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Blood Bank Centrifuges: Driven By Demand

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More blood banks are transforming to component setups, particularly in non-metros and tier-II cities, indicating a tremendous opportunity for growth and development in the blood transfusion sector.

The blood bank centrifuge, is considered to be one of the most efficient ways to separate samples of different densities. Many types of centrifuges are available, ranging from bench-top models, with a capacity of 1.2 L and a maximum load of 1.5 kg, to large free-standing centrifuges, with a capacity of 5 L and a maximum load of 6 kg, or larger. Some of the larger instruments are able to reach speeds of up to 10,000 rpm, while the smaller centrifuges usually have maximum rotational speeds below 300 rpm.

Centrifugation has come a long way since the process was first commercialized for laboratory use in the 1940s. The original rotors, such as those built by Svedberg, were made of tensile steel. Materials such as aluminum alloys and titanium are used to withstand high centrifugal forces. Standard features include processes for cooling, programming, automatic imbalance detection, noise reduction, and changeable rotor systems.

Vacuum systems have also been added to modern centrifuges to reduce friction and maintain temperature control. The development of other tools, such as electron microscopes, has allowed researchers to better examine and investigate the particles being centrifuged.

With research on areas like proteins and cell nucleic matter becoming more and more important and gaining pace all the time, the centrifuge will continue to be a vital piece of laboratory equipment in the foreseeable future.

Global Market

The global market for blood banking and blood products is expected to touch Rs. 180,000 crore (USD 36 billion) and laboratory centrifuges market to constitute Rs. 5000 crore (USD 1.0 billion) by 2015. The global laboratory equipment market faced tough times as the prolonged downturn affected sales in major end-use markets including academics, pharmaceutical, food, retail, and chemical industries. The market was largely impacted by change in capital spending by consumers who deferred spending due to restricted budgets.

Product segment wise ultracentrifuges continue to be the largest market with its extensive usage linked to growing interest of pharmaceutical and biotechnology industries in proteomics. Nevertheless, the product's high accuracy level coupled with growing interest stemming from biotechnology and pharmaceutical industries has generated a positive impact on ultracentrifuges sales, despite its technological maturity. The use of multifunctional bench-top micro-centrifuges is expected to register increased demand in the imminent future. These units feature swing-out rotors and high-capacity interchangeable rotors that provide the customers with extra flexibility in maintaining workload and high- and low-speed programmability.

Centrifugation technique is an indispensable tool for modern laboratory processes and has become the basic tool for sample preparation over the years. Researchers are frequently encountered with the task of separating specimens, developing new materials as in the process of drug discovery, analyzing foreign particles, and making precise density measurements. All these require the process of sedimentation and filtration, which can be carried out reliably with the help of a centrifuge. About 95 percent of life sciences researchers are known to be using some form of centrifugation process and very few of them apply manual centrifugation.

Over the years, centrifuges underwent a spate of changes in order to meet the requirements of the users. In tune with the demanding needs of lab researchers, centrifuge manufacturers are focusing on development of products that accommodate higher volumes, support higher speeds, and deliver higher throughputs. On the whole, centrifuge designs stand to be revolutionized by the combined forces of shrinking unit size, superior rotor designs, flexible accessories, and customized programs.

The ageing population, emergence of new infections, and efforts to make available qualitative blood are fueling the market growth. Stringent regulatory and healthcare policies adopted across the world are also influencing the market for blood banking and blood products.

Indian Market

The blood bank centrifuges market in India is currently growing at a modest rate. The refrigerated centrifuges segment has emerged as one of the premier segments in the Indian blood bank equipment market.

The cost of development and demand for speed and quality research has encouraged firms to make strategic alliances with high-technology entities that can aid product development. The strong presence of biotechnology and pharmaceutical segment has helped the blood component industry mark its presence in the market. The government is also making considerable efforts to maintain and promote the proper use of blood components for the utmost utilization of blood.

With sales of 350 units, the blood bank centrifuges market in 2011 is estimated at Rs. 35 crore, a substantial value-wise increase of 30.8 percent, from Rs. 26.75 crore in 2010. The Indian blood bank centrifuges market is split into imported brands and indigenously manufactured ones. Players are actively involved in manufacture of high-end centrifuges that employ superior and latest technology.

Thermo Fisher dominates the imported segment with sales at Rs. 22 crore.

Thermo Fisher also caters to the high-end, corporate hospital chains. Sales in the private sector are estimated at 40 units, at an amount close to Rs. 6.8 crore. The vendor has its strength in its supplies to NACO (National AIDS Control Organization). In 2011, it supplied 154 units, estimated at Rs. 15.4 crore. Orders are also awaited from another tender invited ny NACO in April 2012, for 70 units.

NACO is an important centrifuge buyer. For the year 2012-13, NACO has invited a requirement of 70 units, with two units for each blood bank. These include blood banks at Government Multispecialty Hospital, Chandigarh; Rajawadi Hospital, Mumbai; Harilal Bhagvati Hospital, Mumbai; Indian Red Cross Society in Civil Hospital, Jalandhar; Civil Hospital, Bhatinda; District Hospital, Hanumangarh; Government Hospital, Baran; RBM Hospital, Bharatpur; Government Bangar Hospital, Pali; Government SK Hospital, Sikar, Mahila Chikitsalaya Blood Bank, Jaipur; MG Hospital, Bhilwara; STNM Hospital, Gangtok; Civil Hospital, Lunglei; District Hospital, Bijapur; District Hospital, Yamunanagar; Indian Red Cross Society, Srikakulam; Blood Bank of Sri Satya Sai Institute of Higher Medical Science (SSSIHMS), Prasantigram, Puttaparthy, Dist. Ananthapur; MNJ Cancer Hospital, Hyderabad; District HQs. Hospital, Mahboobnagar; District HQs. Hospital, Ongole (Prakasham District); District Hospital (now RIMS), Cuddapah; IRCS Blood Bank, Amreli; Red Cross Society, Sevashram Hospital, Bharuch; G.K. General Hospital, Bhuj, Khachh; Indian Red Cross Society, Nadiad, Kheda; Indian Red Cross Society, Godhara, Panchmahal; Indian Red Cross Society, Jalgaon; Indian Red Cross Society, Sarjubai Bansila Bajaj, Pandharpur; Jankalyan, Maharashtra; Sri Sai Nath Blood Bank, Nagpur; Indian Red Cross Society, Karnataka; Dr. Baba Sahib Ambedkar Hospital, Delhi; Hindu Rao Hospital, Delhi; and Jai Prakash Narayan Apex Trauma Centre, Delhi.

Hettich, marketed by Care Biomedicals, is also aggressive in the imported segment.

Remi dominates the indigenously manufactured centrifuges segment. Its sales in 2011 are estimated at Rs. 7.87 crore, amounting to 105 units. Other players in this segment include Bioasset Technologies, Deepee Cooling, Elektrokraft India, and Labtop Instruments (formerly Skylab Instruments and Engineering).

The main emphasis is on establishing and maintaining quality parameters in blood processing. Most blood banks are following various procedures to ensure quality blood components and to minimize the risk to the recipient. Accreditation of blood banks and laboratories also acts as a tool for quality management. It ensures that blood banks and laboratories implement an appropriate quality-management system based on predefined standards.

Next-Generation Centrifuges

The process of centrifugation of whole blood is very critical as live cells are not only sensitive to shocks but also require precise relative centrifugal force (RCF) and temperature control. This process can be accomplished by using highly specialized refrigerated centrifuge, which provides a wide range of RCF, acceleration, deceleration, time, and temperature. All these parameters must be achieved and maintained very precisely for the desired quality of all the components separated. The next-generation centrifuges have the following features. Microprocessor-controlled centrifuge achieves the parameters very precisely. This feature helps in getting the standard platelet yield, hematocrit value, and the desired component volume. Frequency drive motor are maintenance free, jerk free, and operate smoothly. They help in getting clear separated layers without RBC contamination. The next-generation centrifuges have internal memory with around 51 programs to store buffy coat, PRP, and FFP separation methods. This feature helps in producing quality results with a single-button operation. Network and PC connectivity allows data management for blood separation. All these features have not only revolutionized the percentage yield of all blood products but have also standardized good-quality blood products every time.

Growth Factors

The factors driving the market growth include the increasing need for blood and blood products and popularity of cord blood. Growth is also being driven by an increase in the demand for good-quality and safe blood in the country. The increasing number of cases that require blood or blood components for therapeutic purposes may help in maintaining a steady demand for blood bank centrifuges. The improving healthcare infrastructure is another major factor since there is an increase in the number of blood banks being set up by the government and by private organizations. There has been a drastic increase in the upgradation of equipment in government blood banking facilities in the recent years. Component collection is gaining importance in India, which is also responsible for the increased demand for blood cell centrifuges. In the coming years, more component blood banks are expected to come up, which will act as a major boost for market growth. After-sales-service facility and trained service staff provided by the manufacturers are also key factors responsible for market growth.

Challenges

Over the years, centrifuges have undergone a spate of changes in order to meet the requirements of the users. In tune with the demanding needs of lab researchers, centrifuge manufacturers are focusing on development of products that accommodate higher volumes, support higher speeds, and deliver higher throughputs. Providing products at par with those of their international competitors is a major challenge for Indian manufacturers. There are several other factors that may hamper market expansion of blood bank centrifuges. One of the challenges for the suppliers of blood-banking devices is the consolidation among end users. This provides them with higher purchasing power and places them in a position to pressurize the company's pricing strategy. The end users tend to be more and more cautious about product innovation. This threatens the potential expansion of the blood-banking devices industry that is currently demanding innovation. On the whole, centrifuge designs stand to be revolutionized by the combined forces of shrinking unit size, superior rotor designs, flexible accessories, and customized programs.

INDUSTRY SPEAK

Intelligent Efforts

Sunil Saraf
Executive Director
REMI Sales & Engineering Ltd.

Transfusion therapy in the past was largely dependent on the use of whole blood. While whole blood may still be used in certain limited circumstances, but as we all know, transfusion of the required blood component is the right treatment approach - an excellent way to conserve blood and maximize its utilization. Component therapy also offers logistic, ethical, and economic advantages.

Being a crucial lifesaving resource, blood and its components have always been the center of focus; for improving biological and clinical quality of all blood components, consistent efforts are being made by blood bankers.

Blood bank centrifuge is a very important equipment as it plays a key role in separating out the blood from its components such as packed red cells, plasma, and platelet concentrate.

The process of centrifugation of whole blood is very critical as live cells are not only sensitive to shocks but also require precise RCF (relative centrifugal force) and temperature control. This process can be accomplished by using highly specialized refrigerated centrifuge, which provides the choice of a wide range of RCF, acceleration, deceleration, time, and temperature. This may determine the composition of the desired component.

Quality does not happen by accident; it is always a sheer result of intelligent efforts.

It is important that the optimal conditions for a good separation be carefully standardized for each centrifuge. A number of choices exist for the selection of a procedure for centrifugation of component preparation from whole blood. But the small deviation from the required run parameter drives to unfavorable results like lesser platelet count and hematocrit value as well as variable component volumes. Hence, the application support from the manufacturer plays a very important role in achieving the optimum component yield and quality. To cater to this need, REMI has developed a specialized and dedicated team to provide clinical and application support for all new installations. Currently, centrifuge market in India is dominated by three major players consisting of Indian and imported brands. REMI has been successful in adapting to all recent advancements due to their engineering capabilities. This has provided a cost-effective solution for the latest technologies available in centrifugation.

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