

NON-WOOD FIBERS AND THE 21st CENTURYAhmad Jahan Latibari ^a

We have traditionally used as much wood as we do food, and nowadays the wood supply coming mostly from natural forests is becoming limiting. However, there are energy-efficient and environmentally acceptable substitutes in the form of “non-woods” that could replace wood. There are some likely means that we can employ to satisfy the increasing wood and paper industries demand with nonwoods; however, several considerations should be taken into account when planning for future raw materials supply strategies.

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The wood and paper industries are under growing pressure to fulfill the needs of demanding societies, and the ever-increasing rise in the living standards has accelerated the consumption of the wood and paper products. Consequently, over-exploitation of natural forests has been witnessed, especially in the developing countries, and this has led to the consistent and continuous diminishment of the condition of global forest resources. In addition, the escalating cost of fossil fuels has prompted not only the rural communities in the developing countries but even in the industrial ones to concentrate on the utilization of wood as a fuel. These phenomena impart more harvesting pressure on forests and wood lands to provide wood needed for such purposes.

Both national and international development organizations have been concentrating their efforts to increase crop production to satisfy the food demands of the growing population around the world, especially in under-developed locations. This requires more agricultural lands, and as a consequence of this development, deforestation in developing countries is more intense. Although industrial countries benefiting from advanced management and technology have been able to conserve their forest lands, we are facing the continuous deforestation on the global scale. Therefore, the wood supply to wood and paper industries is gradually reduced, and severe shortage of wood as a raw material for this sector can be anticipated.

In such a tough situation the wood and paper industries ought to consider alternative measures and procedures to reduce the raw material consumption, to find efficient use of the final products, and to utilize uncommon and unconventional fiber sources.

- To increase the raw material efficiency, advanced procedures to reach higher production yield must be employed.
- During the last decade, the quality of the final products has been improved, and the consumption of feedstock has been lowered. The wood-based panel industry has witnessed lower density of products or the reduction of paper basis weight while striving to maintain product quality metrics and application potential.

- Recycling has been seriously pursued, and recovery rates are increasing, but more work is needed to be done.
- Last but not least is the utilization of agro-based and non-wood fiber resources, both in wood based panels and paper production. The papermaking process itself was invented with the use of such fibers. It has been reported that currently 140 billion tons of agro-based and non-wood biomass is generated around the world, and this volume is rising, thanks to the development of agriculture. The production of such non-wood fibers is not limited to special regions of the world; rather it is scattered everywhere. These agro-based by-products are used as cattle feed, but such application should be monitored carefully, because the presence of compounds such as silica not only do not provide the nutrition to the consumers, but imparts adverse effects on animals. Therefore to better utilize this valuable lignocellulosic raw material, consumers should:
 - A- Find a compromise between the nutrition and industrial raw material value of agro-based biomass to reach the highest efficiency in the utilization of this biomass.
 - B- Even though some of this biomass such as cereal straw and bagasse have been used in paper production, even reaching a relatively mature stage of implementation with currently almost 10 to 12% of papermaking pulp produced based on this raw material, the development and application of higher yield pulping processes must be investigated. Of course, one should not expect to reach pulping yields and quality similar to wood; but an acceptable compromise between the yield and quality must be reached.
 - C- The wood-based panel industry has shown interest in the utilization of non-wood fibers a substitute for wood. Even though early attempts have not been as successful as it was anticipated and special measures such as application of expensive resins were needed to achieve the required quality, continuing research and development efforts have opened new ways toward efficient production of wood based panels from agro-based raw material. However, further research and development work ought to be followed.