

MATERIAL SAFETY DATA SHEET

1. Chemicals and Corporate Identity

Product: Biodegradable Resin PBS

Chemical Name: **Poly (butylene succinate)**

Grade: RA201BL/RA201BH/RA201PL/RA201PH

Recommended Use: For industrial production, mainly used in film blowing, injection molding, etc.

Manufacturer:

Company name: Shandong Ruian Biotechnology Co. Ltd.

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2. Hazard Overview

Pure substance classification: According to GHS standard, this product does not need to be classified.

Labeling elements and warning statements: According to the GHS standard, this product does not require the addition of a hazard warning label.

Summary of Emergency Situation: In general, there are no known hazards. Emits irritating and/or toxic gases under specific operating parameters, such as high temperatures.

Other hazards but not so much as to be classified as such: See Chapter 11, 12 for assessment results.

3. Ingredients and Composition Information

Composition	CAS NO.	Typical Value
PBS	25777-14-4	>99.9%
Ash	-	<0.01%

Chemical properties: pure substance

Chemical structure: containing - [OC4H8O] - and - [COC2H4CO]

4. First Aid Measures

General advice: Avoid contact with skin, eyes and clothing. Remove contaminated clothing.

Skin contact: Rinse or immerse with plenty of water quickly after molten material burns, wrap in clean cotton and gauze, and seek medical attention later.

Eye contact: If contact with eyes, immediately flush with plenty of water for 15 minutes or more. If irritation persists or increases, seek medical attention.

Inhalation: If you feel discomfort after inhaling the dust, move to fresh air. If you have difficulty breathing, perform mouth-to-mouth CPR and seek medical attention. Ingestion: Rinse mouth immediately, then drink 200-300 ml of water, do not induce vomiting, seek medical attention.

Note to physician.

Symptoms/(further) symptoms and/or effects not yet known Hazards/No expected hazards.

Treatment/Symptomatic treatment (remove dirt, attend to vital signs), no specific antidote.

5. Fire Fighting Measures

Extinguishing media: Water spray, foam, dry powder, carbon dioxide.

Extinguishing media not applicable for safety reasons: Direct water spray.

Fire Fighting Procedures: Keep personnel evacuated and keep fire upwind. Wear a self-contained breathing valve.

Special Hazards: Carbon monoxide, carbon dioxide, tetrahydrofuran (THF), aldehydes Fumes/smoke, carbon black, hazardous vapors.

Other decomposition products and oxidation products depend on fire conditions. Trace amounts of other toxic substances may be produced under special fire conditions.

For more information: Dispose of fire debris and contaminated fire water in accordance with official regulations.

6. Emergency Treatment for Leakage

Personal precautions: Avoid inhalation. Keep away from fire sources.

Environmental pollution prevention: No special protective measures are required.

Clean-up or collection methods:

Bulk: Sweep/shovel

Residue: Sweep/shovel

Dispose of absorbed material in accordance with regulations.

Additional notes (information): High slip hazard from product leaks/spills.

7. Operation Disposal and Storage

Operation disposal: The processing equipment must be installed with local exhaust ventilation. When working in the discharge system, such as at the nozzle and mouth mold, at the screen changing area, at the drainage port, etc., special care should be taken, because some hazardous substances may have residue accumulation in the discharge system to avoid dust formation and deposition. Avoid the generation of static electricity. Avoid contact with other molten polymers. Operation should meet the requirements of industrial hygiene and safety practices.

Fire and explosion protection: Avoid the formation of dust. Dust can form explosive mixtures with air. Provide exhaust ventilation. When grinding (milling) products, pay attention to dust explosion protection rules.

Storage: Place in a clean, dry, dust-free environment to ensure that the product is clean in its original packaging. It should be kept out of direct sunlight, protected from high temperature/humidity and avoid contact with soil. Storage with other substances, especially hazardous substances, should be avoided. Eliminate all sources of ignition: heat, sparks, open flames.

Storage stability: Excellent storage stability, with a shelf life of 1 year at an ambient temperature of 23° C. The modified resin should be stored in the original bag, and to avoid the resin becoming wet, the bag should be kept sealed and the storage temperature should not exceed 60°C.

Storage containers: Carbon steel, high density polyethylene, low density polyethylene, polypropylene, aluminum foil, etc.

8. Exposure Control and Individual Protection

If well ventilated, it can be assumed that the threshold limit values will not be reached.

Tetrahydrofuran (THF), 109-99-9.

TWA value: 50 ppm (ACGIHTLV)

STEL value: 100 ppm (ACGIHTLV)

TWA value: 300 mg/m³ (OEL (CN))

Skin indication: (ACGIHTLV) Risk of skin absorption 1,4-Butanediol (BDO) 110-63-4.

Personal protective measures:

Respiratory protection: If dust is formed, use respiratory protection, e.g. wear a face mask with particle filter.

Hand protection: When handling hot molten substances (EN 407) (e.g. textiles or leather), additional heat-resistant gloves are required.

Eye protection: Bilateral safety glasses with frames (framed goggles).

Body protection: Body protection must be selected according to the activity and possible exposure areas, such as aprons, protective boots, chemical protective clothing.

General safety and hygiene measures: Avoid molten materials Avoid inhalation of dust/fumes/vapors. Eye wash springs and safety showers should be located nearby. Operations should meet industrial hygiene and safety practice requirements. Airtight work clothes are recommended. Do not eat, drink or smoke during use. Hands and face should be washed before leaving work or taking a nap. Skin should be washed and skin care products should be used after work.

9. Physical and Chemical Properties

Shape: Granules

Color: White

Odor: Slight odor, product specific

Olfactory threshold: Not applicable

PH value: substance insoluble in water

Melting range: 110-116° C

Boiling range: Not measurable due to decomposition of the substance

Flash point: Not applicable

Evaporation rate: Not applicable

Flammability (solid/liquid): not highly flammable

Lower explosion limit: According to the analysis of product composition and structure, there is no danger under general use

Explosion upper limit: according to the product composition and structure analysis, general use case, there is no danger Combustion temperature: >400°C

Thermal decomposition: >280°C

Spontaneous combustion: no spontaneous combustion

Radioactivity: non-radioactive

Vapor pressure: the product is non-volatile solid

Density: 1.26g/cm³(25°C)

Relative vapor density (air): not applicable, product is non-volatile solid

Water solubility: insoluble

Effective solvent: chloroform, methylene chloride, N-methyl pyrrolidone, etc.

Molecular weight: >100,000(GPC)

Other information: If necessary, other physical and chemical properties will be presented here subsequently.

10. Stability and Reactivity

Chemical stability: good stability under recommended storage conditions.

Prohibited substances: strong acids, strong bases, strong oxides.

Thermal decomposition: >280°C, prevent high temperature during processing.

Corrosiveness: non-corrosive to metals.

Possible decomposition products: Under prolonged and/or high temperature conditions, dangerous decomposition products may be produced, such as carbon monoxide, aldehyde, tetrahydrofuran, small molecular weight oligomers, etc. Complete combustion produces carbon dioxide and water vapor.

Hazardous reactions: No hazardous reactions when stored and handled according to regulations/instructions.

11. Toxicological Information

Acute toxicity: Practically non-toxic by single dermal contact. Practically non-toxic by inhalation.

Practically non-toxic by single ingestion.

Irritation: No irritation to eyes. Non-irritating to skin.

Respiratory/Dermal sensitization: Chemical structure indicates no sensitizing effect.

Germ cell mutagenicity: The chemical structure does not show any special caution for this effect.

Carcinogenicity: The chemical structure does not exhibit special caution for such effects.

Reproductive toxicity: The chemical structure does not exhibit special vigilance for such effects.

Developmental toxicity: The chemical structure does not exhibit special vigilance for such effects.

Specific target organ system toxicity (single exposure): Based on the available information, there is no specific target organ toxicity for a single exposure.

Repeated dose toxicity and specific target organ system toxicity (repeated exposure): repeated dermal absorption of the substance did not show effects related to the substance. Repeated inhalation of the substance did not show effects related to the substance. Repeated oral ingestion of the substance does not result in substance-related effects.

Inhalation hazard: No inhalation hazard is expected.

Other relevant toxicity information: Testing as needed.

12. Ecological Information

Degradability: under certain conditions, e.g.: fully biodegradable in soil after a limited time and generally non-ecotoxic. Not discharged to streams, ponds, lakes or sewers where the rate of biodegradation is prolonged.

Aquatic toxicity evaluation: Product is likely not acutely hazardous to aquatic organisms.

Product has not been tested. This statement is based on the structure of the product.

Soil organisms: No adverse effects at the highest concentration tested.

Terrestrial plants: No adverse effects at the highest concentrations tested.

Mobility: No predicted adsorption to solid soil phase.

Bioaccumulation: No significant bioaccumulation effect.

Other ecotoxicity recommendations: product has not been tested. This ecotoxicity statement is introduced by other products with similar structure and components. Additional note (information): To the best of our knowledge, no adverse ecological effects are foreseen.

13. Waste Disposal

No special requirements. Comply with national, provincial and local environmental regulations. The best disposal methods are (1) recycling, (2) landfill, and (3) incineration. Although RA201BL/RA201BH/RA201PL/RA201PH is fully biodegradable, method (1) is a good alternative.

14. Shipping Information

Not classified as a hazardous material under railroad regulations.

Not classified as hazardous under road transport regulations.

Not classified as hazardous under inland waterways regulations.

Not classified as hazardous under maritime transport regulations.

Not classified as hazardous under air transport regulations.

5. Regulatory Information

Other regulations: If regulatory information applicable to this product is not provided in other parts of this MSDS, it will be described in this section.

This MSDS is prepared in accordance with the General Principles of Chemical Classification and Hazard Communication, Chemical Safety Technical Instructions. Depending on the application area of this product, the corresponding national laws and standards must be followed.

16. Other Information

The information provided in this Material Safety Data Sheet is correct as of the date of its publication. The information provided is intended only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information pertains only to the specific material specified and may not be valid for use with any other material or in any process, unless specified in the text.