

ALSACE BIO HYGIENE

Microbiological analyses of nutrition

Advising audits in hygiene

Personal trainings

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Evaluation of the POTEMA[®] system

- Bacteriological
- Mycological
- Paracritical

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- Pharmacist / Biologist -

Methodology

The "SCOTCH-test" technique

- 10 samples of scotch tape were fixed on a contaminated mattress surface before the vacuum-cleaning was started and got transferred to microscope slides later on.
- 10 samples were taken at the same kind after 5 minutes of vacuum-cleaning.
- The results were analysed by microscope (obj. 40).

- RESULTS

The pre-test of vacuum-cleaned tissues showed a heavy concentration of potential allergens:

- tissue fibres
- fungi spores
- fungal filaments*
- fungi conidiophores
- plant pollen
- plant residues
- acarines (house dust mites)

This examination was proved by the ACAREX-test made with extracted vacuum-cleaned dust. (Maximal coloration of the producer's test scale was reached!)

EXAMINATION OF THE MICROSCOPE SLIDES

- Before vacuum-cleaning:

- Slide N°1: **tissue fibres +++, conidiphores of penecillium, pollen, fungi spores +++**
- Slide N°2: **tissue fibres +++, spores +++, fungal filaments**
- Slide N°3: **pollen +++, conidiphores of penecillium, tissue fibres +++, acarine (1), tissue fibres +**
- Silde N°4: **tissue fibres +, spores ++**
- Silde N°5: **spores +++, fungal filaments, tissue fibres +++, pollen ++**
- Silde N°6: **spores ++, pollen ++, tissue fibres +++**
- Silde N°7: **spores +++, acarine (1), fungal filaments ++, pollen +, tissue fibres +**
- Silde N°8: **condidiphores of penecillium, spores +++, fungal filaments ++, tissue fibres +++**
- Silde N°9: **condidiphores of aspergillus, spores +++, fungal filaments ++, tissue fibres +++**
- Silde N°10: **condidiphores of aspergillus, spores +++, acarine (1), pollen +++, tissue fibres +++**

* Fungal filaments (botanical: hyphens) built up the mycelium (= "roots" of a fungus).

- After the vacuum-cleaning of 5 minutes (minimum time recommended by the producer)

- Slide N°1: **tissue fibres +**
- Slide N°2: **tissue fibres +**
- Slide N°3: **tissue fibres +, spores +**
- Silde N°4: **tissue fibres +**
- Silde N°5: **tissue fibres +**
- Silde N°6: **tissue fibres +, spores +**
- Silde N°7: **tissue fibres +, spores +**
- Silde N°8: **tissue fibres +**
- Silde N°9: **tissue fibres +**
- Silde N°10: **tissue fibres +**

CONCLUSION:

According to the results a very significant reduction of allergens is ascertained:

- Elimination of all development stages of fungi (fungal filaments, conidiphores)
- Elimination of the vegetative forms of acarines (= house dust mites)
- Elimination of pollen and plant residues
- Extreme elimination of fungi spores (3 of 10 microscope slides were barely positive)

The combination of vacuuming with high frequency vibrations approves a very good elimination for the most part of the potential allergens.

EVALUATION OF THE ACTIVITY OF THE POTEMA® MATTRESS CLEANING SYSTEM

D) THE ACTIVITY OF DIFFERENT RESPIRATORY ALLERGENS

- In France respiratory allergies are an important problem at the public health system.

- Most of the respiratory allergies are caused by the following allergens:

ACARINES	D2	Dermotophagoides farinae
	D1	Dermotophagoides pteronyssius
MOULD	M6	Alternaria alternata
	M3	Aspergillus fumigatus
	M1	Penecillium notatum
ANIMAL	E1	Epithelium of cats
	E2	Epithelium of dogs
POLLEN	G2	Agropyron repens (couch grass)
	G6	Phleum pratense (grass pollen)
TREES	T3	Birch
	T9	Olive
HERPES	W1	Ambrosia artemisiifolia (common ragweed)
	W3	Ambrosia trifida (giant ragweed)
	W6	Artimisia vulgaris (mugwort)
	W19	Parietaria officinalis (wall pellitory)
	W9	Plantago lanceolata (plaintain, ribwort)

- The concentration of the above mentioned allergens in a closed area may cause severe crisis.
- Many of these allergens are constantly found in mattresses (acarines, mould), other were found casually (pollens, hairs of dogs and cats, ...).
- While the cleaning of smooth surfaces with a normal household vacuum-cleaner is sufficient, its function may be unsuitable for mattress surfaces or other permanent textures. This causes ecological niches, which cannot be affected by a classical household vacuum-cleaner.

II) BACTERIOLOGICAL ANALYSIS

Evaluation of the combined action of ultraviolet radiation (UV) and the vacuuming process

- The ultraviolet radiation induces a bonding of the thymine bases of the bacteria DNA. This bonding prohibits the DNA replication whereby the bacteria can't split anymore and get eliminated.
- For this reason bacteria, which were not removed by vacuuming, get an irreversible damage, which causes their destruction, by the usage of the system.

- **METHOTOLOGY:** by application of sterile gauze (5/5cm)

- Sterile gauze is applied on the mattress before and after the vacuum-cleaning
- The analysis is made by application on liquid medium:
 - 1) mesophile flora at 30°C (PCA medium)
 - 2) enterobacteria (DRIGALSKY medium)

- RESULTS:

	BEFORE VACUUMING / UV RADIATION	AFTER VACUUMING / UV RADIATION
Mesophile Flora	50 000 CFU / 25 cm ²	500 CFU / 25 cm ²
Enterobacteria	20 CFU / 25 cm ²	< 1 CFU / 25 cm ²

III) CONCLUSION

- Though the combination of vacuuming and high frequency vibrations the **POTEMA**[®] system provides enormous interest for the prevention of allergic diseases, not only because of the elimination of the allergens (numerous at our analysis) but rather it's removal from the textile fibres.
- At our analysis the activity of the ultraviolet radiation (at 253,7 nm) had an interesting disinfecting effect by reducing the total flora of the factor 100. This effect could be improved, if the cleaning time would be extended from 5 to 10 minutes. The application of the **POTEMA**[®] system could be used in hospitals and health care related sectors to prevent nosocomial infection.

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Resume of the examination

Evaluation of the activity of the POTEMA[®] mattress cleaning system

I) THE ACTIVITY OF DIFFERENT RESPIRATORY ALLERGENS

- TECHNIQUE: "SCOTCH-"tape TEST

ESTIMATION OF ALLERGENS FROM THE FIRST RESIDUES OF THE VACUUMED DIRT

- The microscope analysis shows a black coloured composition of mattress fibres, spores, fungal filaments, pollen, plant residues and some acarines (house dust mites).
- The "ACAREX- test" reacts very positive
- Methodology
- 10 microscope slides were analysed before and after the vacuuming process.
- The microscope analysis shows a **significant reduction** of the bacteriological contamination of the tested mattress surface.

II) BACTERIOLOGICAL ANALYSIS

- TECHNIQUE: application of sterile gauze
- Sterile gauze was applied on the mattress before and after the vacuum-cleaning.
- After the breeding of the bacteria cultures a significant elimination of the bacteriological contamination of the mattress surfaces could be attested.

III) CONCLUSION

- Excellent eliminating effect on respiratory allergens.
- Good germicidal action through the additional effect of UV radiation in combination with vacuuming and high frequency vibrations.