

DIAGNÓSTICO DE FITOVIROSES

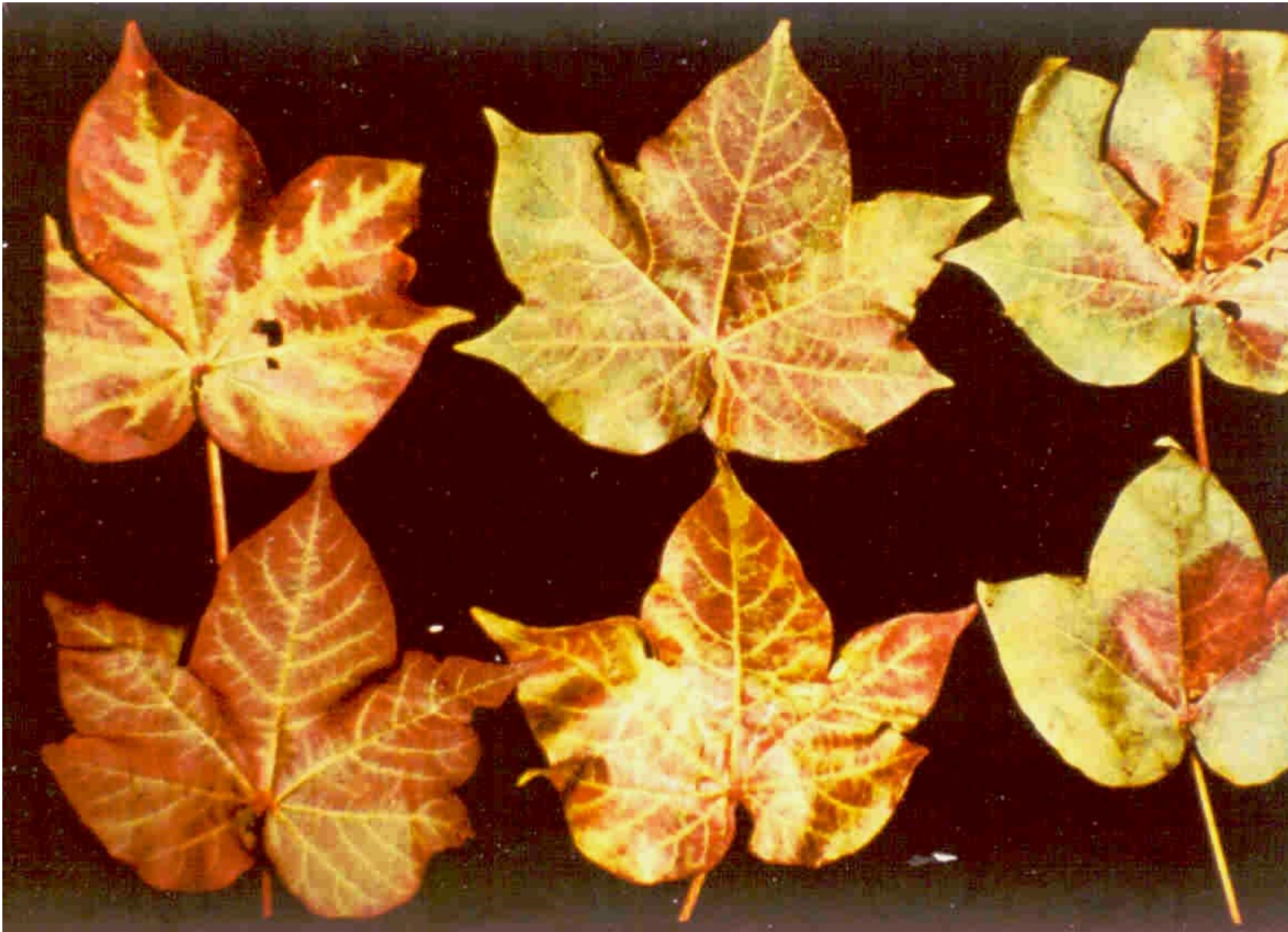
Prof. Jorge A. M. Rezende
jrezende@usp.br

1. RECONHECIMENTO

**2. FATORES QUE INDUZEM SINTOMAS SEMELHANTES
AOS DAS VIROSES**

3. DIAGNOSE

DEFICIÊNCIA NUTRICIONAL VS VÍRUS VS TOXEMIA DE ARTRÓPODE



Deficiência de Mg

Vermelhão (vírus)

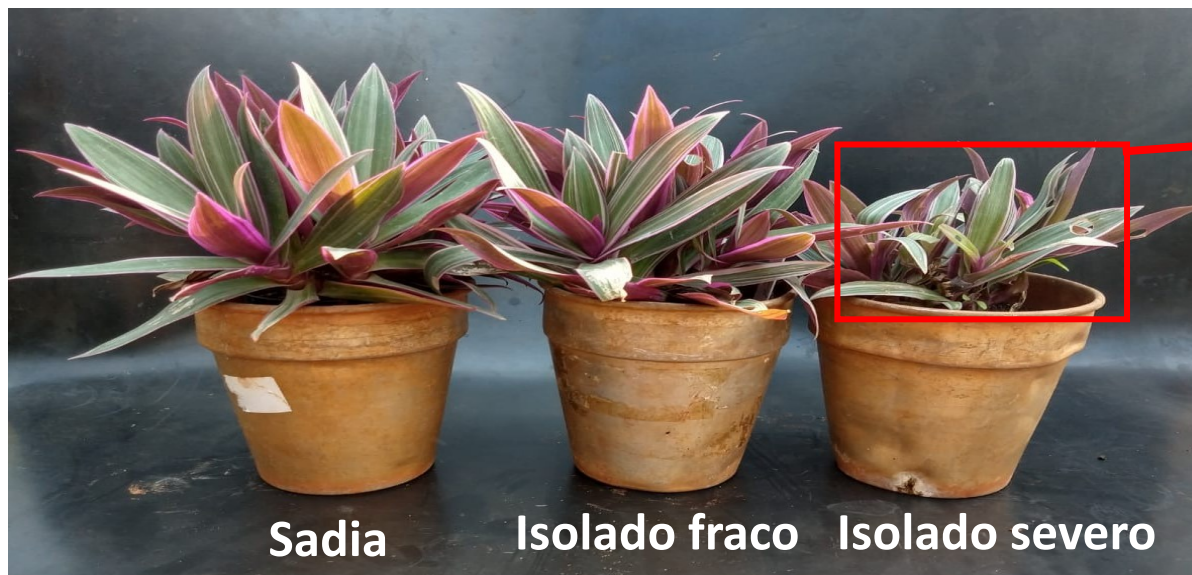
Ácaro

3. DIAGNOSE

1. Sintomas da planta no campo

- Experiência do investigador
- Infecção mista
- Estirpes diferentes
- Vírus que causam sintomas semelhantes
- Efeito do ambiente

Abacaxi roxo - *Tradescantia spathacea*



Costus stripe mosaic virus

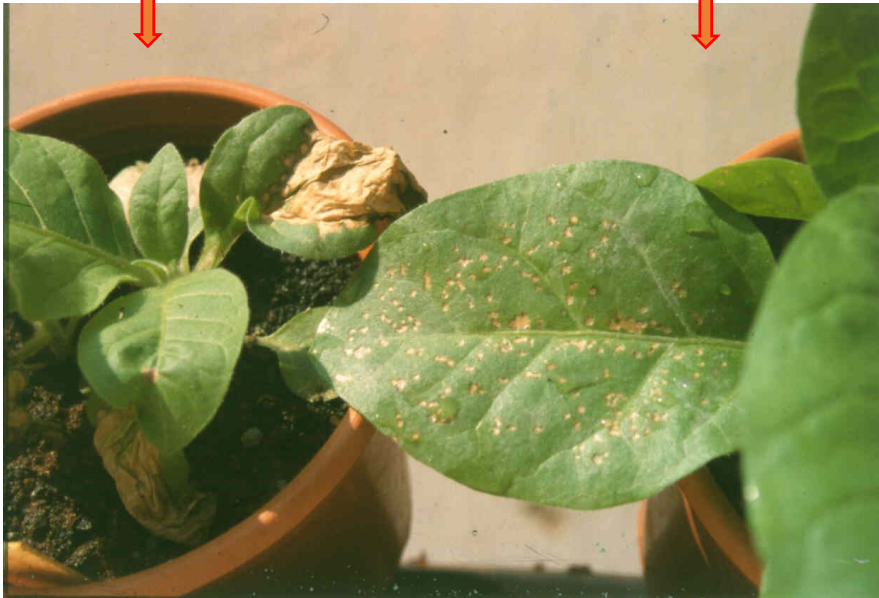
VÍRUS QUE CAUSAM SINTOMAS SEMELHANTES



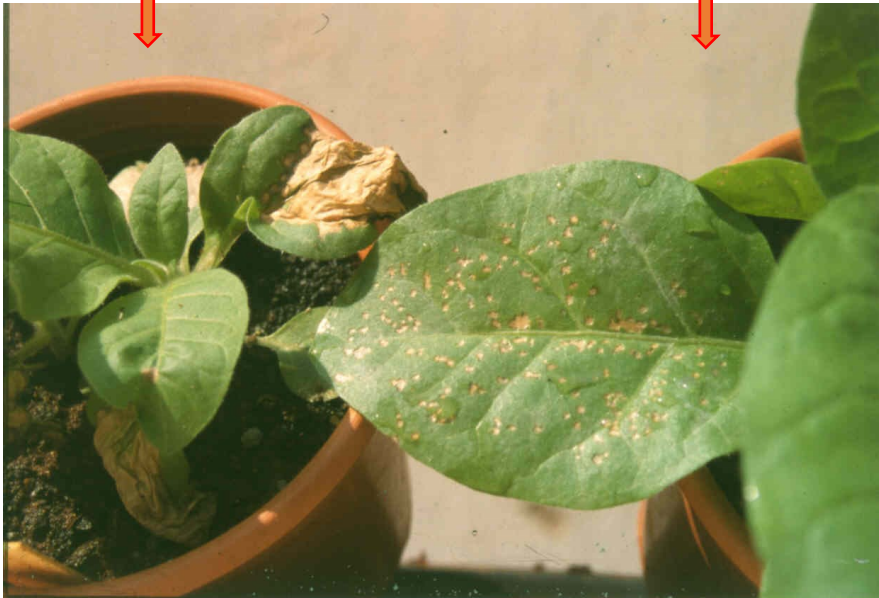
2. Planta indicadora

Espécie que reage com sintomas característicos e consistentes para o(s) vírus em estudo.

Vírus do mosaico do fumo



Vírus do mosqueado do pimentão



Vírus do mosaico amarelo da abobrinha



3. Hospedeiras diferenciais

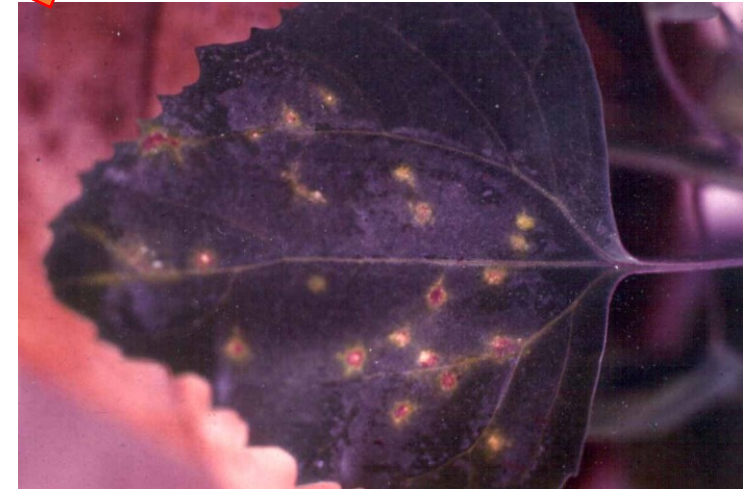
Vírus	Indicadoras			
	Abóbora	<i>C. quinoa</i>	<i>C. amaranticolor</i>	Feijão BT-2
PRSV-W	Mosaico	-	-	-
ZYMV	Mosaico	L.L.C	L.L.N.	-
WMV	Mosaico	L.L.C	L.L.N.	Mosaico



Abobrinha de moita



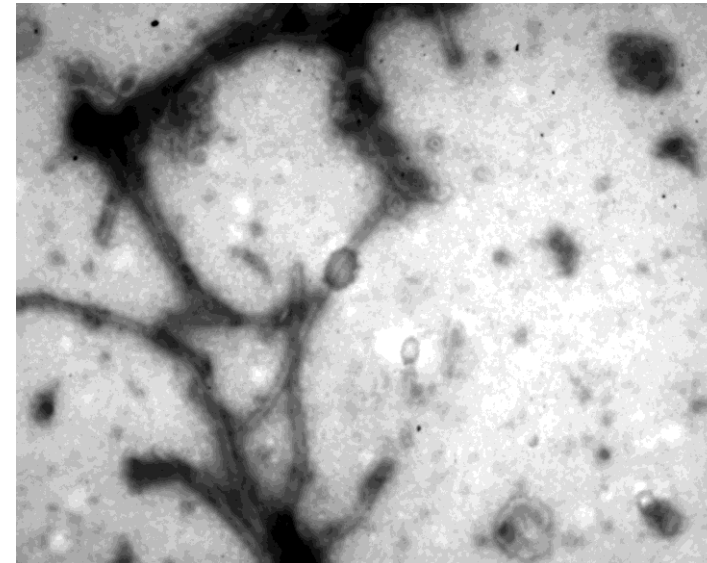
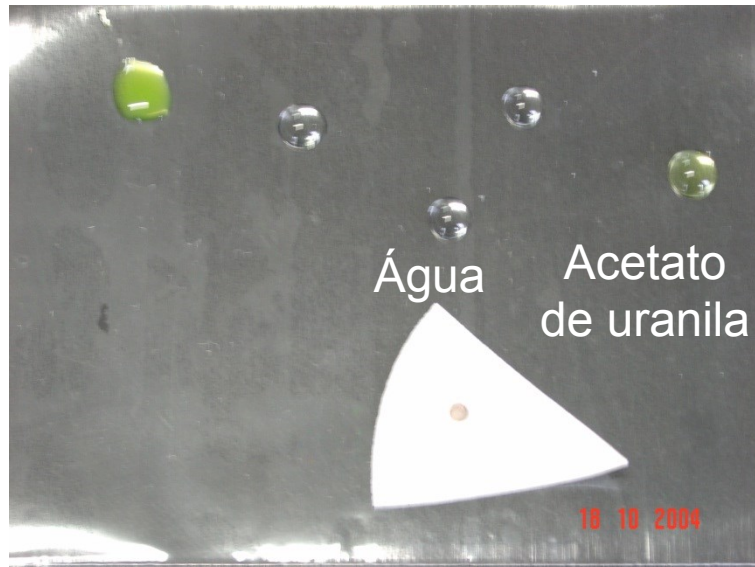
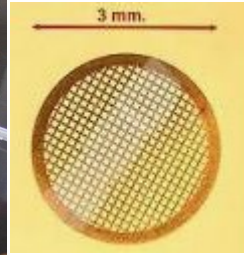
Chenopodium quinoa



Chenopodium amaranticolor

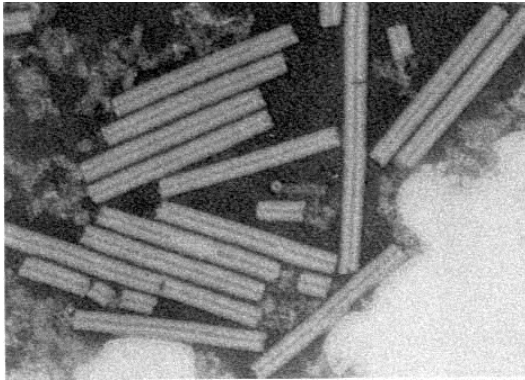
4. Microscopia Eletrônica de Transmissão

Contrastação negativa (“leaf dip”); morfologia das partículas

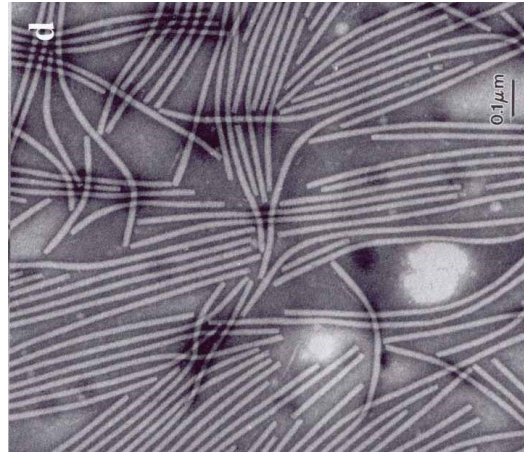


4. Microscopia Eletrônica de Transmissão

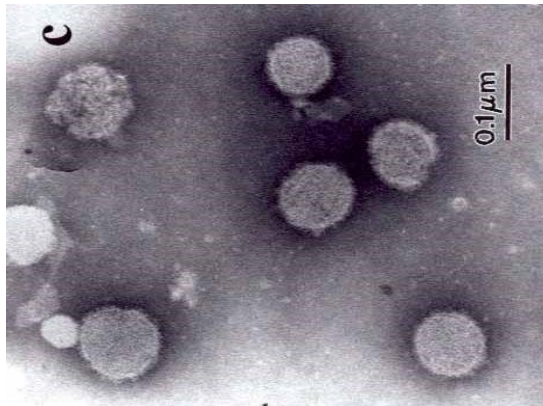
Cortes ultrafinos: morfologia da partícula e efeitos citológicos



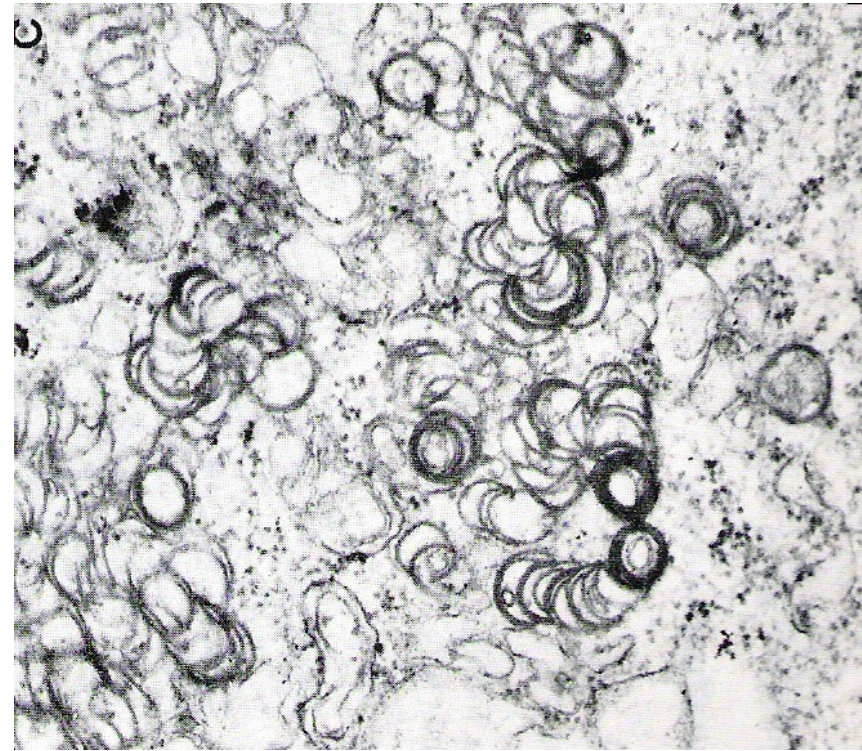
Tobamovirus - TMV



Potyvirus



Tospovirus

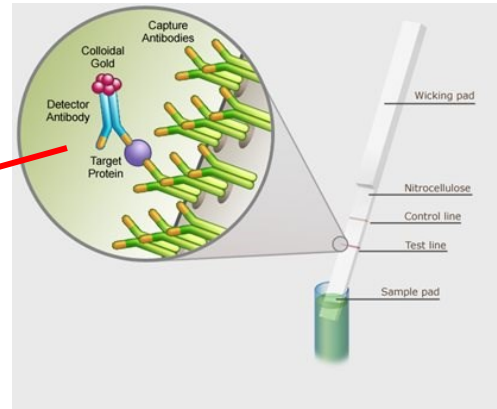


Inclusões citoplasmáticas de potyvirus

5. TÉCNICAS MOLECULARES

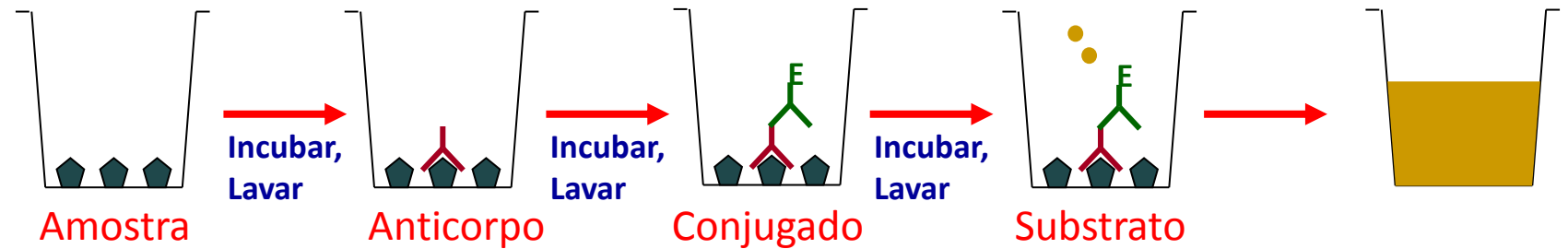
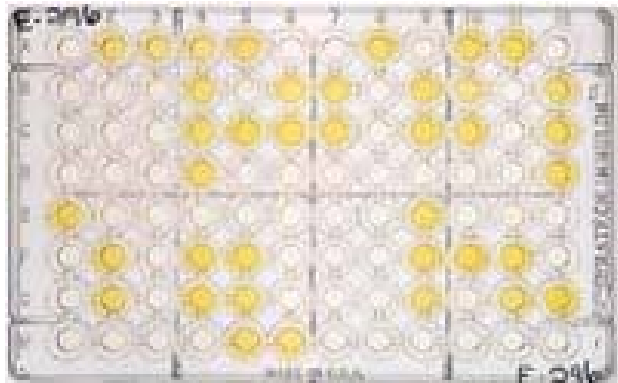
SOROLOGIA: ELISA, DOT BLOT, WESTERN BLOT

Teste da fita



<https://www.foodchainid.com/>

Enzyme Linked Immunosorbent Assay - ELISA



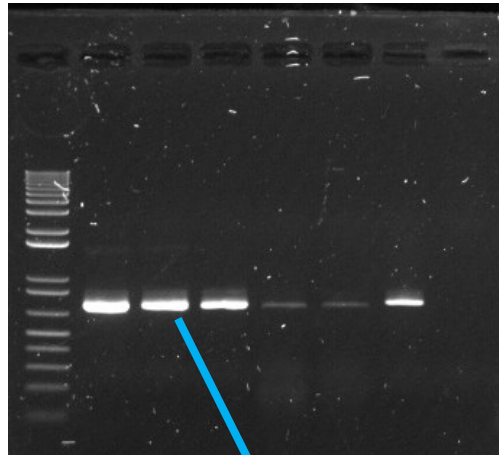
5. TÉCNICAS MOLECULARES

1. Reverse transcription - Polymerase chain reaction - RT-PCR

Para vírus de RNA

2. Polymerase chain reaction – PCR

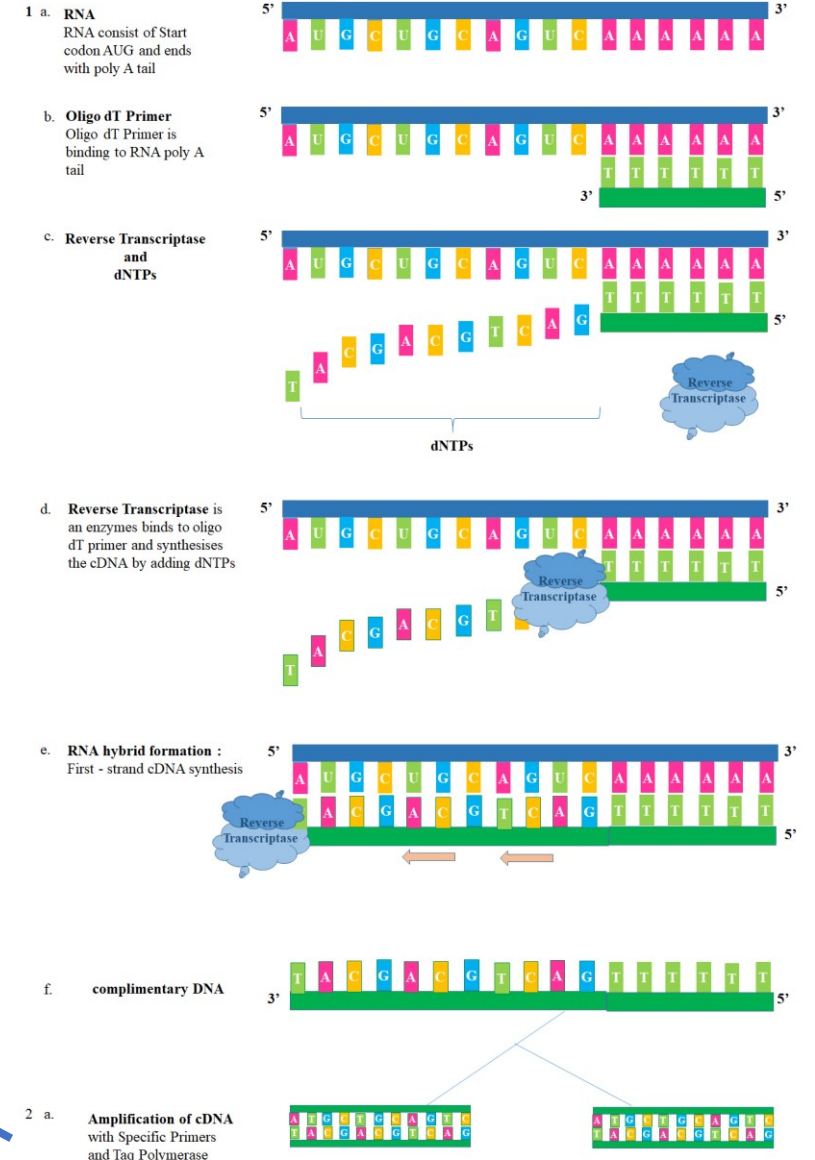
Para vírus de DNA



Sequenciamento de nucleotídeos dos amplicons
Identificação do vírus no Genbank

4.8 Reverse transcription polymerase chain reaction (RT-PCR)

In RT-PCR, The RNA population is converted to cDNA by reverse transcription (RT), and then the cDNA is amplified by the polymerase chain reaction. The cDNA amplification step provides opportunities to further study the original RNA species, even when they are limited in amount or expressed in low abundance. Common applications of RT-PCR include detection of expressed genes, examination of transcript variants, and generation of cDNA templates for cloning and sequencing.



5. TÉCNICAS MOLECULARES

- High throughput sequencing (HTS)
- Next generation sequencing (NGS)
- Deep sequencing
- Sequenciamento paralelo maciço

Permite o sequenciamento de milhões de nucleotídeos em curto interval de tempo.

Combinado com ferramentas de bioinformática permite a detecção de vírus já identificados e outros ainda desconhecidos