Sustainability, industrial ecology, eco-efficiency and green economy are guiding the development of the next generation of materials and products. To go green, the world is replacing the conventional unsustainable products with sustainable ones. It has become necessary to replace the petroleum originated plastics materials by sustainable alternatives. Bio based plastics are supposed to be one of the viable alternatives of polythene because of their biodegradability. But several researchers have raised question about the complete biodegradability of the bio based plastics (Chavez et al., 2012). Moreover, bio based products are prepared from food grain which may adversely affect the increasing global food demand. On the other hand, jute is 100% biodegradable and could be an appropriate alternative of polythene. It is reported that one hectare of jute plants absorb 15 tons of CO₂ from the atmosphere and add 11 tons of O₂ during its life span of 120 days. Moreover, the decomposed leaves and roots of jute plants increase the fertility of the soil that reduces fertilizer cost of the next crops. The study compared the environmental impact of bio based plastics and jute by reviewing readily available LCA studies or environmental assessment studies for conventional jute fabrics, polylactic acid (PLA), thermoplastic starch (TPS), poly-hydroxyalkanoid (PHA) and their composites. The environmental impact categories considered in this article are use of non-renewable energy, greenhouse gas emission; acidification and eutrophication are from secondary sources.

Environmental Footprint of Bio Based Plastics and Jute

**Environmental Footprint**

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<td>Environmental foot print of bio based plastics and jute</td>
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**Core Activities of IJSG**

- Provide effective framework for international cooperation
- Market promotion of jute and kenaf
- Poverty alleviation
- Women empowerment
- Ensure sustainable development
- Public private participation
- Entrepreneurship development

A major way of comparing the ecoprofile of bio based plastics and jute materials are to address the gross energy demand. The energy demand is the combination of the energy used in the process and feedstock related energy. Chavez et al., (2011) ranked PHA as the light green in bio plastic spectrum because of its less energy consumption. It was reported that during the manufacturing process 1 kg fabric of jute shopping bag saves 80 MJ of energy in comparison to 1 kg of PHA (figure 1). In case of TPS and PLA the amount of saved energy is 20 MJ and 54 MJ respectively (figure 1). The energy saving scenario is almost similar when fabrics of food grade jute bag and hessian were compared with the bio based plastics. In addition, the Cargil Dow Polymers has projected different scenario of energy consumption of PLA and in the most environment friendly scenario the energy consumption is 7 MJ/kg when the 100% renewable and clean energy is used. However, in the present scenario jute fabric consumes around 2MJ/kg of energy during its manufacturing process (figure 1). These analysis prove that energy consumption scenario of all types of jute fabrics are lower than their bio based counterparts.

**Green House Gas Emission**

The global warming potential which is mainly caused by CO₂, CO₂, CH₄ and N₂O are considered to express the GHG gas emission potential. For both traditional and diversified products of jute, the primary manufacturing step is the production of yarn. In this stage GHG emissions are from secondary sources.
Acidification potential of bio plastics and jute carrier materials. The eutrophication potential of jute materials are nil (PwC, 2006). The highest eutrophication potential is observed for polyactic acid (PLA) produced bio material (table 1). In case of PHA cradle to grave eutrophication potential was not available because the fate of PHA products is still unknown (Kim and Dale, 2005). In addition, the cradle to gate eutrophication potential of PHA is still controversial because the commercialization of these products is still in way. Gerngross (1999) stated that the cradle to gate eutrophication potentials is 2.02 (g-N eq. kg−1) but this was 1.68 (g-N eq. kg−1) on the study of Akiyama et al (2003). Moreover, Kim and Dale (2005) suggested two methodologies where the eutrophication potential of PHAs are 1.90 and 1.43 (g-N eq. kg−1) respectively. In case of PLA resin production stage contributes to the 36% eutrophication of aquatic environment. On the other hand, PwC (2006) stated that the eutrophication potential of jute materials (cradle to grave) under Indian subtropical environment condition is zero. These results also help us to take decision that the jute materials are more sustainable alternatives than bio based plastics.

**Conclusion**

This article has tried to discuss the comparative environmental footprint of bio based plastics and jute products. The result found that from cradle to factory gate the bio based plastics consume more energy compare to jute materials. The comparisons of per kg material showed that jute fabrics offer important potential for energy savings and green house gas emission reduction. Moreover, the jute materials can also save an important percentage of renewable energy when compared with composites of bio based plastics. For waste treatment at the end of life, incineration with energy recovery is a common option for bio based polymer. In addition there is still a question mark about the complete biodegradability of bio based plastics. But jute materials are naturally biodegradable and no artificial intervention is required for disposing it. Jute materials with the current technology do offer environmental and occupational health safety advantages over bio based products. None of the bio based plastics in commercial use or under development are fully sustainable. Several scientists also projected that in near future technology of bio based product does not provide sustainable environmental benefits. In terms of energy use, green house gas emission, eutrophication and acidification jute products are better than their bio based counterparts. This leads us to rethink the strategy adopted by several fast growing global cities like Shanghai, Dubai, New York, London and others. The bio plastics alternatives is pushed through is not really sustainable and environmentally friendly. The eco-conscious consumers are being fed using half truth about the bio plastics products with different catch names as an alternative to polythene. Obviously the role of rich petro sector companies behind this half

**References**


[Table 1 Eutrophication potential for bio plastics and jute]

<table>
<thead>
<tr>
<th>Type of materials</th>
<th>Disposal type</th>
<th>Eutrophication potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermoplastic starch</td>
<td>Incineration+20% land filling</td>
<td>103 g</td>
</tr>
<tr>
<td>Polyactic acid (PLA)</td>
<td>Land filling</td>
<td>0</td>
</tr>
<tr>
<td>Hessian fabrics</td>
<td>Incineration</td>
<td>0</td>
</tr>
<tr>
<td>Fabrics of food grade jute bag</td>
<td>Land filling</td>
<td>0</td>
</tr>
<tr>
<td>Fabrics of jute shopping bag</td>
<td>Incineration</td>
<td>0</td>
</tr>
<tr>
<td>Fabrics of jute shopping bag</td>
<td>Land filling</td>
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**Acidification**

According to Dinkel et al., (1996) acidification potential of thermoplastic starch is 1.09±0.5% equivalent to per kg of SO2 if it is disposed through 80% incineration and 20% land filling. On the other hand, the acidification potential is reduced to 1.06±0.5% if the thermoplastic is disposed by 100% composting. In addition, no disposal protocol of PLA was available in the literature but Madival et al (2009) stated that around 63% of the SO2 emission for PLA occurred during the resin production. The acidification potential of jute carrying materials is almost zero (figure 3) that arises from the LCA analysis of PwC (2006). Not only in case of thermoplastic starch but also for the other bio based plastics the acidification potential is positive which makes us to conclude that incase of acidification potential the jute products are better than its biodegradable plastics alternatives.

**Acidification potential**

![Figure 3 Acidification potential of bio plastics and jute](image)
Minimum Support Price (MSP) for Jute in India 2013-14

The Cabinet Committee on Economic Affairs (CCEA) has approved the Minimum Support Price (MSP) for the 2013-14 seasons for TD-5 grade of jute at Rs.2300 per quintal for the entire country. This represents an increase of Rs.100 per quintal over the MSP announced by the Government for last season, an official press release said. The decision is expected to encourage farmers to step up investment in jute cultivation and thereby production and productivity of jute in the country. The Jute Corporation of India (JCI) would continue to act as the nodal agency to undertake price support operations of the MSP in the jute growing states.

Source: Net India News Network, April 02, 2013

5pc ST be Charged on Supply of Jute Bags

The Federal Board of Revenue, Pakistan has categorically conveyed to the Regional Tax Offices (RTOs) and Large Taxpayer Units (LTUs) that the supply of jute bags to government departments is chargeable to sales tax at the rate of 5 percent. The FBR has issued instructions to all RTOs and LTUs to issue a clarification of applicability of sales tax rate on supply of jute bags to government departments under SRO.221(I)/2013, SRO.154(I)/2013 and SRO.1125(I)/2011.

Source: Business Recorder, April 21, 2013

Jute Matters

May 2013

Annual Review Meeting for PY-3 of the IJSG project Potential Application of Jute Geo-Textile at IJSG Conference Hall on April 4, 2013

T. Sanyal, Chief Consultant, NJB (PEA) presented an overview of the component-wise activities of the project for PY-3 as well as for Qtr. 1 of PY-4. Mr. A. K. Khastagir, Project Manager, NJB (PEA) presented the work plan for PY-4. Engr. Md. Habibur Rahman of JDPC thereafter presented the progress of Bangladesh part of the project in brief. This was followed by presentation of Prof. Abdul Jabbar Khan of BUET along with the findings and the process of monitoring of performance of JGT. Director, BJRI mentioned the need for procurement of new instruments for laboratory upgradation. Regarding treatment of JGT with some additive other than bitumen for enhancing its durability for river bank protection work, he mentioned about the inadequacy of the machinery required for treatment and man-power to carry out this job. LGED-representative mentioned about convincing the government for regular use of JGT in road construction. BWDB-representative stated about procedural in carrying out JGT-based bank-protective works. At last, Mr. T. Sanyal summed up the discussions. He drew special attention of BUET on customization of GEOSLOPE software for JGT-use in roadsand of the laboratory set-up for conducting ‘dissimilar’ tests for JGT.

In his concluding remarks Secretary General, IJSG stated that this project being vital for Bangladesh, it would be in the national interest that all facilitating agencies should step up their efforts to meet the time targets and fulfill the technical targets. He advised JDPC to take stock of the situation every month. The meeting was concluded with the vote of thanks from the Executive Director of JDPC.

News on Jute

Dundee Plans to Renew World’s Oldest Jute Mill

Proposals to revitalise Dundee’s Queen Victoria Works and Regent Works area could see the world’s oldest jute mill given new lease of life. Dundee City Council planners are being urged to back a new draft planning brief which could pave the way for the oldest operating jute mill in the world to be given a new lease of life. Dundee City Councilors are being urged to back a new draft planning brief which could pave the way for the oldest operating jute mill in the world to be given a new lease of life. Dundee City Council planners are recommending that councilors adopt a new draft site planning brief for the mill and the Regent Works between Brook Street and Douglas Street to enable the buildings to be redeveloped as high quality homes and offices. Their report states: “The Queen Victoria Works was an extensive former flax mill which dated from 1828 and is situated towards the western boundary of the Blackness Conservation Area. Until its closure in the late 1980s the mill was the oldest operating jute mill in the world. Councillor Will Dawson, convener of Dundee City Council’s city development committee said: “This is a prominent site in the Blackness Conservation Area with an industrial past stretching back almost two centuries. Although the buildings are likely to be in poor structural condition we would like to see as much of the material as possible salvaged for re-use.

Source: www.scotsman.com, April 16, 2013
Nestlé Cuts Packaging Plastics by 34% Since 1991

Swiss food manufacturing giant Nestlé has reduced the amount of plastic materials it uses in packaging by 34% since 1991, the group told the ‘Renewable Plastics’ conference in Amsterdam on April 16, 2013. Philippe Roulet, head of Nestlé’s global packaging materials and testing, told delegates the use of plastics and laminates had fallen more than any other material – the company has reduced its use of glass by 13%, for example – partly because of changes to water bottles. The bottle for Ozarka, a bottled water brand sold in the US, was now made with only 9.3g of resin, he said, showing a slide which demonstrated that bottles for carbonated drinks were sometimes made with more than 20g of materials.

Nestlé has made concerted efforts to reduce its packaging materials use over the last two decades, he added, as food and its packaging proved to be the major contributor to environmental degradation in Europe, even worse than transport. However, Roulet said use of materials was not the only consideration in terms of making the food supply chain more sustainable. "We need to consider a holistic approach and think about packaging and product, not just packaging,” he said. “On its own, plastic has a higher impact than paper, but as paper results in more product spoiling, the overall waste is the same.” In order to achieve this holistic approach, Nestlé uses the packaging eco-design tool Packaging Impact Quick Evaluation Tool (PIQET), which looks at all areas of the supply chain, comparing the environmental impact of all areas of production. Many bio-materials look great on paper but have limited applications, said Roulet. For example, PLA is a poor moisture barrier and PE made from sugar cane had a limited availability.

[Source: European Plastic News, April 18, 2013]

Upcoming IJSG Events

- 14th meeting of Committee on Projects (COP), IJSG Secretariat, Dhaka, Bangladesh, May 15, 2013
- 16th meeting of Council of IJSG, IJSG Secretariat, Dhaka, Bangladesh, May 16, 2013
- Training on design and product development of jute diversified products, Kolkata, India, May 20 to 26, 2013
- Interactive meeting of IJSG with JDP manufacturers, Kolkata, India, May 30, 2013
- Training on design and product development of jute diversified products, Hyderabad, India, June 03 to 09, 2013

Upcoming International Events

- The 10th International Conference of the European Industrial Hemp Association (EIHA), Rheinforum, Wesseling near Cologne, Germany, May 22 – 23, 2013 [http://www.eiha-conference.org/]
- Natural Fiber Fair, Arcata Community Center, Arcata, USA, September 07 – 08, 2013 [http://www.biztradeshows.com/natural-fiber-fair/]

Private Jute Mill Owners for Facilities Similar to Those of State-Owned Ones

Private jute mill owners have demanded facilities similar to those of state-owned mills as the sector is struggling to survive due to the lack of government policy support, industry people said. They claim that if the private jute millers get the same facilities as provided to the state-owned ones, both production and export will increase by 25-30 percent, creating employment opportunities for many. Bangladesh Jute Mills Association (BJMA) and Bangladesh Jute Spinners Association (BJSJA), two platforms of private sector jute mills, alleged that private mills have become the victims of the government’s ‘dual policy’. "Private jute mills perform better than the public ones but the government supports only the loss-making state-owned mills." The government is providing fund to the BJMC (Bangladesh Jute Mills Corporation) mills though the corporation is yet to become a holding company, he alleged. "We are contributing to the national exchequer but are deprived of support," Md Shams-uz-Zoha, chairman of BJSA said. Despite global recession and political crisis in Middle Eastern countries, Bangladesh earns Tk 53.56 billion annually by exporting jute and jute goods, with the private mills’ contribution being 80 percent, he said. The government has offered financial support worth about Tk 50 billion (Tk 5,000 crore) to the mills run under the BJMC, he said adding that the private jute millers are yet to get the cash incentive worth about Tk 5.0 billion since fiscal year (FY) 2009-10 to FY 2012-13. The government provides a 10 percent incentive for the jute sector to inspire the exporters with a view to enhancing the shipment.

"If the private jute millers get the same facilities as provided to the state-owned ones, both production and export will increase by 25-30 percent, creating employment opportunities for many"