

# Ukuphonononga udityaniso lokuhamba njengendlela yokwenziwa kwee-ARV zasekhaya kunye nezozoqoqosho

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## 01. Intshayelelo

- Ixabiso lokufuna eliphezulu le-antiretrovirals eSub-Saharan Afrika
- Izinongo ezisebenzayo zoxubo mayeza (ii-API) zenza malunga nama- ~80% eendleko ze-ARV
- UMzantsi Afrika uzisa ii-API eziyi-100% ezixabisa izigidi zama-~\$800 ezisuka kumazwe angaphaya kolwandle
- Imveliso ye-API yasekuhlaleni inga:

- Amakhonkco okubonelela ngokukhuselekileyo
- Hlisa amaxabiso
- ngokukhawuza unyango olutsha
- Ulwandiso lweenkqubo ezivikela i-HIV

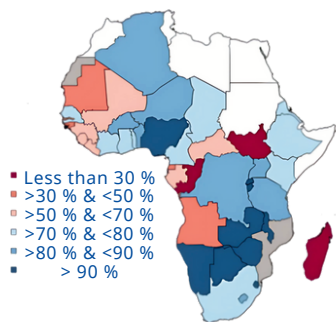
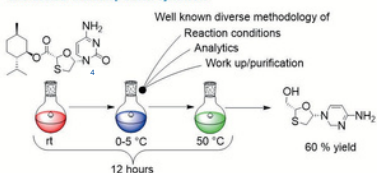


Fig 1: ipesenti yabantu abakwi-ARVs e-Afrika, ngo-2021

- Ibhethsi chemistry yindlela eqhelekileyo yokudityaniswa kweziyobisi, kodwa ukuqhubeka kodityaniso, njengakwi-lamivudine, yenye indlela esebenzayo (ku-figa yesi-2)

### a. Classical multistep batch synthesis



### b. Continuous flow multistep synthesis

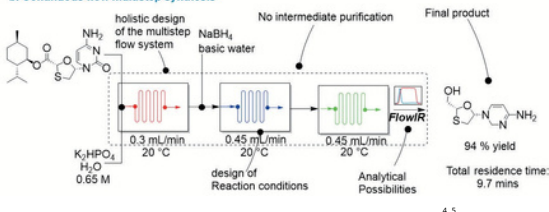


Fig 1: Uthelekisa phakathi kwebhethsi kunye nokuhamba okuqhubekayo kwe-API synthesis

## 02. Injongo

Kule projekthi, sifuna ukuqesha i-flow synthesis eqhubekayo ukuphuhlisa iindleko ezisebenzayo, iinkqubo eziluhlaza (ezendalo) zokwenziwa kwee-ARVs ezikhethiweyo ezihambelana noMzantsi Afrika.

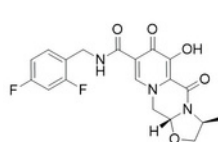
## 03. Indlela yokwenza uphando

- Ibhethsi yodibaniso kula mayeza ee-ARV angezantsi (Fig. 3).
- I- LC-MS kunye ne-NMR zazisetyenziselwa ukubonakaliswa kwamachiza aphakathi kunye nawokugqibela.
- Ibhethsi iguqulelwe kokuqhubekayo ukuphucula ukusebenza kakuhle kunye nokwandiswa.
- I- Synthetron Reactor (ifiga yesine) yakhethwa ngenxa yeenzuzo zayo ezohlukileyo:

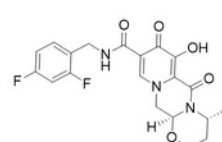
- Ubungakanani bobungqindilili bayo,
- Ulungelo kwimeko ezitshintshayo.
- ukonga iindleko kugxininiso oluphezulu,
- Idisikhi ukujikeleza okutsha okwasa ukuxuba.



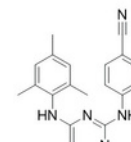
Fig 4: I-Synthetron ehamba ngokuqhubekayo i-reactor



Cabotegravir



Dolutegravir



Dapivirine

Fig 3: Ulwakhiwo lwe-API lwamachiza e-ARV aphantsi kophuhliso lophulo okuqhubekayo

## 04. Ingxoxo

### Uhlengahlengiso lweNdelela yokwenziwa

- Kuyilwe iindleko eziphakathi ezifanelekileyo kwi-cabotegravir kunye ne-dolutegravir ngokususa ii-reagent ezibizayo.
- Iqinisekise indlela entsha yokwenziwa kuzo zontathu ii-API kusetyenziswa ibhethsi ye-chemistry.

### UPhulo lweKhemistri yokuPhucula

- I-cabotegravir okanye i-dolutegravir udibaniso kuphucula lophulo, ukuphumeza iipesenti eziyi-100% zoguqulo lwabaphakathi abangundoqo.
- Sekwe okungcono (Kuhlaza, indlela engabizi kakhulu kodwa esebenzayo)
- Ukonyuswa kwemveliso.

### Iindleko zeModeli yeMpahla:

- Kuphuhlise imodeli yexesha langoku lokuqaphela kweendleko zokovelisa, Ukuphucula lawulo lwemali.

## 05. Isiququmbelo

### I-ARV API luhambo oluqhubekayo lodibaniso olunikeza:

- ukwanda kokusebenza,
- Ubusako bokuhlangabezana nemfuno yokwandisa,
- kunye nokunciphisa iindleko.

### Imveliso ye-API yendawo ibalulekile ukuze:

- ukukhusela amakhonkco okubonelela kunye
- Ukwehlisa ukuthembela kumazwe angaphandle.

### Le Ndelela ibalulekile ukuhlangabezana neemfuno ze-ARV zase-Afrika kunye nolwandisa ufikelelo kunyango lwe-HIV.

### Inqanaba elilandelayo leprojekthi libandakanya:

- ukugqibezela kophulo lokuphucula kunye
- Ukuthumela itekinoloji kwiPharma ese-CPT kuvavanyo lobungqina bengqiqo.

## 06. Uncwadi olunxulumeneyo

1. Fact sheet 2024 - Latest global and regional HIV statistics on the status of the AIDS epidemic, UNAIDS 2024
2. The Department of Trade, Industry and Competition (DTIC) Annual Report 2022/23
3. Thomas R. et al., Lancet Glob Health, Volume 9, Issue 5, 2021
4. Mandala, D. et al., Organic & Biomolecular Chemistry, Volume 15, Issue 16, 2017
5. Ramshaw C. et al., US Patents 7,125,527, 2006
6. Holl R.A. et al., US Patents 7,534,404, 2009

## 07. Imibulelo



"Le nkqubo ifezekise iinxaxa engamandla yamantu baseMelika nge-U.S. President's Emergency Plan for AIDS Relief (PEPFAR) kunye ne-U.S. Agency for International Development (USAID). Imixholo ekule nkcazo-ntetho zezo zombonisi kwaye ayibonisi imbono ye-U.S. President's Emergency Plan for AIDS Relief, i-U.S. Agency for International Development okanye i-U.S. Government."