SAFETY DATA SHEET
Regulation (EC) No 1907/2006 (REACH), Annex II
(COMMISSION REGULATION (EU) No 453/2010)

Version 1  Issue Date 04-Sep-2014
Product Name PBAT modified starch--Ecoworld®FS-0330  Revision date 04-Sep-2014

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier
Product Name   PBAT modified starch--Ecoworld®FS-0330
REACH registration number   No information available

1.2. Relevant identified uses of the substance or mixture and uses advised against
Recommended Use   Biodegradable resin
Uses advised against   No information available

1.3. Details of the supplier of the safety data sheet
Supplier   JINHUI ZHAOLOONG NEW TECHNOLOGY CO.,LTD
Address   XIAOYI ECONOMIC DEVELOPMENT ZONE, LVLIANG, SHANXI PROVINCE
Postal Code   032308
Phone   +86-351-8689356-8009
FAX   +86-351-8689718
E-mail   springshi@jinhuigroup.com

1.4. Emergency telephone number
+86-351-8689356

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture
Classification according to Regulation (EC) No. 1272/2008 [CLP]
Not classified

Classification according to Directive 67/548/EEC or 1999/45/EC
Not classified

2.2. Label elements
Symbols/Pictograms   None
Signal word   None
Hazard Statements   Not applicable
Precautionary Statements   Not applicable
2.3. Other hazards

No information available

SECTION 3: Composition/information on ingredients

3.1. Polymer

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>EC No</th>
<th>CAS No</th>
<th>Weight-%</th>
<th>Classification according to Directive 67/548/EEC or 1999/45/EC</th>
<th>Classification according to Regulation (EC) No. 1272/2008 [CLP]</th>
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</thead>
<tbody>
<tr>
<td>BDO</td>
<td>203-786-5</td>
<td>110-63-4</td>
<td>-</td>
<td>Xn; R22&lt;br&gt;R67</td>
<td>Acute Tox. 4 (H302)&lt;br&gt;STOT SE 3 (H336)</td>
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<tr>
<td>TPA</td>
<td>202-830-0</td>
<td>100-21-0</td>
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<td>Not classified</td>
<td>Not classified</td>
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<tr>
<td>Adipic acid</td>
<td>204-673-3</td>
<td>124-04-9</td>
<td>-</td>
<td>Xi; R36&lt;br&gt;Eye Irrit. 2 (H319)</td>
<td>Not classified</td>
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<tr>
<td>Starch</td>
<td>232-679-6</td>
<td>9005-25-8</td>
<td>-</td>
<td>Not classified</td>
<td>Not classified</td>
</tr>
</tbody>
</table>

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice
Remove contaminated clothing and shoes. If symptoms persist, call a physician.

Inhalation
Not an expected route of exposure. If inhale dust, get medical advice/attention immediately.

Skin Contact
Product is not irritating to skin. Wash off with soap and water after handling.

Eye contact
Not an expected route of exposure. No first aid measures needed.

Ingestion
Not an expected route of exposure. If swallowed by mistake. Get medical attention immediately.

4.2. Most important symptoms and effects, both acute and delayed

No information available.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
No information available.

5.2. Special hazards arising from the substance or mixture

Thermal decomposition can lead to release of irritating and toxic gases and vapors.
5.3. Advice for firefighters

Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
- Evacuate personnel to safe areas
- Ensure adequate ventilation, especially in confined areas
- Remove all sources of ignition
- Avoid contact with skin, eyes and inhalation of vapors
- Use personal protection recommended in Section 8

6.2. Environmental precautions
- Prevent entry into waterways, sewers, basements or confined areas

6.3. Methods and material for containment and cleaning up
- Collect in suitable containers for disposal according to local / national regulations (see Section 13)

6.4. Reference to other sections
- See Section 7 for more information
- See section 8 for more information
- See section 13 for more information

SECTION 7: Handling and storage

7.1. Precautions for safe handling
- Handle in accordance with good industrial hygiene and safety practice
- Ensure adequate ventilation, especially in confined areas
- Avoid generation of dust
- Use personal protection recommended in Section 8

7.2. Conditions for safe storage, including any incompatibilities
- Keep away from heat
- Keep locked up and out of reach of children
- Store in accordance with local regulations

7.3. Specific end use(s)
- Apart from the uses mentioned in SECTION 1.2 no other specific uses are stipulated.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
### Derived No Effect Level (DNEL)
No information available.

### Predicted No Effect Concentration (PNEC)
No information available.

#### 8.2. Exposure controls

**Engineering Controls**
Use with local exhaust ventilation. Ensure adequate ventilation, especially in confined areas.

**Personal protective equipment**

- **Eye/face protection**: Wear safety glasses with side shields (or goggles) if necessary
- **Hand Protection**: Wear protective gloves
- **Skin and body protection**: Suitable protective clothing
- **Respiratory protection**: In case of insufficient ventilation, wear suitable respiratory equipment

**Environmental exposure controls**
Do not allow into any sewer, on the ground or into any body of water.

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Norway</th>
<th>United Kingdom</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
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<tbody>
<tr>
<td>Adipic acid (CAS #: 124-04-9)</td>
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<td>TWA: 5 mg/m³</td>
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<td>-</td>
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<tr>
<td>TPA (CAS #: 100-21-0)</td>
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<td>TWA: 10 mg/m³</td>
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<td>-</td>
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</tbody>
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<table>
<thead>
<tr>
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<th>Italy</th>
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<tbody>
<tr>
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<tr>
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<td>TWA: 5 mg/m³</td>
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<th>European Union</th>
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<tr>
<td>Adipic acid (CAS #: 124-04-9)</td>
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<td>TWA: 10 mg/m³</td>
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<td>BDO (CAS #: 110-63-4)</td>
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<td>STEL 200 ppm</td>
<td>STEL 800 mg/m³</td>
<td>TWA: 50 ppm</td>
<td>TWA: 200 mg/m³</td>
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<td>Adipic acid (CAS #: 124-04-9)</td>
<td>STEL: 10 mg/m³</td>
<td>TWA: 5 mg/m³</td>
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<td>TPA (CAS #: 100-21-0)</td>
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<td>TWA: 10 mg/m³</td>
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<table>
<thead>
<tr>
<th>Derived No Effect Level (DNEL)</th>
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<tbody>
<tr>
<td>No information available.</td>
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<table>
<thead>
<tr>
<th>Predicted No Effect Concentration (PNEC)</th>
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</thead>
<tbody>
<tr>
<td>No information available.</td>
</tr>
</tbody>
</table>

**Appearance**: Solid

**Color**: White

**Odor**: Odorless

**Odor Threshold**: No information available

**pH**: No information available
Melting point/freezing point
20°C(BDO)
151°C(Adipic acid)

Boiling point / boiling range
230°C(BDO)
ca. 330 °C(Adipic acid)

Flash point
130°C(BDO)
260°C(TPA)
196°C(Adipic acid)

Evaporation rate
No information available

Flammability (solid, gas)
Not flammable

Flammability Limit in Air
No information available

Vapor Pressure
<1mbar(20°C)(BDO)

Vapor density
No information available

Density
1.26(g/cm³)(polymer)
1.26

Relative density
1.26

Bulk density
No information available

Specific gravity
No information available

Water solubility
Mixable(BDO)
15 mg/l(20 °C)(TPA)
15 g/l(20 °C)(Adipic acid)
50 g/l(90 °C)(Starch)

Partition coefficient
-0.83(BDO)
2(TPA)
0.081(Adipic acid)

Autoignition temperature
370°C(BDO)
496°C(TPA)
420°C(Adipic acid)
Ca. 400°C(Starch)

Decomposition temperature
>300°C(TPA)
Ca.200°C(Starch)

Kinematic viscosity
Not applicable

Dynamic viscosity
71.5mPa·s(25°C)(BDO)

Explosive properties
Not an explosive

Oxidizing properties
No information available

9.2. Other information
No information available

SECTION 10: Stability and reactivity

10.1. Reactivity
No information available.

10.2. Chemical stability
Stable under normal conditions.

10.3. Possibility of hazardous reactions
None under normal processing.
10.4. Conditions to avoid
Heat, flames and sparks

10.5. Incompatible materials

10.6. Hazardous decomposition products
None under normal use conditions

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDO (CAS #: 110-63-4)</td>
<td>1530 mg/kg bw(rat)</td>
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<td>-</td>
</tr>
<tr>
<td>TPA (CAS #: 100-21-0)</td>
<td>&gt;6400 mg/kg bw(rat)</td>
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<td>-</td>
</tr>
<tr>
<td>Adipic acid (CAS #: 124-04-9)</td>
<td>5560 mg/kg bw(rat)</td>
<td>-</td>
<td>&gt;7.7 mg/L (Rat) 4 h &gt;31 mg/L (Rat) 1 h</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation
Non-irritating to the skin.

Serious eye damage/eye irritation
No eye irritation.

Sensitization
No sensitization responses were observed.

Germ cell mutagenicity
No information available.

Carcinogenicity
No information available.

Reproductive toxicity
No information available.

STOT - single exposure
No information available.

STOT - repeated exposure
No information available.

Aspiration hazard
No information available.

SECTION 12: Ecological information

12.1. Toxicity
12.2. Persistence and degradability
No information available.

12.3. Bioaccumulative potential

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Partition coefficient</th>
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<tbody>
<tr>
<td>Adipic acid (CAS #: 124-04-9)</td>
<td>0.081</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil
No information available

12.5. Results of PBT and vPvB assessment
PBT/vPvB assessment information is not available as chemical safety assessment not conducted.

12.6. Other adverse effects
No information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods
- Waste from residues/unused products
- Contaminated packaging
Disposal should be in accordance with applicable regional, national and local laws and regulations

SECTION 14: Transport information

14.1 UN Number
Not regulated

14.2 Proper shipping name
Not regulated

14.3 Hazard Class
Not regulated

14.4 Packing Group
Not regulated

14.5 Environmental hazards
Not applicable

14.6 Special precautions
No information available

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable
SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

European Union

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work
Take note of Directive 94/33/EC on the protection of young people at work
Take note of Directive 92/85/EC on the protection of pregnant and breastfeeding women at work

International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA</th>
<th>DSL/NDSL</th>
<th>EINECS/EL</th>
<th>ENCS</th>
<th>IECSC</th>
<th>KECL</th>
<th>PICCS</th>
<th>AICS</th>
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<td>BDO 110-63-4</td>
<td>X</td>
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<td>X</td>
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<tr>
<td>TPA 100-21-0</td>
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<td>Starch 9005-25-8</td>
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<td>X</td>
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</tbody>
</table>

"-" Not Listed
"X" Listed

15.2. Chemical safety assessment

No information available

SECTION 16: Other information

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

Issue Date 04-Sep-2014
Revision date 04-Sep-2014
Revision Note Not applicable

Key or legend to abbreviations and acronyms used in the safety data sheet

TWA - TWA (time-weighted average)
STEL - STEL (Short Term Exposure Limit)
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances
Full text of H-Statements referred to under section 3
H302- Harmful if swallowed.
H319- Causes serious eye irritation.
H336- May cause drowsiness or dizziness.

Full text of R-phrases referred to under sections 2 and 3
R22- Harmful if swallowed.
R36- Irritating to eyes.
R67- Vapours may cause drowsiness and dizziness.

Disclaimer
The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

-------- End of Safety Data Sheet ---------