Description
Polyhydroxyalkanoates (PHAs) are polymers of oxyderivatives of natural fatty acids (β-hydroxy-butyric acid and β-valeric acid). They have a melting point of 180°C, a decomposition temperature above 200°C, a crystallinity of 50-80%, and a molecular weight of 100-800 kDa. These polymers do not show cytotoxicity, immune toxicity, and sensitizing and hemolyzing activities and do not cause an immediate allergic reaction. The biological compatibility of PHAs at the cell, tissue, and organism levels is demonstrated.

Technical appraisal and economic benefits
The designed biomaterials:
- are not toxic;
- decompose in biological media to the final products (CO₂ and H₂O);
- are thermoplastic;
- are biocompatible;
- show antioxidant properties and a piezoelectric effect;
- are used as powders, solutions, and melts to produce articles (films and porous matrices, hollow structures, suture filaments) and do not require technological additives;
- are sterilizable by conventional methods;
- are synthesized using available and inexpensive home-made reagents.

Application areas
The materials are used in medicine:
- as a matrix for tissue engineering;
- for production of surgical fabrics and nonwoven materials;
- as elements for osteosynthesis;
- vascular implants;
- drug delivery systems.

Development stage
There is a report of the Test Laboratory of Biological Safety of Medical Articles of the State Center of Biomaterial Research of the Research Institute of Transplantology and Synthetic Organs of the Ministry of Health of the Russian Federation, on the suitability of the material for medical and biological applications.

Patent situation
Russian Federation patents are granted for the methods of producing PHB and PHB/PHV.

Commercial offers
- Supply of polymer specimens to produce and test medical articles;
- Organization of production;
- Search for partners.

Estimated cost
To be negotiated.

Contacts
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