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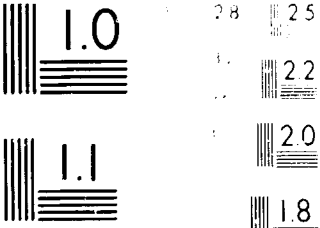
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org



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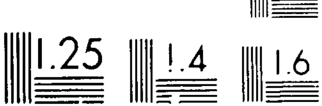

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ABACA PULP *

by

William T. Heyse **

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** Senior Vice President, Research and Development, C.H. Dexter Division, The Dexter Corporation, Two Elm Street, Windsor Locks, Conn.06096, USA

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Pulp produced from the abaca plant (Musa textilis) has a surprising variety of qualities. These qualities of pulp may be grouped into three major classifications:

1. Pulp for very porous specialty tissues
2. Pulp for high-tear and tensile strength specialty papers
3. Tropical substitute pulp for coniferous long-fibered pulps

The pulp for the third application is obtained from chips or similar materials from the entire stalk whereas the raw material for the pulps for use in the two classifications of specialty papers is mechanically cleaned to various degrees prior to pulping.[1]

Pulp For Very Porous Specialty Tissues

Tissues such as teabag paper, mimeograph stencil tissue, low-density electrolytic capacitor tissues, electrical tape base tissues, meat casing coating base, plug wrap for ultra low-tar cigarettes, lens tissue, etc. use a modest quantity of abaca pulp of Type 1 described above. The raw material for the pulping process is selected from the highest grades of abaca fiber. This fiber is mechanically cleaned prior to pulping using traditional hand cleaning or, for the best quality pulp, spindle stripping techniques. Philippine Grades I, S2 or G or Ecuadorian Grades 2, 3 or 4 are the most common raw materials. The pulp properties are influenced by fiber source (geography), growing conditions, plant variety and the quality of the mechanical cleaning. The typical best grade of pulp will contain only a small percentage of pith cells.

Abaca pulp of this quality has generally replaced Kozu pulp traditionally used by Oriental hand papermakers. Some Kozu pulp is still used today and some machine-made Kozu tissues exist. Depending upon the application, sisal pulp is a viable partial substitute for abaca pulp. Sisal pulp produces slightly softer-feeling products that are not quite as strong as porous abaca tissues. The fiber cell dimensions of sisal are similar to the fiber cell dimensions of abaca, sisal being only slightly shorter and slightly thinner. The raw material for this type sisal pulp is selected from among the best grades of sisal fiber, which is generally priced slightly below the price of the very best grades of abaca fiber.

Over the years synthetic fibers have also eroded the use of abaca pulp in some porous tissues. Depending upon the application requirements, the papermaker has substituted rayon, polyester and insoluble polyvinylalcohol and some polypropylene fiber in products that traditionally would have used Type 1 abaca pulp.[2] In the United States today, abaca pulp is more expensive than rayon, polyester or polypropylene fiber. To compare the price of raw abaca fiber converted to pulp, one can simply multiply the raw fiber price by a factor of two to arrive at a pulp price which would include yield losses, energy costs, chemical costs, labor costs, capital costs, and a modest return on capital. For example, a fiber price of $1.10 per kilo converts to $2,200.00 per ton.

For the majority of the very porous specialty tissue applications, use of never-dried pulp is essential to achieve the finished product qualities. The porous specialty tissues are very low-density materials and are sold in small rolls. Hence, shipping costs and also duties for finished products are important to the paper producer. Costs for shipping finished product exceed pulp freight rates which are also well above raw fiber freight rates.

The paper manufacturing locations are therefore located in or near the major market areas; the United States, Europe or Japan. To use wet pulp, the Type 1 abaca pulp mill should be located with the paper mill to achieve maximum pulp quality, minimum freight cost and working capital costs. Most of the major manufacturers of porous specialty tissues have their own pulp mills. There is no significant market for this kind of pulp since only a portion of these type-specialty papers can use dried pulp. Furthermore, the world market for this type of material is only growing at a rate of around 5% per year.

Pulp For High-Tear and High-Tensile Strength Specialty Papers

Currency papers, light weight onionskin, dust filter papers, packaging tape base, and some art and cigarette papers use Type 2 abaca pulp. The raw material for the pulping process is selected from coarsely cleaned abaca fiber which is typically priced at about 50 to 60% of the price of the Type 1 raw materials. Typical raw materials are the Philippine grades of abaca - Y2 from Leyte, Samar or the Bicol. Other residual grades and some fair-cleaned grades are used to produce variations in pulp properties. Again, the pulp properties are somewhat influenced by fiber source, and the quality of mechanical cleaning. Since these pulps are frequently bleached and then refined (beaten) prior to use, the initial differences are not so important. The typical pulp of Type 2 will contain about 20% by weight of pith and parenchyma cells.

Traditional competing materials for Type 2 abaca pulp include pulp from old ropes, old rags or flax pulps. As these materials have declined in availability, the market for Type 2 abaca pulp has developed. Currently, Type 2 abaca pulp markets are being eroded by long-fibered coniferous pulps such as redwood pulp or some of the cotton pulps. Both are lower in price.

Again, since the Type 2 pulp is usually beaten before use, pulp can be shipped as dry lap. The major market for this type of pulp is located in Japan for currency paper with minor markets in Europe and the United States. Excess world capacity for this type of pulp currently exists in the Philippines.

Tropical Substitute Pulp for Coniferous Long-Fibered Pulps

More of a dream today than a reality is the use of abaca pulp for traditional paperboard manufacture. The appropriate raw materials for such a venture include whole abaca or banana stalks converted into chips,(3)(4) field and stripping waste from other abaca operations or possibly a material known as tuxy ribbons which is used today to produce a low-grade pulp Type 2. The addition of modest quantities of Type 3 abaca pulp to bagasse pulps or tropical hardwood pulps will improve tensile strength, tear strength and burst strength, and could perhaps allow reductions in the basis weight of packaging materials. One would use less abaca pulp to achieve the effect obtained with North American coniferous pulps.

An approach to this concept was begun here in the Philippines years ago by Colonel Francisco Gomez and his idea of the Gocellin process.(5)(6)(1) Apparently the process has not proven to be economical.

The Impediment to Increased Usage - Cost of Abaca - A Common Thread

As mentioned earlier, abaca pulp of Type 1 is competing with lower-cost sisal pulp and the synthetic fibers rayon, polyester, polypropylene and polyvinyl-alcohol. Depending on local costs of these competing materials in various parts of the world, there is more or less incentive to replace abaca pulp. Similarly, there are efforts to contain the rising costs of high-grade wood pulps, cotton pulps and flax pulps, and these materials reduce the growth of abaca pulp Type 2. Since Type 3 pulp has never developed, there appears to be a common thread - the high cost of raw abaca material. With today's agricultural methods, the average abaca plantation will yield slightly more than one-half ton of Type 1 pulp per hectare per year or slightly less than one ton of Type 2 pulp per hectare per year, or perhaps up to two tons of Type 3 pulp per hectare per year. Unfortunately, average plantations of a few hundred to a thousand hectares no longer exist in the Philippines. In this country the plots are small; the labor therefore to extract the fiber is not organized efficiently, and transportation costs are increasing rapidly. There is a need to organize efficient farms to maintain and expand the markets for Type 1 and Type 2 abaca pulps but not at a rate of more than 1,000 to 2,000 hectares per year in addition to the acreage required to replace small farms that cease to exist. An excellent guide for plantation development is available in a booklet printed by the University of Philippines, Los Banos library.(7)

Further research is needed to increase abaca yields per hectare and reduce the cost of labor and energy in harvesting and extracting the fiber. A year ago in Rome, a small panel of experts recommended several excellent research programs to the UNCTAD Working Group on abaca. Successful completion of these yet-to-be-started research programs will immensely aid in making abaca pulp competitive in the world market.

Tissue culture techniques can be used to provide virus-free seedlings for plantations.(8) Further similar research may produce high yield varieties, fiber with improved properties, etc.

In past years some research effort has been expended in the area of extraction of the fiber. About twenty-five years ago there was a large effort to use decorticating machines to extract the fiber from leaf sheaves that were not tuxied. Unfortunately, the very fine, branched fiber cells reinforcing the vessels in the leaf sheaves ended up in the pulp.(9)(10) This material causes defects in the products produced from Type 1 pulp and could not be used. For many of the Type 2 applications the same situation exists. Research must again be applied to reduce the labor cost of tuxying and fiber extraction.

In conclusion - to expand the market for abaca pulp and in particular to develop the application of a tropical substitute pulp for coniferous long-fibered pulps for packaging materials, agricultural practice and research are needed to combine with new methods of material harvesting and extraction to make abaca pulp cost-effective in world markets.

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