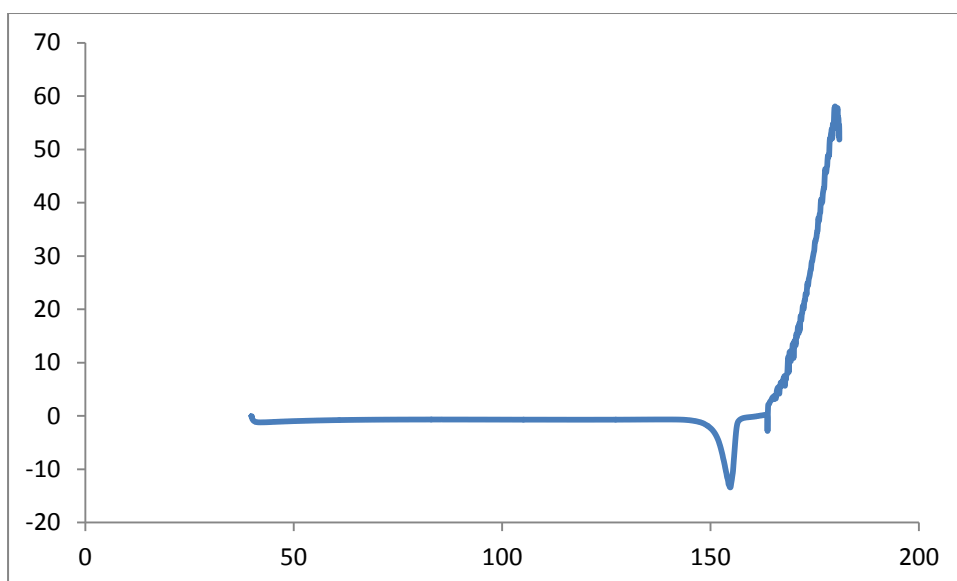


Fig. 4. DSC thermogram of the triclinic artemisinin

The melting point of the orthorhombic and triclinic forms 154.81°C and 154.75°C for respectively. The liberation of formic acid starts between 160-185°C.

Screw configurations: The screws were configured to produce low, medium and high shear intensity.

Low shear

Medium shear

High shear

Length (D) ^a	Element	Length (D) ^a	Element	Length (D) ^a	Element
28	Forwarding	11	Forwarding	6	Forwarding
2.25	30°	1	30°	2	90°
1.25	60°	1	60°	1	60°
1	90°	1	90°	6	Forwarding
6	Forwarding	6	Forwarding	1.25	60°
1.5	Discharge	1.5	60°	4	Forwarding
		8	Forwarding	1	90°
		1	60°	1	60°
		2	90°	1.25	30°
		6	Forwarding	4	Forwarding
		1.5	Discharge	1	60°
				1	30°
				9	Forwarding
				1.25	Discharge
40	Total Length	40	Total Length	40	Total length

Table 1. Screw configurations providing low, medium and high shear

A: in terms of diameter

ID: 16 mm

Temperature profiles: Extrusion was performed at T30 and T140 set of temperature.

Profile	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10
T140	20	100	100	120	140	140	140	140	140
T130	20	100	100	120	125	125	130	130	130

Table 2. Set of temperatures T140 and T130

Dissolution:

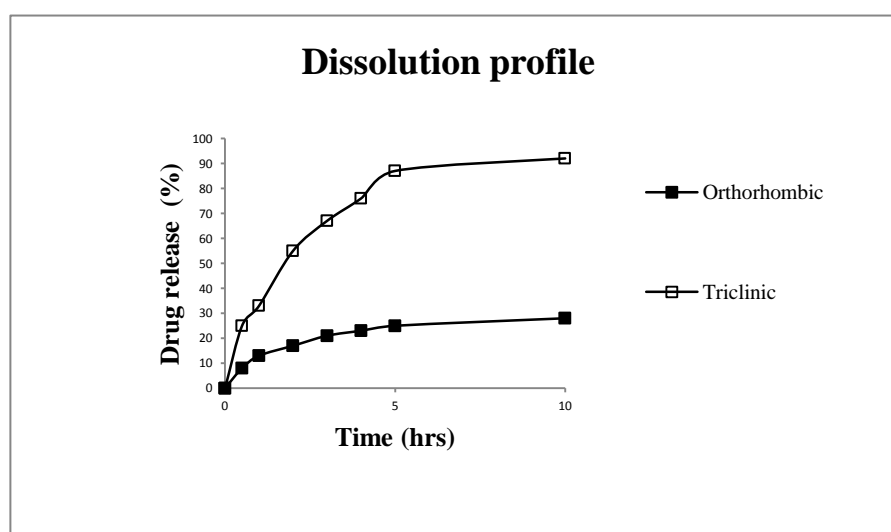


Figure 5. Dissolution profiles of orthorhombic and triclinic form of artemisinin.

In water triclinic crystals showed four times greater dissolution rate in comparison with the orthorhombic form.

HPLC-MS- The purity of artemisinin crystals were confirmed by HPLC-MS.

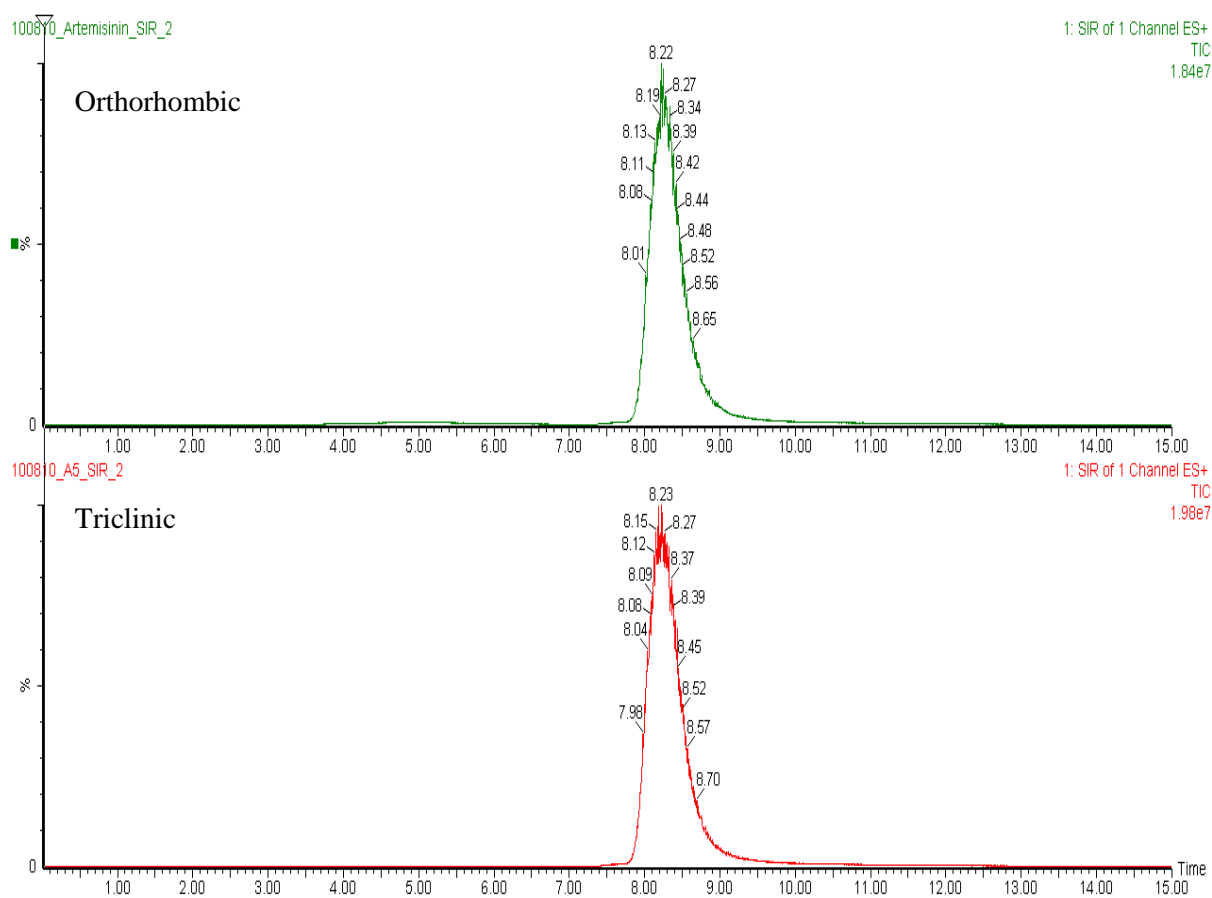


Figure 6. HPLC-MS chromatogram of orthorhombic and triclinic forms of artemisinin

The purity of the triclinic crystals were analysed by HPLC-MS using a Waters Alliance separation module 2695. Column C18, 3 x 100 mm, 1.8 μ m particle size was used and 1 μ l of artemisinin was loaded. 50% acetonitrile, 50% water, 0.09% formic acid and 0.01% trifluoroacetic acid was used as a mobile phase.