Safe-design adhesives used on food packaging materials

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Samtack is a SME dedicated to the production and commercialization of hot melt and water based adhesives for graphic arts, paper, packing and packaging.

The commitment to innovation is one of our strongest points.

Samtack has been working with the GUIA group led by Cristina Nerín at the University of Zaragoza from 2007.

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Materials and articles, including active and intelligent materials and articles, shall be manufactured in compliance with good manufacturing practice so that, under normal or foreseeable conditions of use, they do not transfer their constituents to food in quantities which could:

(a) endanger human health;
or
(b) bring about an unacceptable change in the composition of the food;
or
(c) bring about a deterioration in the organoleptic characteristics thereof.
Is a SML (Regulation (EU) No. 10/2011)?

- yes
- no

Is a No Observed Adverse Effect Level (NOAEL)?

- yes
  - NOAEL/100
  - Tolerable Daily Intake (mg/kg.bw/day)
  - Self derived SML = NOAEL/100 (mg/Kg)
- no

Threshold of Toxicological Concern (TTC)
- Cramer class I: 1.8 mg/person/day
- Cramer class II: 0.54 mg/person/day
- Cramer class III: 0.09 mg/person/day

Self derived SML = TDI (mg/Kg)
- (Person eating 1Kg per day)

To find out where the compound come from

Replacement of the additive

*Risk assessment of non-listed substances and not-intentionally added substances under article 19. Plastics Europe Association of Plastics Manufacturers*
ADHESIVES COMPOSITION

catalyst
hardeners
accelerators
inhibitors
retarders
thickeners
film formers
wetting agents
carrier
plastizicers
tackifiers
antioxidants
antifungal
surfactants
extenders
fillers
MIGRATION TO FOOD

- CURING TIMES AND CONDITIONS
- INTERACTION WITH SUBSTRATES
- BARRIER PROPERTIES
- RATIO OF ADHESIVE/PACKAGING

- IAS
- NIAS

- CONTAMINATION
- DEGRADATION PRODUCTS
- IMPURITIES
- REACTION PRODUCTS
REPRESENTATIVE MIGRATION STUDIES

- BIODEGRADABLE ADHESIVE USED TO BUILD FOOD CONTACT MULTILAYERS

- SELF-STICK LABEL FOR DIRECT FOOD CONTACT

- ACRYLIC ADHESIVE USED TO BUILD FOOD CONTACT LAMINATES
BIODEGRADABLE ADHESIVE

EXTRACTION AND ANALYSIS OF THE ADHESIVES ON THE LAMINATES IN ORDER TO IDENTIFY THE POTENTIAL MIGRANTS GC-MS, APGC-MS/Q-TOF AND UPLC-MS/Q-TOF
BIODEGRADABLE ADHESIVE

UPLC-Q-TOF

FILM 1

FILM 2

NIAS
BIODEGRADABLE ADHESIVE

Multilayer 1: PLA - adhesive 4 g/m²-PLA
Multilayer 2: Ecovio®-adhesive 4 g/m²-Ecovio®
Multilayer 3: Ecovio®- adhesive 4 g/m²-PVA- adhesive 4 g/m²-Ecovio®

1,6,13,18-tetraoxacyclotetracosane-7,12,19,24-tetraone migration to Tenax

Self derived SML Cramer class I 1.8 mg/Kg

COMPLIES WITH REGULATION 1935/2004
SELF-STICK LABEL IN FRESH SAUSAGE

GC-MS

APGC-Q-TOF
SELF-STICK LABEL IN FRESH SAUSAGE
SELF-STICK LABEL IN FRESH SAUSAGE

PET ADHESIVE FOOD

LABEL DIRECT CONTACT

MIGRATION STUDY

M-HS-SPME-GC-MS ANALYSIS
SELF-STICK LABEL IN FRESH SAUSAGE

Self derived SML
Cramer class I = 1.8 mg/Kg
Cramer class II = 0.54 mg/Kg
Cramer class III = 0.09 mg/Kg

Adhesive covers less than 40% of the food surface

COMPLIES WITH REGULATION 1935/2004
ACRYLIC ADHESIVE FOR LAMINATES

UPLC-Q-TOF

**SURFACTANT**
2,4,7,9-Tetramethyl-5-decyne-4,7-diol
2,4,7,9-Tetramethyl-5-decyne-4,7-diol ethoxylated
Multilayer 1: PET-adhesive - PAPER
Multilayer 2: PE-adhesive - PAPER
Multilayer 3: PP-adhesive - PAPER
Multilayer 4: ECOVIO®-adhesive - PAPER
Multilayer 5: PLA-adhesive - PAPER

Self derived SML
Cramer class II = 0.54 mg/Kg
Cramer class III = 0.09 mg/Kg
RISK ASSESSMENT

Is a SML (Regulation (EU) No. 10/2011)?

- **no**

Is a No Observed Effect Adverse Level (NOAEL)?

- **yes**
  - Safety factor = 100
  - Tolerable Daily Intake (mg/kg bw/day)
  - Self derived SML = 60xTDI (mg/Kg)

- **no**

Toxicological Threshold of Concern (TTC)
- Cramer class I: 1.8 mg/person/day
- Cramer class II: 0.54 mg/person/day
- Cramer class III: 0.09 mg/person/day

Self derived SML = TDI (mg/Kg)
(Person eating 1Kg per day)

COMPLIANCE

- NO COMPLIANCE

TO FIND OUT WHERE THE COMPOUND COME FROM

REPLACEMENT OF THE ADDITIVE

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THANK YOU FOR YOUR ATTENTION!