Biocomposites are materials formed by blending natural fibres with other natural or synthetic materials. The use of hemp as a feedstock, which has good growth potential in the Palliser region, is an exciting opportunity. Hemp has been grown for industrial purposes for many decades. While the hemp-based food and supplement markets are maturing and are somewhat competitive, with established manufacturers in both the US and Canada, there are possible emerging hemp fibre and hemp hurd opportunities in automotive parts and building products respectively, ramping up manufacturing in Alberta. Small quantities of hemp fibre are being consumed locally and some is being exported to the US from the Palliser region. Most hemp currently grown in Alberta is for seed and this is grown within the Palliser region. But the EATC region is also well suited to growing industrial hemp varieties suited to yield fibre and hurd of high quality and quantity.

FEEDSTOCK

Industrial hemp is grown primarily for its seeds and fibres, or in some cases both. Straw from the hemp crop, which was largely considered as a waste product in the past, is currently used to produce hemp fibres, which is processed further and can be used in a variety of industries such as textile, bioplastics, and pulp and paper. It should be noted that the hemp straw consists of 15% to 30% fibre, 55% to 60% hurd (the woody core of the stem), and 15% to 25% is dust, which can possibly be pelletized and used as biofuel. The leaves contain 23% protein, among other valuable compounds.

Hemp is currently grown in the EATC region and the growing conditions are favourable for straw intensive varieties. There are several hemp varieties, some with a significant biomass proportion growing 2 to 3 metres in height. Shorter varieties are easier to harvest for producers who only want seed. Seed is harvested later than pure fibre crops as it needs to mature longer. Southern Alberta hemp grows shorter stalks, making it more suitable for seed harvest. But specially equipped combines can harvest the entire crop so it is conceivable that both food and fibre could be grown in the same field to enhance producer netbacks, given an appropriate hemp variety. Hemp straw after combining from high yielding varieties can provide 1.2 to 2.4 tonnes/acre or 2.4 to 4.8 tonnes/hectare.

In circumstances where producers harvest both grain and straw (there are maturation timing issues to consider) it is useful to also understand grains yields. These are highly variable. For dryland areas, a conservative average is 800 lbs/acre or 850 kg/hectare, with yields significantly higher for irrigated crops. The Palliser region features significant irrigated lands. “[2014] was our biggest expansion year in Alberta,” says Clarence Shwaluk, director of farm operations for Manitoba Harvest. “Right now, the majority of our production is in the irrigation belt between Medicine Hat and Lethbridge … there’s good climate and good soil there.”

MARKET

Growing Market:

According to a new market report, the future of the natural fibre composites (NFCs) market looks attractive with opportunities in the automotive and building and construction industries. The global natural fibre composites market is forecast to grow at a CAGR of 8.2% from 2015 to 2020. The major driver for the growth of this market is the rise in demand for lightweight and environmentally sustainable composite materials in various applications, such as automotive, building and construction, and others. The Palliser region already exports hemp seed and small amounts of fibre to other parts of North America.

So Many Uses:

Hemp offers super absorbency. This quality is desirable for oil and gas cleanup, livestock bedding and personal hygiene markets. Hemp’s very high tensile strength, strength-to-weight ratio, flexural strength and ability to rebound are desired benefits in bio-composites for automotive parts, aerospace and packaging. The textile, paper and building markets have interest in some specialty applications due to hemp’s durability, antimicrobial, acoustic and aesthetic properties. There is growing demand in food markets for certified organic hemp production. Some 80% to 85% of Canadian grain production is exported, mainly to the United States.

And Strong:

While pre-commercial, Just Biofibre Structural Solutions Corp. of Calgary (just over an hour from the west side of the Palliser region) has patented a hempcrete building block which is lower cost on an installed basis, stronger and has better acoustic and insulating properties than cement blocks. Just Biofibre uses the hemp hurd (the woody core of the stalk surrounded by the bast fibre) so is an excellent complement to Biocomposites Group’s demand for hemp fibre. Biocomposites Group is a manufacturer of high performance bio-fibre products. Its blocks provide an insulating value of between R27 and R42 for the same price or lower as conventional concrete blocks.

* http://investmedicinehat.ca/report/hemp-processing/
**New Opportunities:**

The Controlled Drugs & Substances Act regulation currently forces farmers to discard the leaves in the field, due to their low 0.3% THC content. This level is deemed to be above the limit wherein narcotic effects occur. The announcement updating this regulation to permit harvesting of leaves is expected soon. This would open a significant new co-product revenue source for higher value foods, medicinal products, nutraceuticals, and animal feed. Last year, the US Industrial Hemp Farming Act of 2015 was introduced into the Senate, which would change the material’s designation as a controlled substance and permit farmers in the US to produce industrial hemp.

**“Industrial Hemp Enterprise”; Published by Alberta Agriculture and Forestry, November 2015

**VALUE CHAIN & PRODUCTS**

Figure 1 above illustrates the numerous steps in the processing value chain and the resulting products. This value chain excludes leaves, which could also serve as feedstock for health, food, and animal feed products.

Active projects in Alberta include fibre mats for automotive interior panels and hempcrete construction blocks. The Palliser region has the potential to attract hempcrete construction block manufacturing, especially as more hemp varieties with the potential for better combined seed and fibre are introduced.

Internationally, hemp is becoming a mainstream fibre in many domains. For example, Nike uses hemp fibres in its running shoes. There are several Canadian companies including Hemp Oil Canada Inc., Hempola Valley Farms, Fresh Hemp Foods Ltd., Ruths Hemp Foods, Cool Hemp, and Natures Path, etc.—who are working to develop and market hemp seed products. These companies are all involved in the hemp seed market and are producing a wide range of products like snack foods, hemp meal and flour, edible oil, shampoo and conditioners, moisturizers, commercial oil paints, beer, aromatherapy, and cosmetic products.

Rail access is vital to agricultural processing opportunities. Canadian Pacific Railway (CP Rail) is the predominant railway company through most of the region. CP Rail’s main line splits at Medicine Hat and runs south through Lethbridge then on to the Crowsnest Pass to British Columbia; and north through Calgary and on through Roger’s Pass to British Columbia.
HEMP PROCESSING ALREADY IN THE EATC REGION

Two hours north of the Palliser Region, InnoTech Alberta (formerly AITF) Vegreville decortication has made it possible for an Alberta company to conduct successful pilot programs with automotive parts manufacturers for hemp reinforced automotive interior panels. Each panel within a single car model would generate approximately $2 million in sales.

Given the large reduction in mass of fibre versus the entire hemp plant, it is advantageous to have decortication facilities close to the field. There may be an opportunity for up to 4 new decortication facilities in East Alberta, should this market opportunity fully emerge. Plans were advanced in 2014 to develop a processing plant announced for Southern Alberta, and groups such a Palliser Economic Partnership and Invest Medicine Hat are eager to promote hemp processing in the region.

TRANSPORTATION CAPACITY IN PALLISER REGION

The Palliser region has an excellent transportation system for moving agricultural products, connected by a series of high load highways. The high load corridors along Highway 41 and 36 run north-south to U.S. and Mexican markets. And the region is bisected by the #1, feeding into the main hub of Calgary. The Trans-Canada highway system that connects western Canada to the strategic ports of Prince Rupert and Vancouver in British Columbia. A serious of other high load and secondary highways connect the region, along with CN and CP rail lines, and a number of regional airports.

One of the Palliser region’s primary industries is agriculture, including farming and ranching. The area has close to 3,300 farms – not including the many non-farm establishments in the agri-food industry – with over 2.7 million acres in cropland and over $507 million in livestock. It also has nearly a third of all irrigated land in the province of Alberta.
The adjacent map highlights the region’s transportation system. Palliser is a highly attractive location for hemp processing facilities that would have easy access to American markets through the Port of Wild Horse and the Port of Aden on the southern edge of the region.

Sample Site Locations in the Palliser Region for Hemp Processing

<table>
<thead>
<tr>
<th>Location</th>
<th>Rail</th>
<th>Labour</th>
<th>Water</th>
<th>Transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Brooks</td>
<td>CP</td>
<td>15,000</td>
<td>Bow River</td>
<td>Powered by Sheerness (780 MW) – with 230 kV lines</td>
</tr>
<tr>
<td>City of Medicine Hat</td>
<td>CP</td>
<td>63,000</td>
<td>S. Saskatchewan River</td>
<td>Medicine Hat (87 Operating/ Capacity 210 but in other sources shown as 50 MW)</td>
</tr>
</tbody>
</table>

Palliser Economic Partnership (PEP) strives to provide current and accurate information however numbers are approximate and information is subject to change. This information has been sourced from communities, Government of Alberta departments and other organizations. Please contact PEP should you require additional information or visit www.palliseralberta.com.

KEY REGIONAL ADVANTAGE

The Palliser region’s pivotal location within the Eastern Alberta Trade Corridor (EATC) positions businesses well for easy access to local, national and international markets, opening up product export and import opportunities. The EATC’s partnership with the Ports to Plains Alliance further expands market access down into the United States and Mexico.