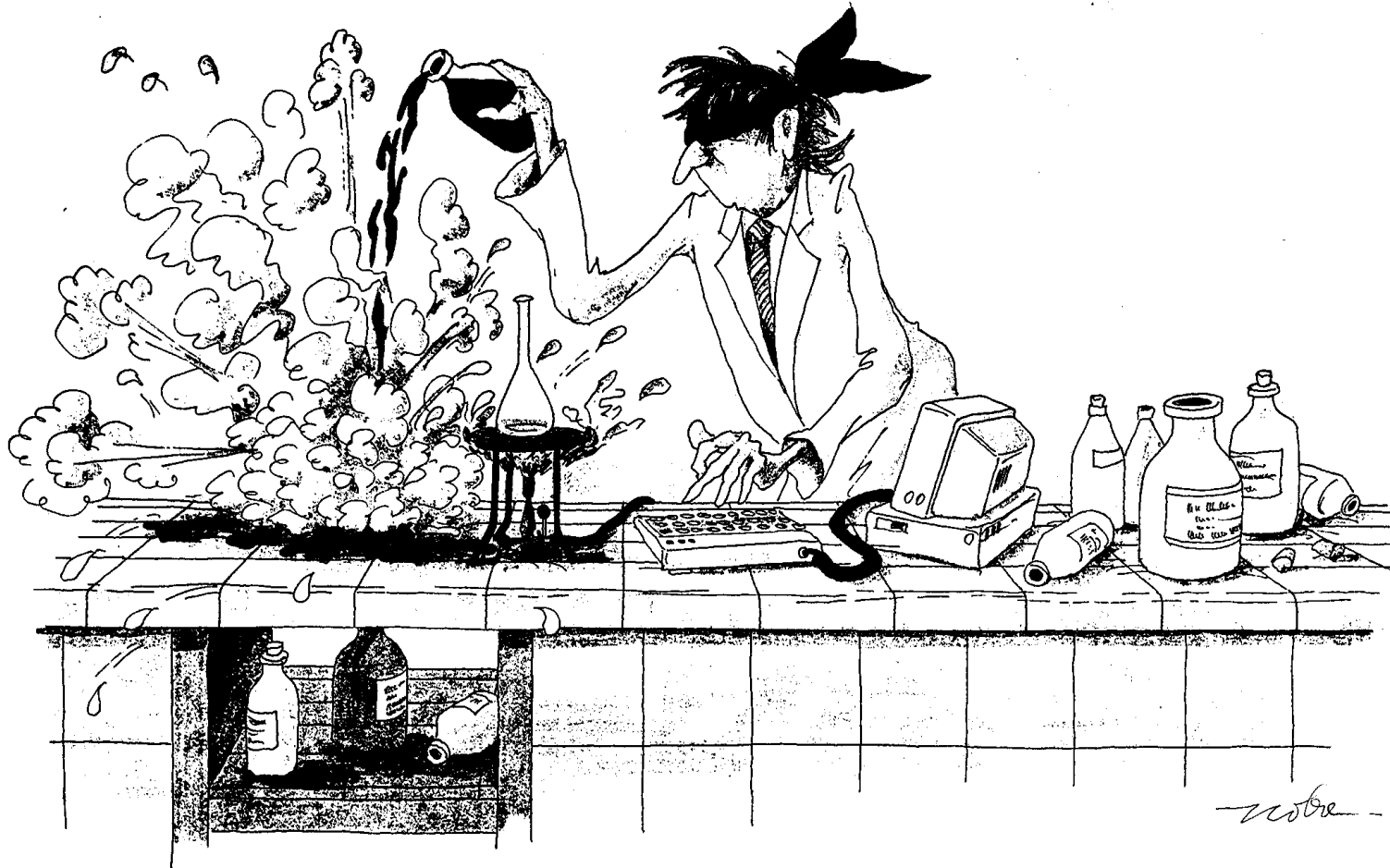
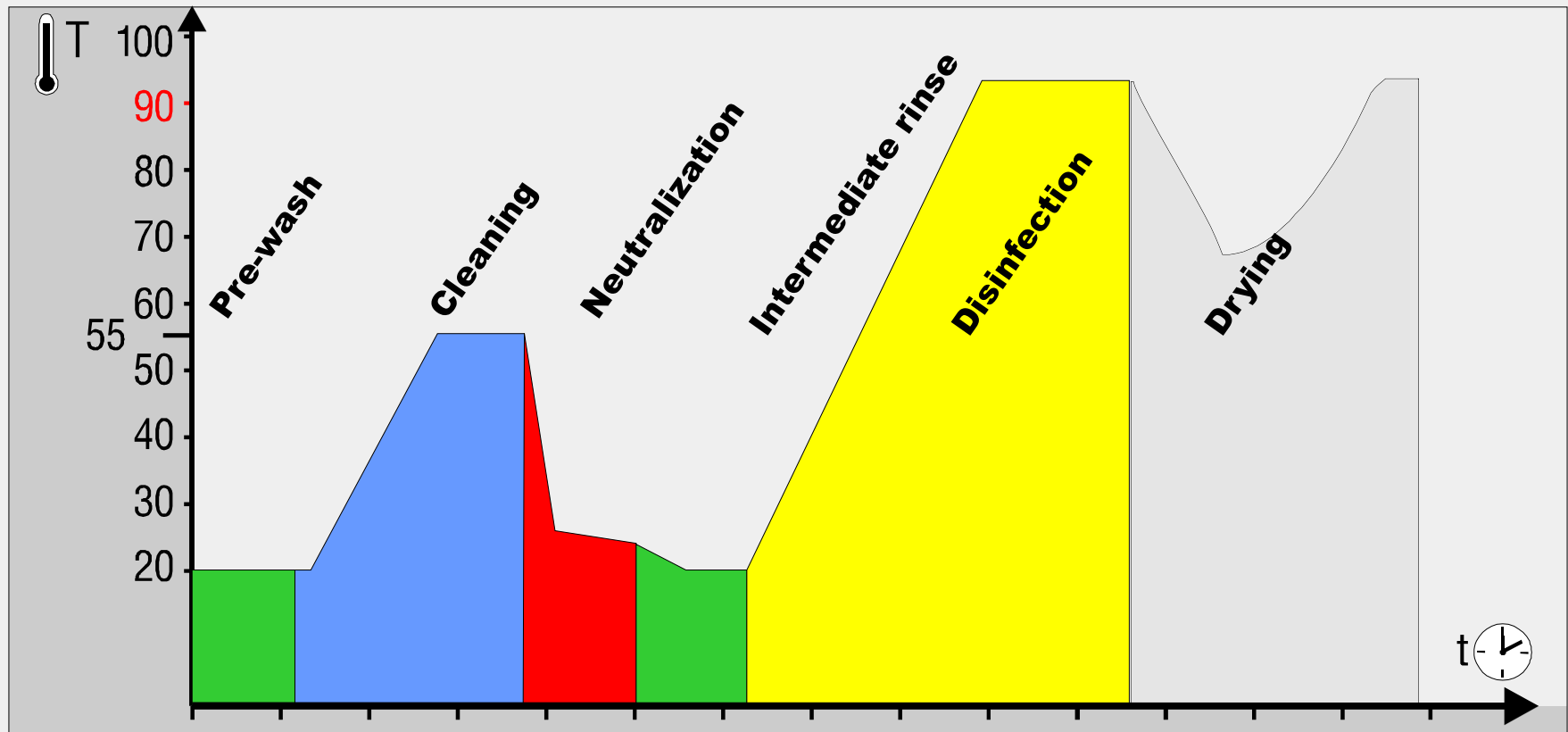


# Process Optimisation

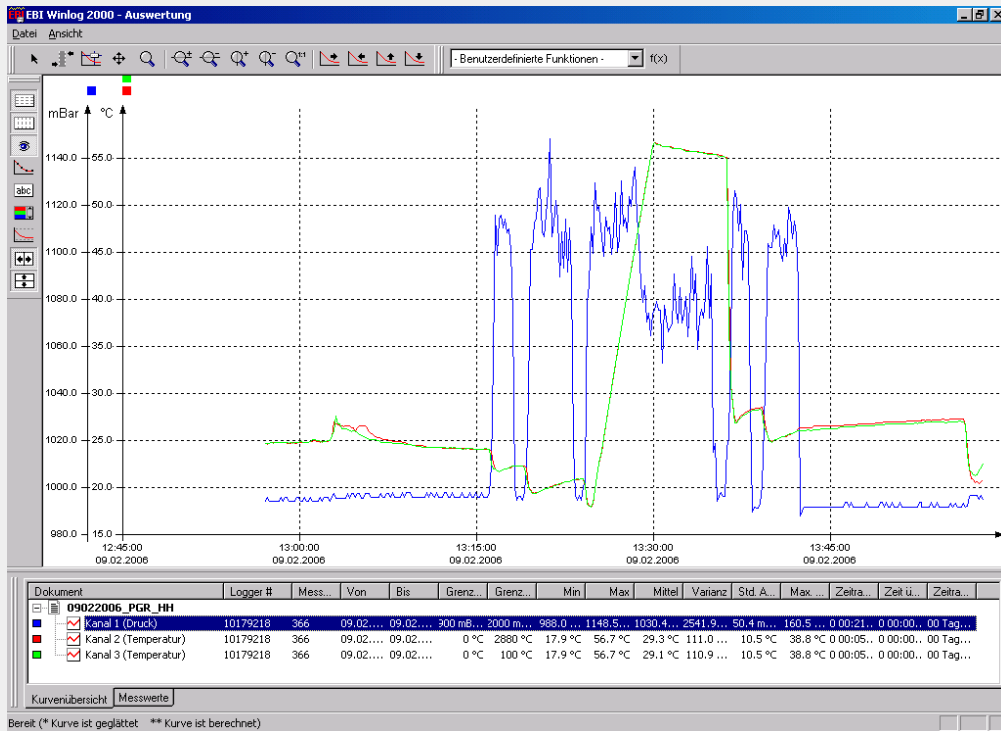


*Blindversuch*

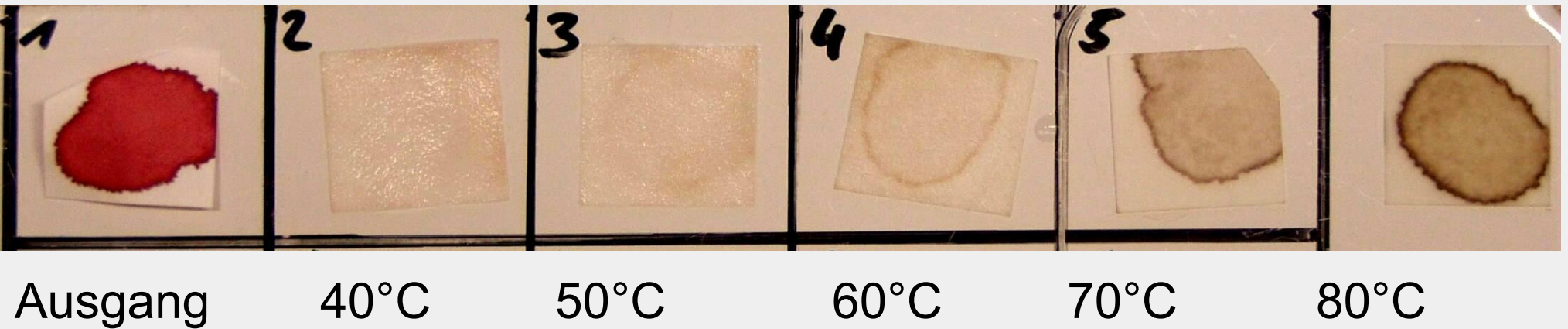
# Thermal disinfection



# Temperature and pressure measurement using a Logger



# Visualisation of blood fixation by thermal denaturation



# Protein denaturation by temperature

temperature (°C)	deionized water - restprotein (%)	deionized water pH11 - restprotein (%)
30	44,3	17
35	39,1	11,5
40	39,4	10,9
45	39,3	7,9
50	36,5	6,1
55	34	6,4
60	39,2	6,7
65	45,3	7,4

protein reduction of blood contaminated filter pieces after washing with normal and alkalized DI water at different temperatures. With the measurements at 60 and 65 °C the recovery was below 90%.

# Remaining cleaning problems

**Even with optimal design of the Vario-process not all cleaning tasks will be accomplished:**

- **Incrusted residual blood in difficult accessible areas of instruments (slits, joints)**
- **After longer drying on times, e.g. after surgery on weekend reprocessing the instruments on Monday**
- **Denaturation and fixation by antiseptika**
- **Thermal fixation with HF instruments**



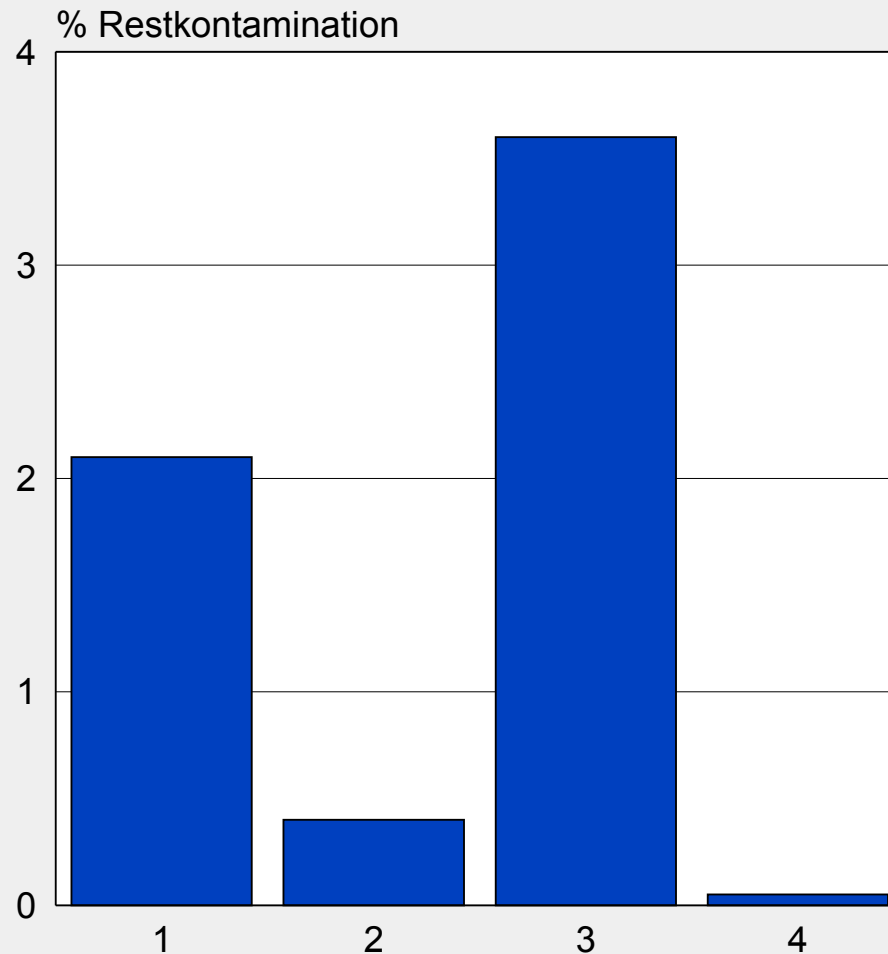
**In a domestic dishwasher (TOSI) fibrin polymer is easily removed by an oxidative cleaner.**



# Oxidative effect of peroxide in a laboratory test

## Filter paper method

1. DI-water
2. NaOH solution pH 11
3. Hydrogenperoxide 0,1 %
4. Peroxid 0,1%/ alk. FR pH 11

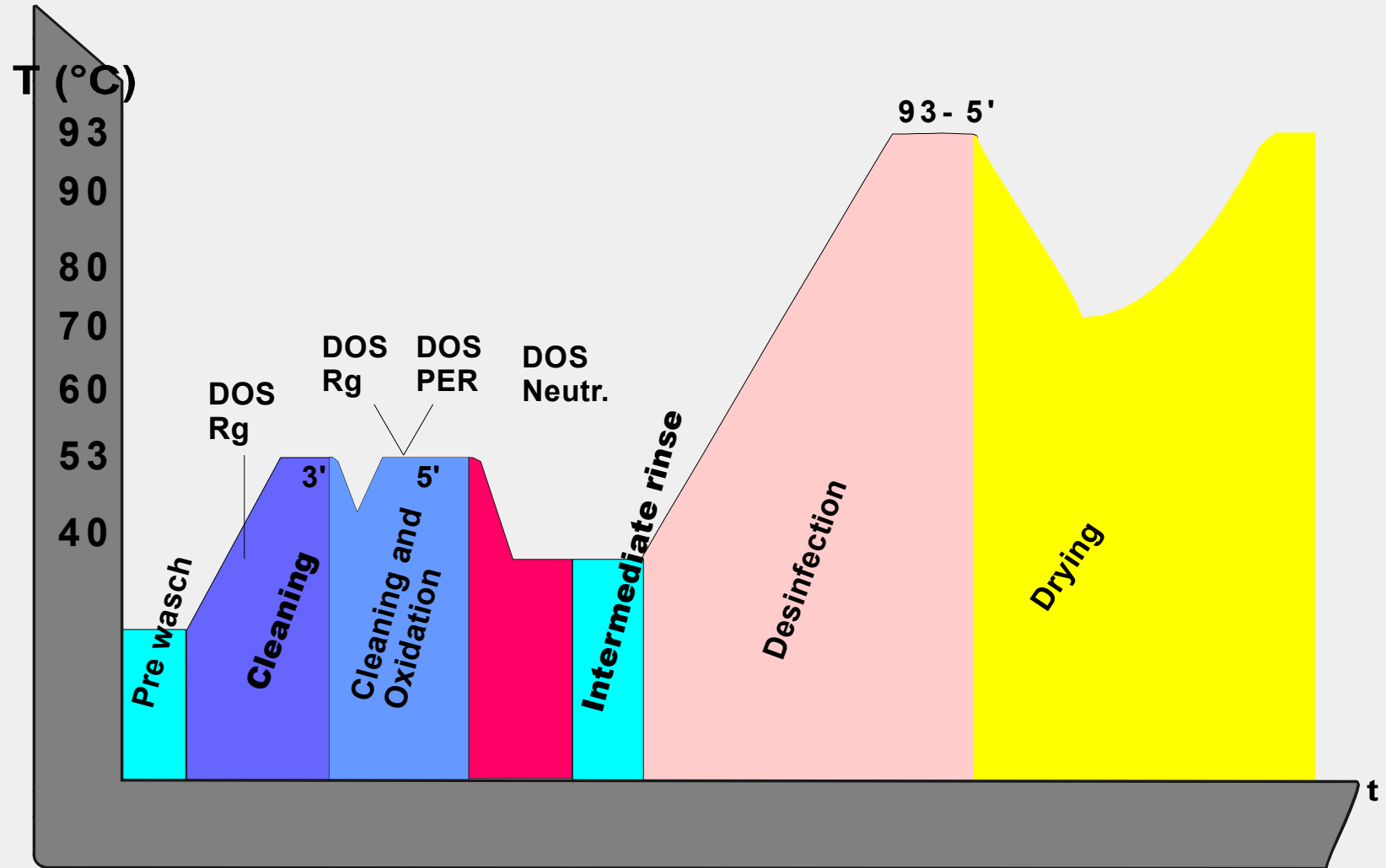




# Activation of active oxygen liberation by alkalinity



# The solution : Oxivario



# Blood fixated by glutardialdehyde

after Vario



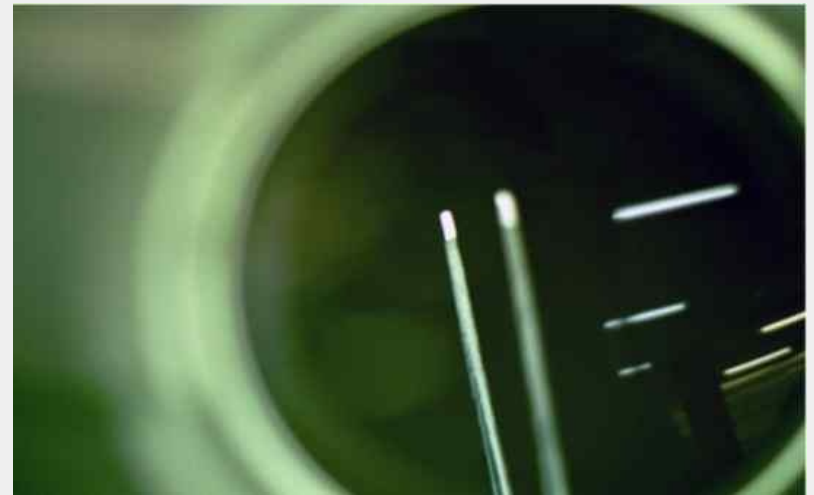
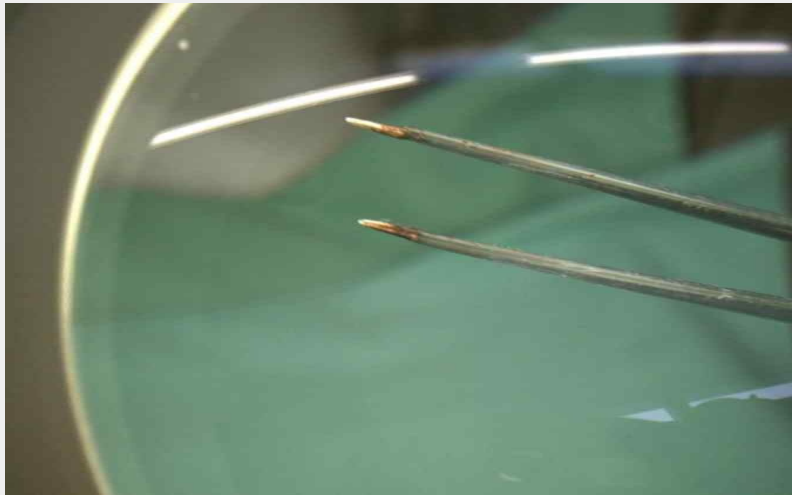
after Oxivario process



# Coagulation forceps

before

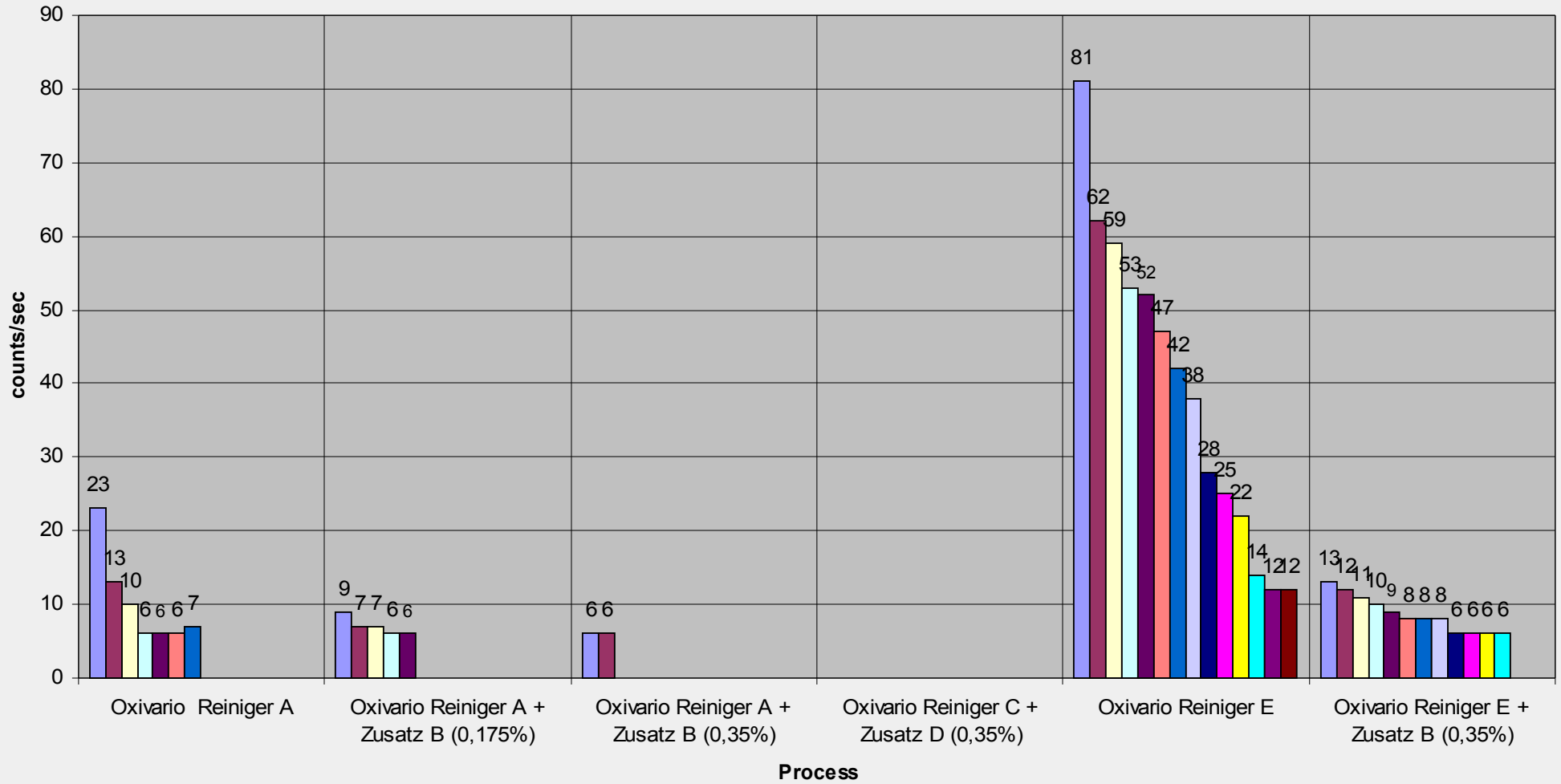
after Oxivario



# **Contamination of haemostatic clamp with clottable and radioactive labeled blood**

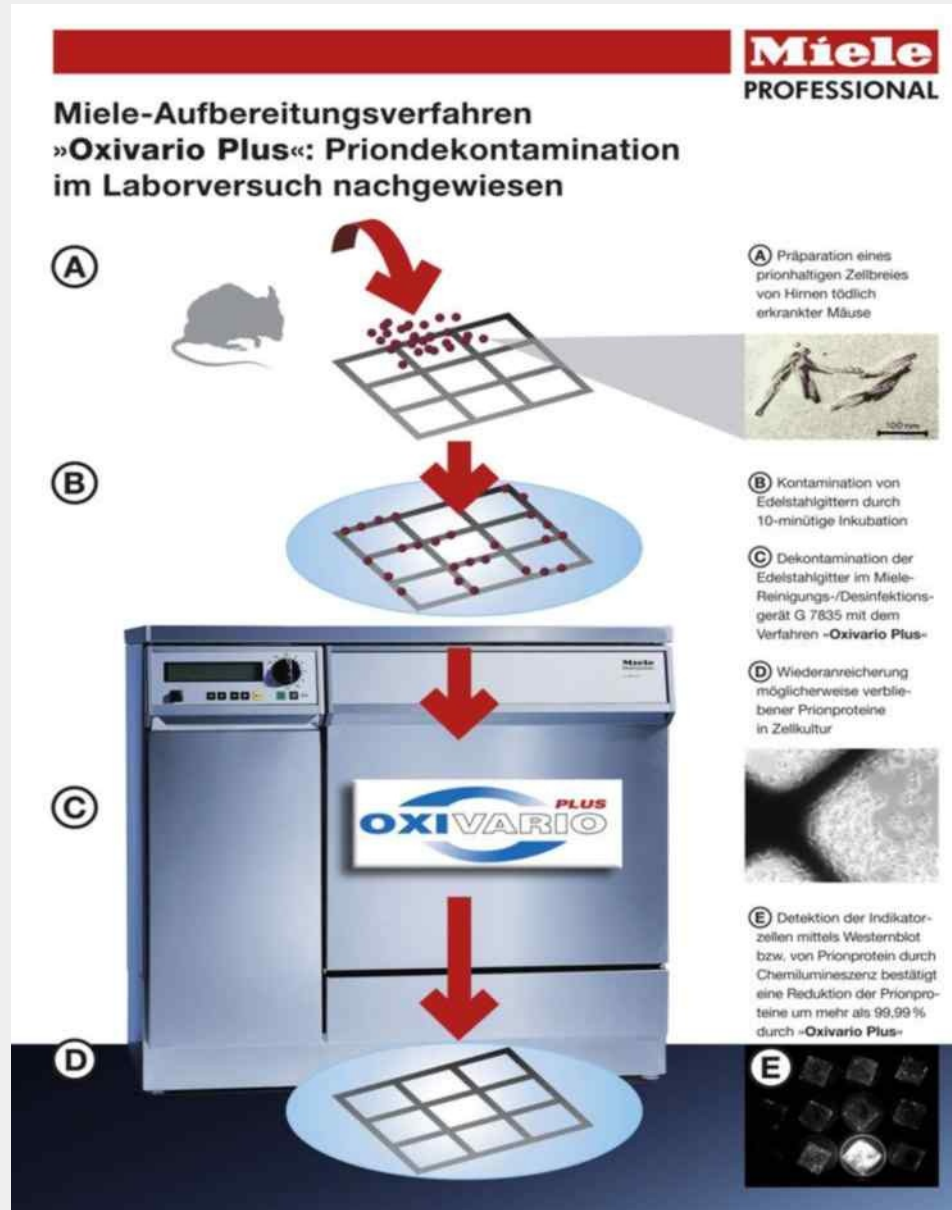


**number of clamps above 5 counts/sec**





# Prion decontamination





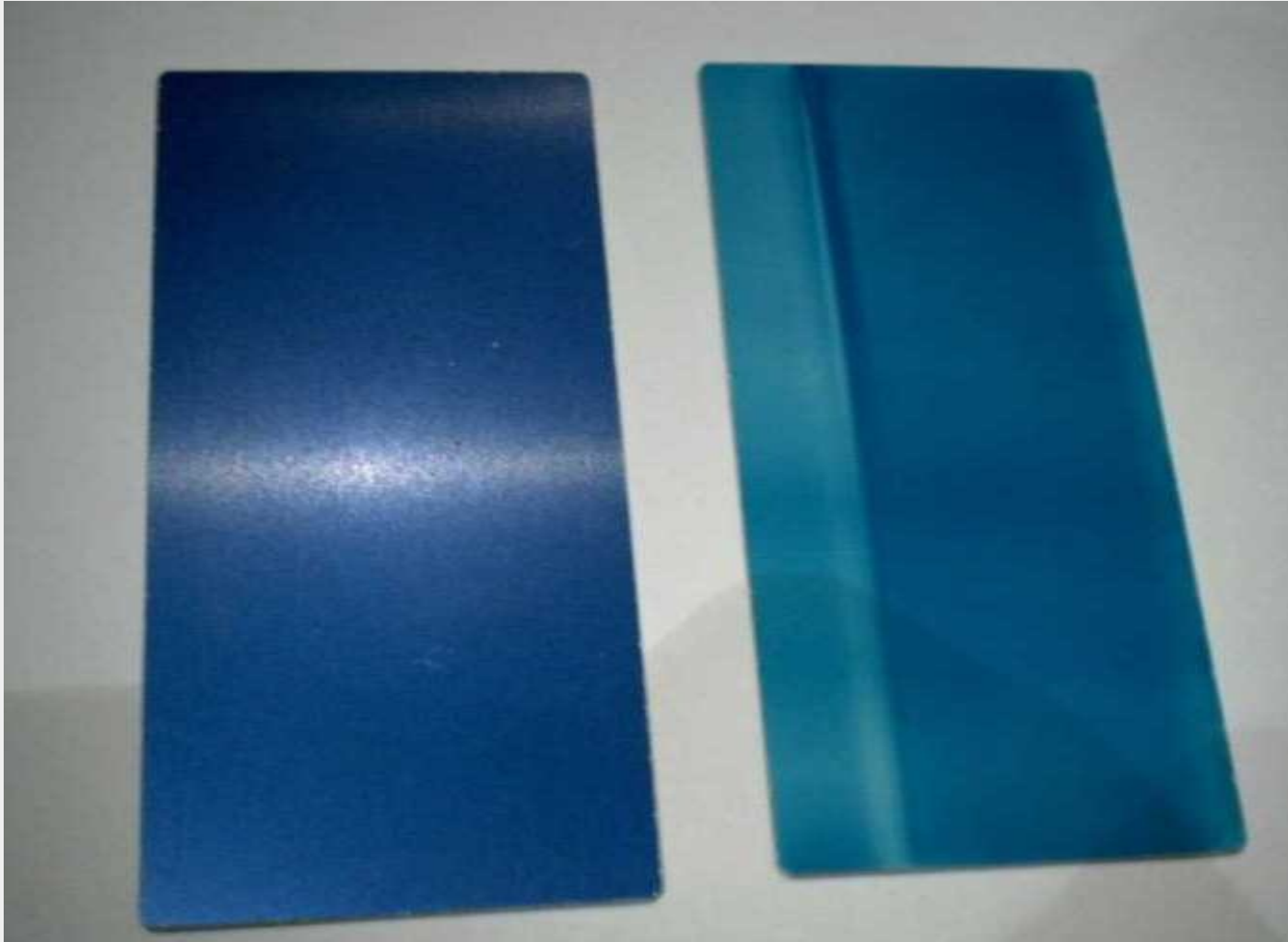
# Colour changes by Oxivario with Titanium implants



# Stainless steel coated with TiAlN by plasma technology



# Changes with anodised aluminium after one Oxivario cycle





# **Trials with anodized Al-plates**

## **Exposition for 1 hr at 55°C**



**Alkaline detergent solution adjusted to**

**pH 8,0 – 9,0 – 10,0 – 11,0**

# Tests with anodized Al-Plates

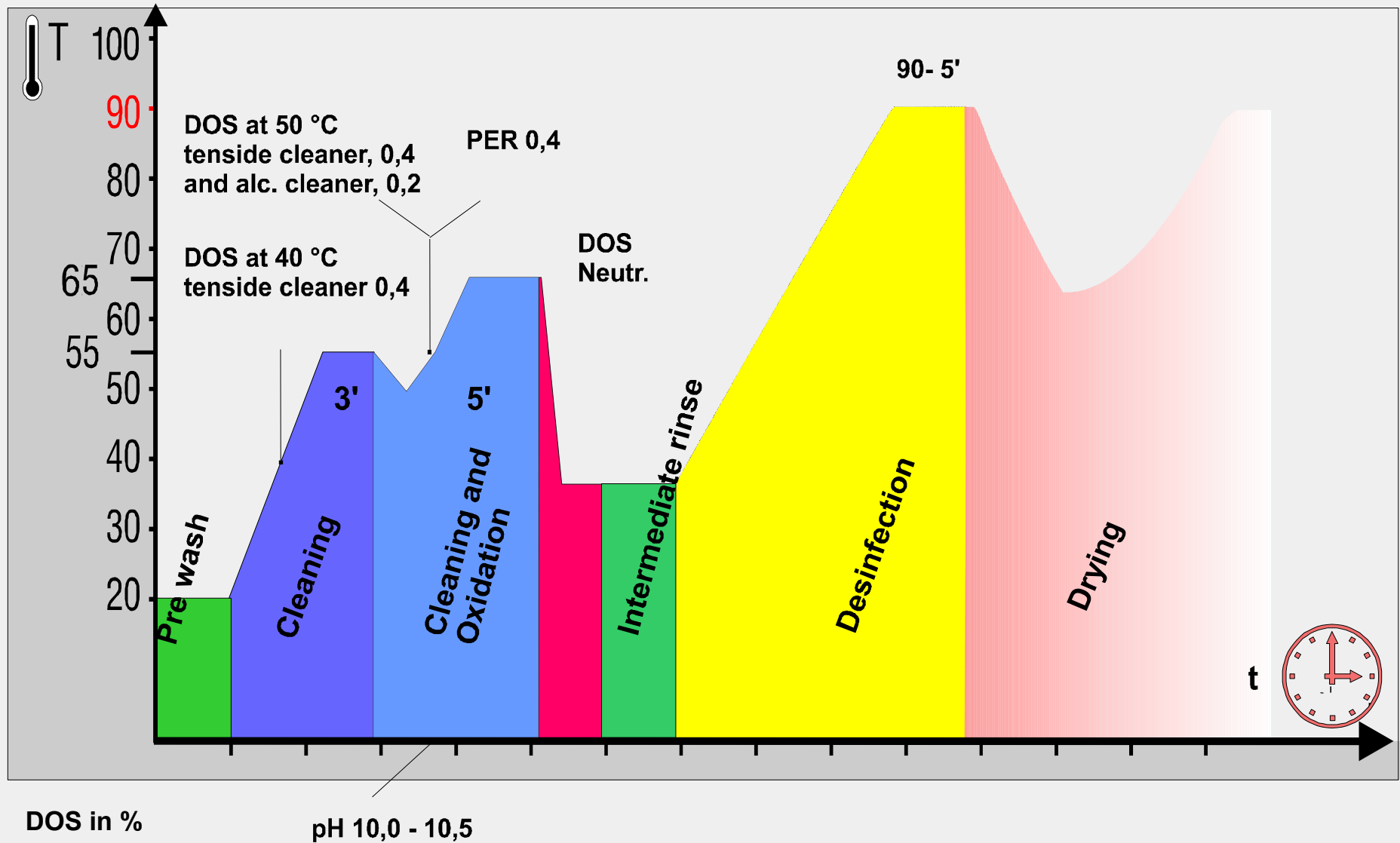
## Exposition for 1 hr at 55°C



**Alkaline detergent solution + hydrogenperoxide (32%) 0,35%**

**pH 8,0 – 9,0 – 10,0 – 11,0**

# Orthovario process





# Tests with motor system and material obtained from Aesculap



# Mobile unit for orthopaedic instruments



**Improving cleaning - we are on a good way!**

