

# The Vote Hemp Report

Education - Registration - Mobilization

2002/2003



**State Action  
Builds**

**Nutritional  
Hemp Food**

**Hemp:  
Fuel of the Future?**

**Hemp Fiber  
Will Propel New  
Technologies**

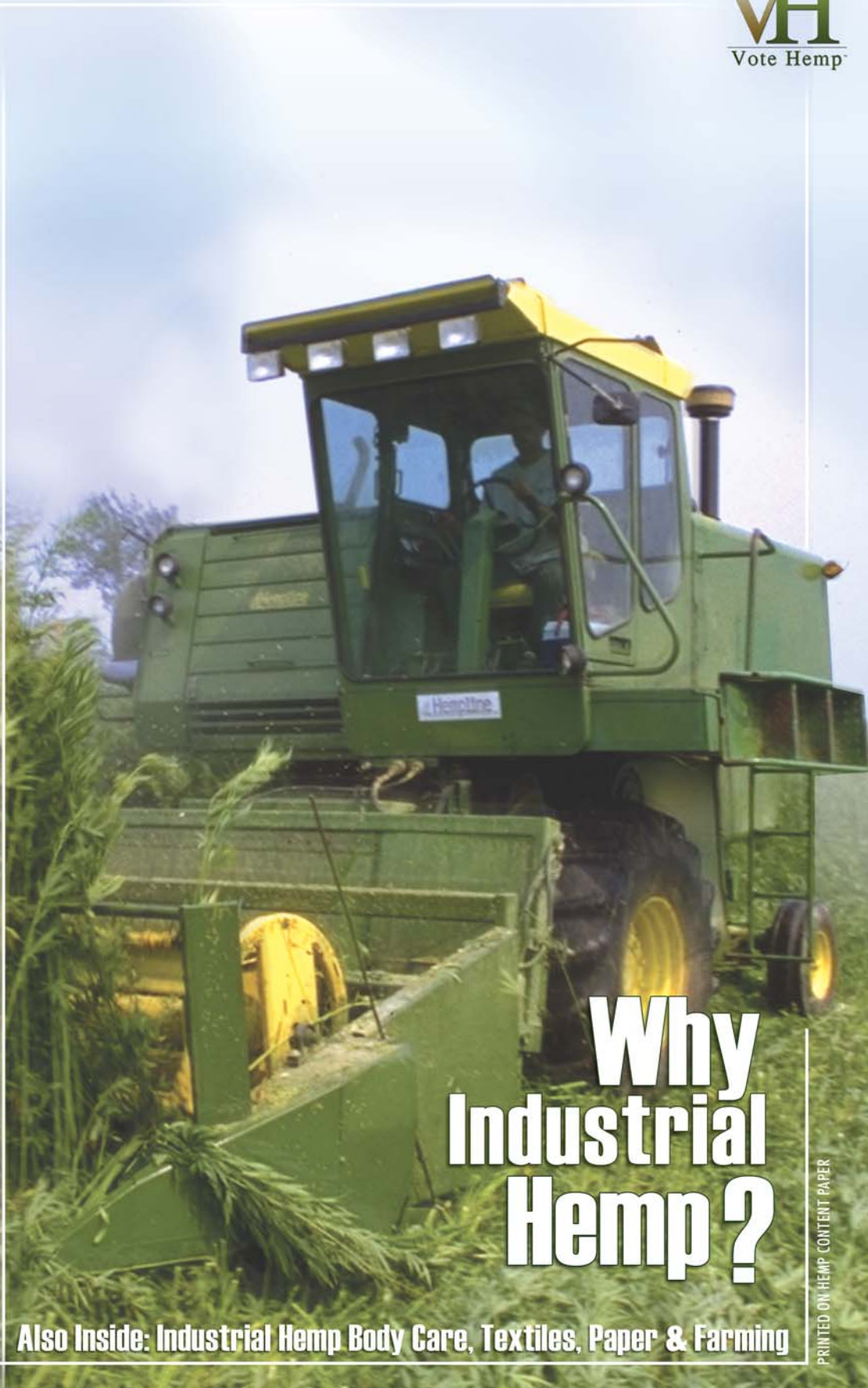
**Canada &  
Europe:  
Hemp Industries-in-Progress**

**Why  
Industrial  
Hemp?**

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Also Inside: Industrial Hemp Body Care, Textiles, Paper & Farming

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## Cynthia Thielen Hawaii State Representative

We in Hawaii are fortunate to be home to the first industrial hemp crop to be cultivated in American soil since the federal government's erroneous policy reversal caused the death of the agricultural hemp industry shortly after WWII. Through state legislation passed in 1999, the Hawaii Industrial

Hemp Research Project (HIHRP) has progressed successfully over the last three years in defining the strain of hemp best suited to Hawaii's climate. The vital research continuing in this project is the first step towards establishing an industry that will bolster the health of Hawaii's economy and environment.

Industrial hemp is an ideal crop for Hawaii. Because of our climate and hemp's growth cycle, we have the advantage of being able to produce at least three crops per year. Although industrial hemp has myriad uses and products, I see Hawaii focusing on seed production, building materials and bioremediation.

Why is hemp important for my state? For decades Hawaii has remained dependent on tourism, the military and agriculture for its revenue base, all of which have seen a downturn in recent years. We are currently struggling in the wake of our failing pineapple and sugar industries, decreased tourism and military cutbacks. Hawaii is at a crucial turning point. We have an opportunity to shift from dependence on foreign and federally influenced markets to locally-based industry. I see industrial hemp as a key to providing Hawaii with much needed economic independence and diversity.

Industrial hemp can provide business and employment opportunities across the U.S. It's time to get past the "giggle factor" and look at how corporations already are taking advantage of this versatile crop: tree-free hemp

paper is now available in Staples stores nationally; The Body Shop carries a line of hemp lotions, soaps and lip conditioners; hemp foods are available at natural food stores everywhere; and Ford and DaimlerChrysler, among others, are using hemp composite automobile parts.

Why is there domestic opposition to industrial hemp when over thirty industrialized nations (including Canada, England, France and Germany) permit it to be grown? Why is there opposition when hemp was an important crop from the founding of our nation (when it was once even accepted as payment of taxes) up through WWII? We all know about government regulations and what they can do to hurt businesses.

On a personal note, I have benefited greatly from the use of hemp oil as a treatment for sun-damaged skin. After having a cancerous basal cell removed, I started ingesting one tablespoon of hemp oil daily. My dermatologist credits the hemp oil for the rapid and cosmetically successful healing of my incision. (*Editor's note: this is most likely specifically due to hemp oil's exceptional GLA and SDA content; see Gero Leson's "Nutritional Profile and Benefits of Hemp Seed, Nut and Oil" on page 12).*

Industrial hemp's versatility makes it an incredible agricultural crop and economic booster. I am proud that Hawaii has recognized the value and potential of this crop and will continue to support its establishment on the local and national level.

Aloha,

Cynthia Thielen  
Assistant Minority (Republican) Floor Leader  
Hawaii House of Representatives



## Louie B. Nunn Former Governor of Kentucky

*Editor's note: Louie B. Nunn was the Governor of Kentucky from 1967 to 1971. He was the last Republican to be elected Governor of the state.*

It is time to separate reality from rhetoric. When I was Governor, I listened to all sides of the issues, carefully considered all opinions before me and tried to be fair in my responses. Being actively involved in public service, I am often asked for my opinion on various matters affecting our state. One of the most recent, the industrial hemp issue, has also proven to be one of the most important.

Although Kentucky has long been known for its historical hemp industry, it wasn't until recently that I became educated about industrial hemp. Frankly, I was opposed to the legalization of hemp for years because I had been of the opinion that hemp was marijuana. I was shortsighted in my thinking, and I was wrong.

As Kentucky farmers struggled with the loss of 65% of their tobacco income, I was asked to examine information on hemp. What I learned was that hemp is not a drug and never was. After studying the facts, I believe hemp cultivation has the potential to make a positive impact on our faltering agricultural economy and to create economic opportunities for our farmers and local industries.

I am concerned with all the misleading and intimidating rhetoric being offered to politicians as facts. We Kentuckians have been so mired in misinformation about industrial hemp that it has become difficult to distinguish reality from rhetoric.

They say politics makes strange bedfellows, but none stranger than marijuana growers and law enforcement. Like bootleggers and preachers, they oppose

legislation for different self-serving reasons.

Law enforcement opposes legalizing hemp production because officers get paid to destroy it, while marijuana growers oppose legalization because hemp cross-pollinates and destroys marijuana's potency. And neither side talks about Orincon, a company with remote sensing technology able to differentiate marijuana and hemp from up to 5,000 feet in the air, or other simple in-field tests that accomplish the same results.

But despite these diametrically opposed sides, there is a middle ground where common sense and rational people exist together. Today, with the support of farmers and businessmen, legislators in fourteen states including Kentucky have already passed legislation encouraging or allowing the growth of industrial hemp. Is it rational to say all of these folks are involved with the efforts to legalize marijuana? Should we listen when Canada's Royal Mounted Police report no problems regulating hemp, or are they also working to legalize marijuana? I know Kentucky State Police are as well educated as their Canadian counterparts and could as easily understand and incorporate industrial hemp regulations.

As difficult issues are analyzed with just, unbiased and sensible minds, solutions reached are usually fair and beneficial to all. Why should the industrial hemp issue be treated any differently? We should be looking forward to the time when intelligence and truth overshadow rhetoric and ignorance.

Remember, we can't distinguish between Kentucky white moonshine and spring water just by looking, but we haven't seen fit to outlaw spring water.

Regards,

Louie B. Nunn  
Former Governor of Kentucky

## CONTENTS

page5 Why Industrial Hemp?

page7 Why Vote Hemp?

page8 The State of Hemp in America Today  
by Mari Kane

page9 South Dakota Hemp Crop Adds Impetus  
to State Hemp Petition  
by Bob Newland

page11 Hemp Biomass:  
A Domestic and Sustainable Resource for Today and  
Tomorrow's Energy Needs  
by MA Smith

page12 Nutritional Profile and Benefits of Hemp Seed,  
Nut and Oil  
by Gero Leson

page15 Hemp Body Care Products:  
Looking Good in the Mirror and the Marketplace  
by Gretchen Monette

page15 TestPledge:  
Addressing Marketplace Concerns

page17 Hemp Textiles:  
Worth Working For?  
by Arthur Hanks

page18 Keeping the Trees in the Forest:  
Industrial Hemp as a Paper Alternative  
by Gretchen Monette and Gero Leson

page21 Performance-Based Industrial Hemp  
Fiber Will Propel New Technologies in  
the 21st Century  
by Peter A. Nelson

page23 Quick Cropping Guide for Hemp in  
the 21st Century

page24 Canada:  
Hemp Industry-In-Progress 1998-2002  
by Arthur Hanks

page26 European Hemp Industry:  
Novel Uses Raise Fiber Demand

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Newsletter Design: Cosmic Egg Studios | [cosmiceggstudios.com](http://cosmiceggstudios.com)  
Cover Image: Hemp Harvester, © 2002 Hempline, Inc.

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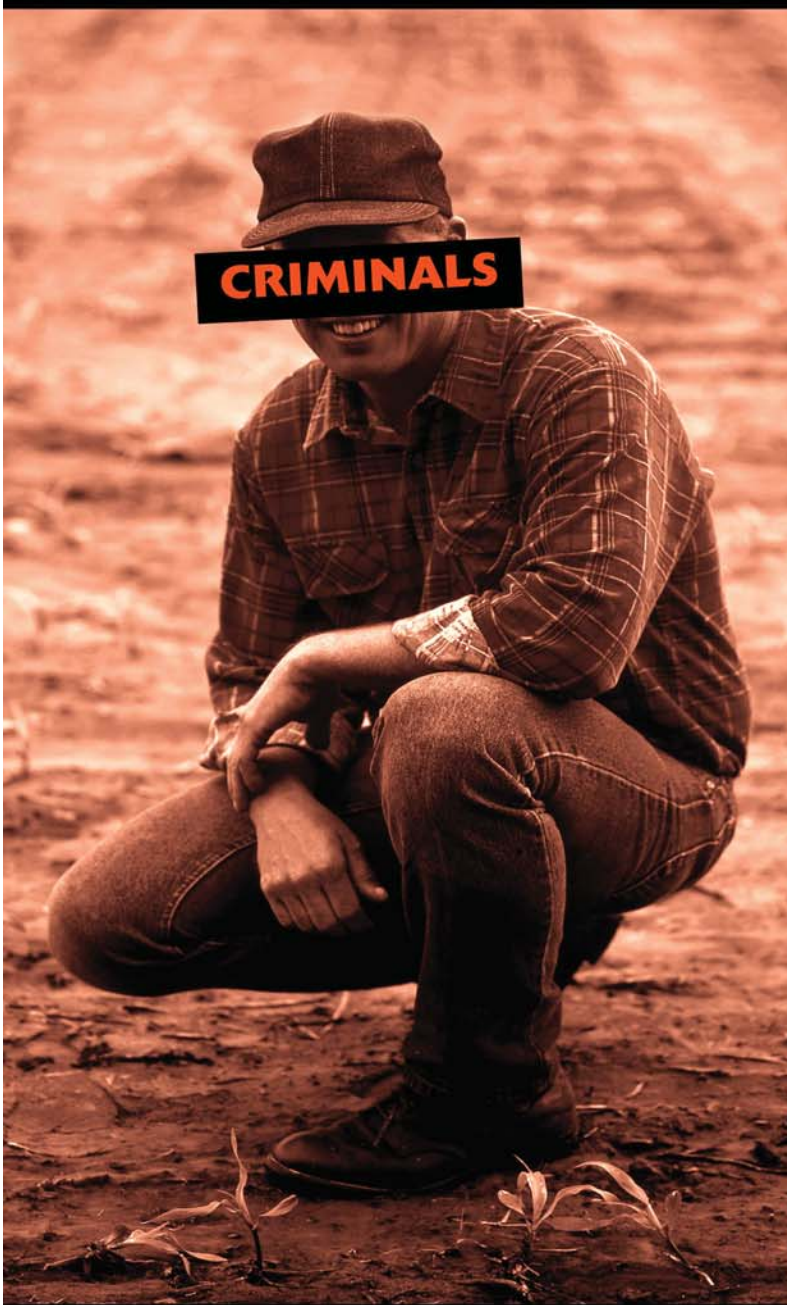
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ISSN 1540-5109

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**Banning industrial grade hemp is affecting more than farmers – it's affecting our future. Save hemp.**

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# WHY CAN'T AMERICAN FARMERS GROW INDUSTRIAL HEMP

Most importantly, because our federal government and the DEA refuse to recognize the difference between industrial hemp and its cousin marijuana like the rest of the world does ... help us to change that!

Contact Your Legislators via the **Action Alert Page** at the **Vote Hemp** web site. [www.VoteHemp.com](http://www.VoteHemp.com)



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Photo by Mari Karie, [hemppages.com](http://hemppages.com)

**VH**  
Vote Hemp

**Education - Registration - Mobilization**

Vote Hemp, Inc. is the only national single-issue 501(c)4 non-profit organization lobbying to change federal law to allow American farmers to grow industrial hemp under control of the USDA.

Our mission is to educate consumers, businesses, farmers and legislators about the many benefits of industrial hemp and to mobilize voters to support pro-hemp politicians.

[www.VoteHemp.com](http://www.VoteHemp.com)

Contributions can be mailed to: Vote Hemp, PO Box 862, Bedford, MA 01730. Donations are not tax-deductible. Visit our web site at [www.VoteHemp.com](http://www.VoteHemp.com) today for much more information and to get involved.

# Why Industrial Hemp?

The subject of why or whether to grow industrial hemp in the United States is often debated yet much misunderstood. The controversy surrounding the plant obscures much of its historical and potential impact - and its adaptability to diverse industries.

It never used to be that way. From the first plantings in Jamestown, when it was illegal *not* to grow hemp, to our founding fathers' hemp plantations, to the hemp sails and rigging of the clipper ships that sailed the 19th century seas, to the hemp canvas-covered wagons of the pioneers headed west, to the sturdy hemp Levi's pants of the original 49ers seeking their fortunes in the California hills, to the massive "Hemp for Victory" government program of WWII, hemp has developed a long and illustrious history in America. In fact, hemp has been used extensively for millennia in cultures around the world and belongs to humanity's common agricultural and commercial heritage.

The seed was known for its healthy protein and rich oil. The outer bast fiber from the stalk was used for clothing, canvas and rope. The useful inner core fiber (or hurds) was used for construction and paper production. In fact, the Declaration of Independence was drafted on hemp paper, and the finest Bible paper remains hemp-based even today. In the early 20th century, some researchers were beginning to look at using the cellulose from hemp as an affordable and renewable raw material for plastics. Henry Ford actually built a prototype car made out of agricultural fiber biocomposites, including hemp.

Despite large renewed domestic production during WWII, hemp's cultivation and use in the U.S. was discontinued in the mid-20th century. This was largely due to misinformed and misguided fears that industrial hemp is marijuana, and hemp became demonized during the "reefer madness" craze that swept the country over much of the last century. Despite easily discernable and widely accepted differences between the two distinct plant varieties, serious misconceptions continue to persist.

However, common sense has an ability to shine through even the cloudiest situations. Environmental and economic interests are beginning to cut



through the policy murk, and support for hemp is forming into a broad political base, including:

- ▶ Farmers: hemp can help farmers looking to diversify their farm operations. Hemp fits well into increasingly popular organic, low-input and sustainable methods of agriculture.
- ▶ Reform-minded businesses: hemp's valuable fiber and large biomass productivity can help companies "go green" by creating a wide variety of opportunities and supplementing or replacing more commonly used, problematic and stressed out raw material sources.
- ▶ Nutritionists and health food advocates: hemp's oil-rich seed has an exceptionally high content of vital Essential Fatty Acids (or EFAs, omega-3 and omega-6) that nutritionists have found to be deficient in our diets. A diet rich in EFAs can help alleviate and prevent many common ailments. For similar reasons, hemp oil is increasingly employed in the natural body care industry as well.

▶ Environmental, student and community activists: hemp can be a key to creating a "green" future and sustainable value-added industries in our neighborhoods, cities, states and country.

▶ Green shoppers: hemp is attractive to people willing to vote with their dollars and buy products that reflect their values.

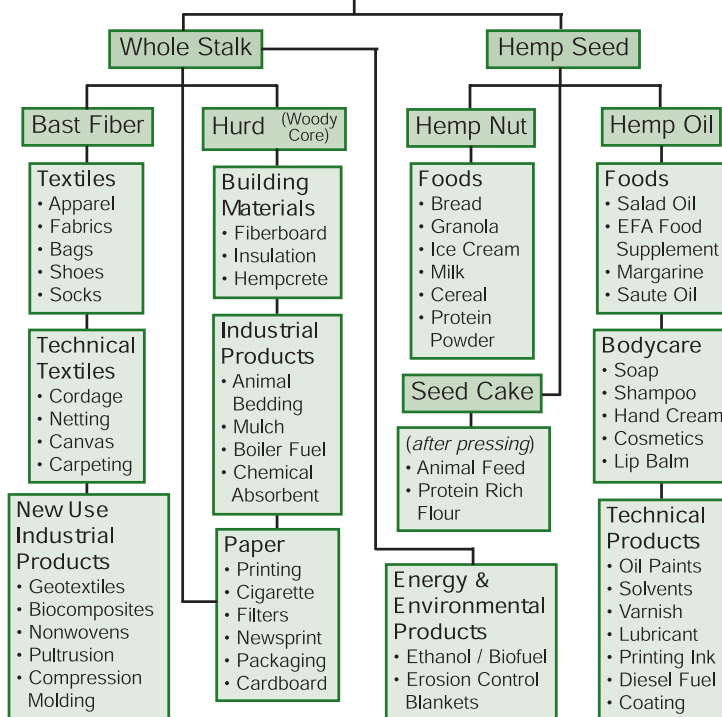
Hemp, of course, is not in itself a total panacea for the social, economic and environmental woes that plague our planet today. Indeed, no single crop can be. But, with focused and sustained research and development in both the public and private sectors, hemp and other qualified annual crops are poised to spur dramatic - and certainly vital - change. These renewable resources will transition our major industries from depending on non-renewable, fast-disappearing resource bases to

being driven and supported on a sustainable economic basis by the annual agri-industrial produce of the Earth's fertile fields.

With thirty-one other nations growing industrial hemp and the U.S. representing the largest consumer and industrial market for their hemp products, we are poised to take advantage of an unprecedented opportunity. Americans are becoming aware of the significant possibilities and benefits that hemp presents. America is getting ready to Vote Hemp.



## Modern Uses of Industrial Hemp



### Industrial Hemp Defined

Industrial hemp varieties of the cannabis plant, also referred to as "fiber" or "low-tetrahydrocannabinol (THC)" hemp, should not be confused with psychoactive "marijuana" varieties of the plant. In fact, they are quite distinct varieties or breeds of the same plant species, much like a St. Bernard and a Chihuahua are very different varieties of the same canine species. It is not possible to get "high" from hemp.

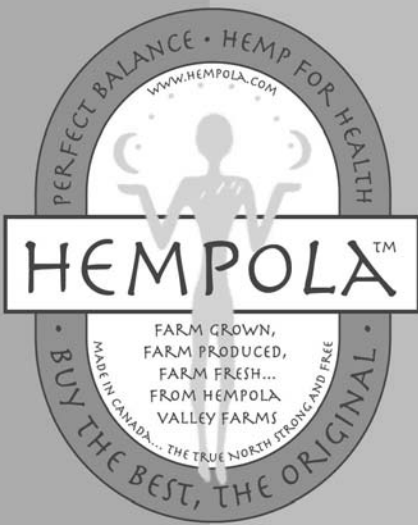
The majority of Western countries recognizes this distinction by differentiating cannabis based primarily on THC content and permits the farming of low-THC hemp varieties for fiber and seed. This distinction is formally affirmed in Article 28(2) of the 1961 United Nations' Single

Convention on Narcotic Drugs, to which the U.S. is a signatory party. The Article reads "This Convention shall not apply to the cultivation of the cannabis plant exclusively for industrial purposes (fiber and seed) or horticultural purposes."

Hemp has a well-established meaning in the international community, referring to non-psychoactive cannabis varieties. Regulations in the European Union and Canada conservatively mandate less than 0.2% and 0.3% THC in the flowers, respectively. In contrast, marijuana varieties generally contain between 3% and 15% THC in their flowers. Because of their minimal THC content, flowers and leaves from hemp have absolutely no value as a psychoactive recreational drug.

In spite of this, the DEA continues to intentionally confound non-psychoactive hemp varieties of cannabis with psychoactive marijuana varieties. The U.S. is the only major industrialized nation to prohibit the growing and processing of hemp. However, non-viable hemp seed, oil and fiber are all currently legal for trade in the U.S., and domestic industry has continued to import them for diverse uses every year since the Marihuana Tax Act, effectively making marijuana illegal, was passed by Congress in 1937. Industry estimates put the total North American retail market for hemp products at approximately \$150 million for 2002.

Note: Throughout this report, the terms "hemp" and "industrial hemp" are used interchangeably.



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## Why Vote Hemp?

VOTE HEMP, Inc. is a non-profit organization dedicated to the acceptance of and a free market for industrial hemp. Industrial hemp encompasses all non-psychoactive low-THC varieties of the cannabis plant and is cultivated for fiber and seed for use in diverse industries. Currently, it is illegal for U.S. farmers to grow hemp because it is improperly classified as a "drug" under the Controlled Substances Act (CSA), along with its psychoactive high-THC cousin, marijuana. Since changes in law require shifts in thinking, which requires education in the facts, our primary goal is to educate legislators and regulators, farmers and business owners, consumers and students, and other concerned citizens.

Vote Hemp has been educating state and federal legislators and working for the acceptance and recommercialization of hemp.

Hemp is a renewable resource for food, fiber, energy and more. The nascent global hemp market is a thriving commercial success. Unfortunately, due to outdated attitudes and Drug War para-

noia in Washington, the U.S. is the only major industrialized nation to prohibit the growing and processing of hemp. More than 30 countries, including Canada, France, England and Germany, allow farmers to grow hemp under straightforward regulatory regimes, and their relevant law enforcement agencies have not experienced any serious problems with diversion. From the time of Jamestown through 1937, and again briefly during WWII under the Department of Agriculture's "Hemp for Victory" program, American farmers cultivated hemp. Now, a large and well-educated cross-section of citizens is demanding that this right be restored.

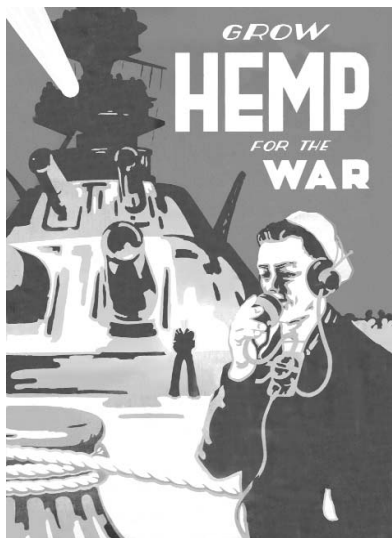
Vote Hemp has been educating state and federal legislators and working for the acceptance and recommercialization of hemp. Vote Hemp published a Voter Guide for the 2000 election, listing the positions on hemp of all candidates for U.S. Congress and the Presidency, and is publishing an updated Guide for the mid-term elections in 2002.

Vote Hemp played a key role in developing industry self-regulation, working with the Hemp Industries Association (HIA) to develop the TestPledge program through which participating companies assure consumers that they need not be concerned about workplace confirmation drug test interference as a result of using hemp products.

Vote Hemp coordinated the legal fight this past year against the DEA's October 2001 rules attempting to ban hemp foods containing insignificant trace THC despite a clear Congressional exemption (21 U.S.C. §802 (16)) for hemp seed and oil. In March of 2002, the Ninth Circuit

Court of Appeals issued a Stay of the DEA's interpretive rule on behalf of the HIA and other affected hemp food companies, rendering the rule null and void until the Court issues its final ruling sometime later this year. Vote Hemp expects the Court will permanently invalidate the DEA's rule and hemp foods will remain legal to import, sell and consume. In fact, industry sales have increased steadily since the Stay was issued.

Vote Hemp also coordinated the submission of over 115,000 comments to the DEA from the public opposing their regulations, as well as a bipartisan



Congressional "Dear Colleague" letter co-signed by 22 members of the U.S. House of Representatives.

Vote Hemp is currently engaged in numerous projects at both the state and federal levels. These include providing information and support for various state legislative efforts and assisting Lakota Sioux farmer Alex White Plume in his family's efforts to grow hemp as a value-added renewable crop on the Pine Ridge Reservation, the land of the sovereign Lakota Nation and one of the poorest areas in the U.S.

Stay informed about industrial hemp news and legislation by signing up for the Action Alert email list at the Vote Hemp web site. Also at the web site's Action Alert Center, with the click of a button you can fax or email a pre-drafted letter to your elected representatives demanding that American farmers be allowed to once again cultivate and process hemp. We encourage you while there to make an online credit card donation to support Vote Hemp's important ongoing efforts, or let us know how else you may be able to help.

Thank you for taking the time to read through *The Vote Hemp Report*.

VH

### Useful Links

Vote Hemp Voter Guide - <http://www.VoteHemp.com/voterguide.html>  
TestPledge Program - <http://www.TestPledge.com>  
HIA vs. DEA - <http://www.VoteHemp.com/news.html>  
Lakota Hemp Project - <http://www.VoteHemp.com/news.html#Lakota>

## Your Vote for Hemp Will Make a Difference!

### Your financial support is crucial to Vote Hemp's efforts.

We need your help now more than ever to keep our organization healthy and able to do our important work effectively. Any donation, large or small, will mean a great deal to Vote Hemp and our ability to effect positive change.

Please help us educate Congress and farmers and build support for hemp. Our work to date has been made possible by many forward-thinking people like you.

#### Over 2002-2003, we will:

- ▶ Lobby Congress to change federal regulations restricting industrial hemp
- ▶ Track voter attitudes through a national poll to demonstrate the wide range of public support for this common sense issue
- ▶ Educate farmers and state and local farm bureaus
- ▶ Persuade state and federal legislators to take a leadership role in advancing the hemp cause
- ▶ Galvanize voters to support pro-hemp candidates

VH  
Vote Hemp

Vote Hemp is making great progress in our mission to re-establish hemp as a premier renewable resource and major agricultural input in the U.S. We have accomplished so much with so little; please help us do even more. Go to our web site to make an encryption-secured credit card donation today:

<http://www.VoteHemp.com/contribute.html>

Or mail your donation to us at: Vote Hemp, P.O. Box 862, Bedford, MA 01730.  
Note that Vote Hemp is a 501(c)(4) non-profit organization, and donations are not tax-deductible.  
Get a Vote Hemp t-shirt for a donation of only \$36

# The State of Hemp in America Today:

## State Legislative Action Builds

by Mari Kane

If a state legislator can get an industrial hemp bill passed today, he or she can accomplish just about anything. Acceptance of hemp farming flies in the face of outdated federal laws that fail to distinguish between low-THC hemp and high-THC marijuana varieties of cannabis. Those laws effectively prohibit the domestic farming and processing of hemp, a plant that still remains in Schedule I of the Controlled Substances Act (CSA).

It takes a true hero to succeed, and there have been more than a few. In fact, 25 of 53 state hemp-related bills introduced since 1995 have passed, a success rate of over 47%. Overall, 14 states have successfully passed hemp-related legislation. 1999 was an especially good mid-term year that saw the passage of ten bills. In 2000, the National Conference of State Legislatures (NCSL) adopted a hemp policy that strongly urged the DEA, USDA and the Drug Czar's office to recognize the distinction between hemp and marijuana. NCSL, which represents thousands of state legislators, also urged Congress to change federal law to allow farmers to grow hemp under a regulated system. Clearly, the political seeds planted years ago are now coming to fruition.

In 2002, hemp bills have been introduced in seven states: Arizona, California, Hawaii, New Mexico, Vermont, Wisconsin and West Virginia. The CA, HI and WV bills have passed, the NM and VT bills have died in committee, and the AZ and WI bills have been held until 2003.

State legislators generally begin by drafting bills calling for scientific, economic and environmental studies of hemp, usually under the auspices of a state university. Some go one step further by calling for the planting of test plots. In those cases, researchers must still obtain the required federal permits from the DEA.

For example, Hawaii, which passed legislation calling for University-sponsored, privately-funded research in 1999, received the necessary state and DEA research permits and has gone on to plant test plots for a third straight year now. North Dakota passed similar legislation that same year, but DEA permits were not obtained until this year. State Representative David Monson (R-ND) is hopeful that, when they meet again in 2003, the legislature will appropriate public funds allowing the state to plant a test crop.

Depending on the state, most opposition to the regulation of industrial hemp emits from local and federal law enforcement agencies and private anti-drug organizations such as Drug Watch International and Family Research Council. These groups employ dramatic rhetoric in an effort to stifle legislative reform. These opponents are even opposed to simply studying the issue. Law enforcement agencies usually claim an inability to distinguish between hemp and marijuana. They also claim that hemp plants might be stolen by drug traffickers, or that some farmers might try to grow marijuana disguised as hemp. Anti-drug groups insist that relaxing restrictions against hemp will send the "wrong message" to kids about the dangers of drugs.

These arguments have very little basis in fact and are increasingly seen as outmoded, fear-driven thinking. In fact, in countries where farmers have legally grown hemp for years, law enforcement has had no problem distinguishing hemp from marijuana, and marijuana use has not increased among the public as a result. Farmers have to apply for permits, buy only approved low-THC hemp seed, and provide GPS coordinates of their fields. In contrast to their concern about the message of hemp products, anti-drug groups do not seem to be concerned that a wrong message is being conveyed by bakeries and grocery stores that sell poppy seed bagels containing trace opiates.

In Hawaii, where hemp cultivation research has been carried on without any major problems for three years, local law enforcement was hard pressed to find any valid reasons to object to State Rep. Cynthia Thielen's most recent hemp bill. The bill made Act 305, Session Laws of Hawaii 1999, permanent, allowing privately-funded hemp research to be continued in the state.

"The only opposition was from Jeanette McDougal of Drug Watch International and the Honolulu Police Department," said Thielen. "The police didn't give 'law enforcement' reasons; they simply said 'the objectives of the original research have been fulfilled.' Since that was incorrect, their testimony had little impact."

On the positive side, support for hemp comes from a broad spectrum - farmers, manufacturers, labor unions, environmentalists, states' rights advocates and private citizens, among others - who view

hemp's potential as a sensible proposal for resource sustainability and economic development. Their wide support is buttressed by the experiences of their counterparts in over thirty other countries that allow the cultivation and processing of hemp, as well as by American consumers who demand hemp as an alternative to cotton, petroleum and wood products.

In Arizona, State Senator Hamilton's bill, SB 1431, passed easily last year, but the Governor vetoed it due to intense pressure from the law enforcement community. There were also questions over whether the university study would be publicly or privately funded, so the 2002 bill was altered to require the university to do a study only if they receive private funding. The bill then passed in the House Education Committee, but the Agriculture Committee Chairman blocked it.

"Unfortunately, they [law enforcement] went to the Chairman of the Agriculture Committee and he listened to them before we were able to make that education effort," said Hamilton, who will be leaving the Senate due to term limits. "Education is the key. Tim Castleman [local hemp expert and activist] and his people had everybody educated on both sides, and now we're going to have all new people to educate."

California's AB 388, sponsored by State Rep. Virginia Strom-Martin, requests the University of California "to conduct an assessment of economic opportunities available through the production of specialty or alternative fiber crops including industrial hemp, kenaf and flax by extrapolating data on productivity and production costs available from trials conducted in other states and countries similar to California's conditions. The assessment shall include an estimation of market demand and likely crop prices, identification of potential barriers

### Mari Kane Talks with State Representative David Monson (R-ND)



David Monson

**MK:** How did you get the notion to regulate hemp in North Dakota?

**DM:** I knew we raised hemp back in the 1940s during WWII, and it had been raised successfully in the state before that and was growing wild all over the place - ditchweed, you know. I'm Republican and in the majority party in North Dakota. A huge majority, pretty conservative, and not out to raise marijuana. [Laughs.] We had credibility, and the farmers got on board, and we came out of there and passed her [the 1999 hemp bill] big-time. And once we got her passed in the House, she pretty well breezed through the Senate. In 1999, five different [hemp] bills all passed big-time. Now, I think if you ran on a platform opposing industrial hemp in North Dakota, you're going to get beat. About 80% of the people think it [hemp] is just fine.

**MK:** You have been pretty busy passing hemp legislation. How did it happen?

**DM:** We had the first [hemp] legislation to pass in the U.S., in 1997, to have industry do research on hemp feasibility. They reported in 1998 or 1999 and determined it was viable and worth pursuing. We passed several bills with bipartisan support by huge majorities, especially in the House. 89-7 voted in favor of the bills to send resolutions to Congressmen, the President and

the DEA, saying there is no reason not to raise this [hemp] as a crop. We passed a law to give NDSU [local university] the right to get a license to grow it. One of the main laws declared industrial hemp an agricultural crop instead of a weed, so it took hemp off the noxious weeds list. Now, since it's considered a crop, we've got licensing procedures put in place very similar to what Canada has. We also put it under control of the Department of Agriculture in North Dakota.

So, we've done pretty much everything in North Dakota that we can. We're ready to raise hemp here; we have everything in place. NDSU applied [to the DEA] for a permit, and I think they have been successful in getting their licenses. But they got them too late to plant this year, so it will wait for next year. The problem is, to do the test plots, they will have to put thousands of dollars into security.

**MK:** Who will pay for that?

**DM:** We're going to have to come up with the funds next session. We meet every two years, next in 2003, and we'll have to try to appropriate some money in their [NDSU's] budget for security stuff. I've got my work cut out for me now to try and get funding for it. It's kind of a chicken-and-egg thing. Until there's a market, people aren't going to raise it, even if it were legal at the federal level. And until it is legal and people are raising it, there isn't going to be a big market. No industry is going to build a multi-million dollar plant and then find out they can't get it raised.



to profitability, and identification of production, legal, processing and marketing issues that would need to be addressed in future demonstration research or pilot commercial trials."

Wisconsin's AB 679, sponsored by State Rep. Eugene Hahn, requires the Board of Regents of the University of Wisconsin "to apply for any federal permits required for research involving 'industrial hemp' (defined as Cannabis sativa with THC concentration not exceeding 0.3% on a dry weight basis)." It continues, "If the University Board obtains these permits, it must conduct research on growing and marketing industrial hemp and annually report the results of the research to the legislature. This bill also requires the Departments of Agriculture, Trade and Consumer Protection to promulgate rules, in consultation with the Attorney General, concerning industrial hemp, including rules for the inspection of industrial hemp fields and for notifying local law enforcement agencies in whose jurisdiction industrial hemp is being grown."

West Virginia's Senate Bill No. 447, sponsored by State Senators Facemyer and Bailey, passed on March 7, 2002 and was signed into law by Governor Wise on March 28. It decriminalized the growing of hemp as an agricultural crop and required the

Agricultural Commissioner to promulgate rules and regulations and develop grower licensing requirements. Senator Facemyer said approval of the bill would only mean that the DEA would work with the state to set up a research project on growing hemp for a few years. Only after that phase is complete might it be possible for farmers to actually grow it, she said.

Clearly, a large number of states are ready and willing to support domestic hemp cultivation and industry. Now, more than ever, it is vitally important that the federal barriers standing in the way are removed, enabling the forces of the free market to work their magic.

*Mari Kane is a freelance writer who covers issues relating to business, the environment and wine. Since 1993, Ms. Kane has written extensively on industrial hemp.*



### Useful Links

NCSL Hemp Resolution:  
<http://www.VoteHemp.com/issue.html#NCSL>  
 Hawaii State Legislators' Letter to President Bush:  
<http://www.VoteHemp.com/issue.html#Hawaii>

State Hemp Legislation Passed		
STATE	YEAR(s)	BILL(s)
Arizona	2001	SB 1519
Arkansas	1999	SR 13
California	1999 & 2002	HR 32 / AB 388
Hawaii	1999 & 2002	HR 110 / HB 57
Illinois	1999 & 2000	SR 49 / HR 553
Kentucky	2001	HB 100
Maryland	2000	HB 1250
Minnesota	1999	HF 1238
Montana	1999 & 2001	HR 2 / HF 1238
New Mex.	1999	HB 104
North Dak.	1999	HCR 3038
Vermont	2000	JRS 98
Virginia	1999 & 2001	HJR 94 & 605
West VA	2002	SB 447

For more information and links to all state hemp legislation which has been introduced since 1995, visit the Vote Hemp web site at: [http://VoteHemp.com/state\\_legis.html](http://VoteHemp.com/state_legis.html)

## South Dakota Hemp Crop Adds Impetus to State Hemp Petition

by Bob Newland

Almost completing a cycle which has not been duplicated since 1958, Alex White Plume has planted, cultivated, harvested, sold and arranged delivery of an industrial hemp crop in 2002. White Plume, a Lakota Sioux Indian whose hemp crop was illegally destroyed in 2000 and 2001 by U.S. federal law enforcement officers, had contracted his crop to the Madison Hemp & Flax Co. of Lexington, Kentucky. Before they could pick up the crop, however, a federal judge granted a temporary restraining order preventing the delivery and completion of the cycle. Alex White Plume and other family members are now facing several civil charges and will appear in court in early October.

This news coincides with the political campaign for "Initiated Measure 1" on November's general election ballot in South Dakota. The "South Dakota Industrial Hemp Act of 2002" was placed on the ballot by the South Dakota Industrial Hemp

Council (SDIHC) which wrapped up its year-long petition drive on May 7.

Bob Newland, a co-founder of the SDIHC and nominee for South Dakota Attorney General, said, "Alex White Plume has done more than any other single person to expose to South Dakotans and the world the absolute absurdity of U.S. public policy regarding hemp."

With the appearance of the Hemp Act on the ballot there, South Dakota is a focal point for hemp advocates. South Dakota voters will choose "yes" or "no" on the following proposed addition to state law in November: "Any person may plant, cultivate, harvest, possess, process, transport, sell or buy industrial hemp (cannabis) or any of its by-products with a tetrahydrocannabinol (THC) content of one percent or less."

### Lakota Hemp History

Under the Fort Laramie Treaty of 1868, the U.S. recognized the sovereign right of the Lakota Nation (Oglala Sioux) to be self-sufficient based on "cultivating the soil for a living." The nomadic Lakota understood they were to raise food and clothing from the soil as a substitute for buffalo which had provided them sustenance since antiquity. Industrial hemp was a staple crop in the region throughout the 19th century and was well adapted to the climate of South Dakota.

The Lakota had the right to cultivate hemp in 1868 and were encouraged by the U.S. to continue doing so. Wild ("feral") hemp, such as that cultivated by Alex White Plume, thrives naturally throughout South Dakota today - remnants from

historic hemp cultivation on the Plains. The Lakota recognized this history and their sovereign rights in passing Ordinance 98-27 of 1998, authorizing the cultivation of hemp at the Pine Ridge Indian Reservation while retaining "marijuana" laws unchanged.

Alex White Plume's hemp crop was intended to be used in a local, community-based hemp house demonstration project, a working model of agriculture-based, environmentally sustainable economic redevelopment. Since Pine Ridge is located within one of the poorest counties in the U.S., it is critical to establish such models there. The DEA's continued harassment of the Lakota people concerning these activities undermines their important efforts to make a better life with limited resources.

It will be the first time voters have ever directly voted on the question of hemp production in the U.S. in a statewide referendum (as opposed to elected state representatives voting in state legislatures). The SDIHC conducted a poll of South Dakota voters in 2001, which demonstrated that over 80% want farmers to be able to grow hemp if they choose to do so.

The proposal, when enacted, will distinguish hemp from marijuana by THC content and will remove South Dakota's barriers to hemp production. The change will coincide with a federal bill being contemplated by North Dakota Senator Kent Conrad, which will also define hemp as distinct from marijuana and will move regulation of hemp from the DEA to the USDA.

"We ache for adjectives strong enough to describe the absurdity of federal policies regarding hemp," Newland stated. "Over thirty nations grow, process and trade in hemp. The U.S. and Canada will consume over \$150 million of hemp products in 2002. Legal Canadian-grown hemp is being trucked past barely-surviving South Dakota farms. Our politicians talk constantly about finding alternative energy sources, saving the family farm, creating new value-added agricultural opportunities, cleaning up the environment and reducing our dependence on foreign energy and fiber supplies. But they ignore the billion-dollar golden opportunity sitting right in front of them - the promise of industrial hemp - which can potentially address all those concerns."

"I think South Dakotans will overwhelmingly pass the Hemp Act in November. I also think they will elect politicians who endorse hemp - because they support hemp, not in spite of it."



### Useful Links

More information on Alex White Plume and the Lakota Hemp Project:  
<http://www.VoteHemp.com/news.html#Lakota>  
 General information on hemp in South Dakota:  
<http://www.sodakhemp.org/>



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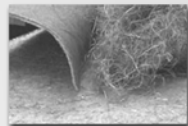
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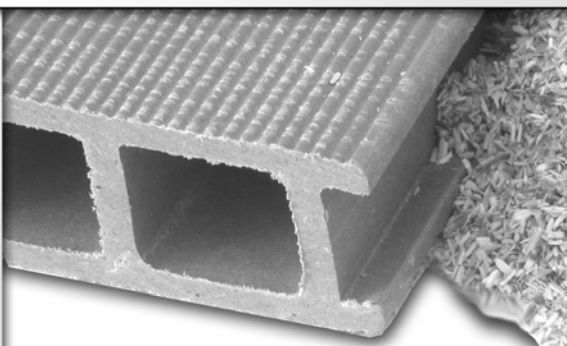


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# Hemp Biomass: A Domestic and Sustainable Resource for Today and Tomorrow's Energy Needs?

by MA Smith & Eric Steenstra

America has an energy problem. We consume an estimated 200 billion gallons of petroleum-based fuel annually, and there are legitimate questions as to how sustainable or environmentally and economically affordable that consumption rate is.

David Morris, President of the Institute for Local Self Reliance (ILSR), writes: "Market economies work best when they rely on accurate prices. Yet many of the prices we pay do not reflect the full costs of producing, using and disposing the goods we consume. The most important example of this mismatch may occur in the transportation sector."

In a 1998 paper for ILSR, "Oil Slickers: How Petroleum Benefits at the Taxpayer's Expense," Dr. Jennifer Wahl calculated that the true cost of gasoline is about 32 cents more per gallon than the pump price - or a total of about \$84 billion per year. This figure includes tax subsidies and tax breaks received by the petroleum industry, the military costs of protecting foreign oil supplies, and the environmental and health costs associated with pollution and global warming.

Wahl notes in her paper that her figure is a conservative estimate, considering that it was at the low end of the range (\$0.22 - \$1.34 per gallon). When she wrote the paper four years ago, she did not anticipate such increased military deployment in the Middle East, nor the costs of future disasters reminiscent of the Exxon Valdez.

The U.S. certainly has the lowest gasoline prices among industrialized countries. Trying to change this subsidy regime through gas hikes would amount to political suicide. Cheap gas for Americans is like free bread was to the Roman proletariat. But long-term foreign deployment of American troops in the Middle East is ultimately not the kind of security that is likely to prove stable.

There is, however, a home-grown solution to America's energy needs - and it is not based on science fiction, wishful thinking or pacifist handwringing. At a recent (May 2000) Nixon Center roundtable discussion, R. James Woolsey, former Director of the CIA, argued that new technology developments in the production of ethanol fuel could revolutionize energy markets.

Ethanol is a high-octane, water-free alcohol produced mainly from fermented sugars or converted starches found in common and abundant commodity crops such as corn, wheat and other cereals. It is now commonly

used as a gasoline additive, replacing toxic materials like methyl tertiary butyl ether (MTBE). While ethanol production is limited by high costs at present, new research demonstrates that it is possible to use any plant or plant product, commonly called biomass, to make ethanol. Ethanol production is currently about two billion gallons per year, providing 1% of the country's liquid fuel. With nine plants that came into production this year, annual capacity has increased to 2.55 billion gallons, and eleven plants under construction will soon add another 340 million gallons.

New research promises to develop processes that decisively reduce costs to the point where petroleum products would face vigorous price competition. Woolsey identifies new enzymes - biocatalysts - being developed through biotechnology as key to unlocking the energy potential of starch, sugar, cellulose and hemicellulose found in plant matter, allowing them to more efficiently be fermented into ethanol. Biomass ethanol essentially recycles agricultural residue. Because crops like hemp sequester carbon dioxide, there is no net addition of this greenhouse gas into the atmosphere. As this helps reduce atmospheric climate change, it is a significant advantage over using petroleum.

Another area where biomass holds an advantage over petroleum is in the range of products it can produce. As in oil refineries, biorefineries would yield a host of products, the number of which would only increase over time. Many biorefinery products can also be produced by oil refineries, such as liquid fuels, organic chemicals and various materials. However, biorefineries can manufacture many other products that oil refineries cannot, including foods, feeds and biochemicals.

These additional capabilities give biorefineries a potential competitive edge and enhanced financial stability.

The processing technologies of refineries tend to improve incrementally over time, eventually causing raw material costs to become the dominant cost factor. In this regard, biorefineries have another potential advantage over petroleum refineries because plant-derived raw materials are abundant and cheap domestic resources. The availability and prices of agricultural raw materials may thus be more stable and predictable than those of petroleum which will become inevitably scarcer and more

expensive with time.

Momentum for the idea is building. Other researchers suggest that a gasification process, using heat to "crack" the plant cellulose, may be another viable way of making affordable biomass-based energy. And while it is unlikely that ethanol will displace petroleum in the near future, research being conducted by universities, small companies and the U.S. Department of Energy is helping forge the way forward. Automakers are creating "flexible fuel" vehicles - pickups from Ford, Mazda and Chevrolet and some minivans from Chrysler and Dodge - that can run on either gasoline or up to 85% ethanol fuel. The American Lung Association has endorsed ethanol as a way of helping to clean the air of our crowded cities.

On the federal level, President Clinton made the development of biofuels a priority in 1999 when he signed Executive Order 13134 which created the Interagency Council on Biobased products. The Council's primary mission is to develop a comprehensive national strategy, including research and development and private sector incentives, to stimulate the creation and early adoption of technologies needed to make bioenergy and bio-based products cost competitive. Congress subsequently passed the Biomass Research and Development Act of 2000 (BRDA) which was sponsored by Senator Richard Lugar (R-IN), the influential ranking Republican on the Senate Agriculture Committee. The BRDA gives the USDA \$300 million to spend over six years to promote and develop biomass technology and crops.

"Cellulosic biomass is extremely plentiful. As it comes to be used to produce competitively-priced ethanol, it will democratize the world's

fuel markets," writes Lugar in a 1999 paper ("The New Petroleum") he co-wrote with Woolsey on the subject for *Foreign Affairs* (January/February 1999).

In fact, energy democracy is a key foundation of revitalizing

Biomass ethanol essentially recycles agricultural residue. Because crops like hemp sequester carbon dioxide, there is no net addition of this greenhouse gas into the atmosphere.

America's rural fabric, argues ILSR's Morris. He coined the term "Carbohydrate Economy" to describe the emerging industries of the 21<sup>st</sup> century that will take advantage of an underutilized raw materials base - plant matter.

"A carbohydrate economy reduces pollution, builds stronger rural communities and supports a rooted farmer-owned processing and manufacturing sector," writes Morris.

*continued on page 12* ▶

► continued from page 11

While urban and forestry waste could be diverted into energy processing streams, agricultural residues from commonly-grown commodity crops are most available and will likely claim the bulk of future biomass ethanol production. Because of high transportation costs, most biomass will be processed near the point of origin. The 50-mile rule (the affordable limit of transport) will mean that energy production will be decentralized and value-added benefits will spread to numerous rural communities, as well as to the original producers of biomass, the family farm.

The current common wisdom holds that agricultural industries must focus on multiple value-added products from the various fractions of crops to maintain economic viability, and biomass ethanol production will provide enhanced rural development by spurring on a plethora of co-products.

Canada's Saskatchewan Hemp Association has posited hemp as an ideal candidate for biomass/ethanol production because:

- hemp offers high tonnage of biomass over a single short growing season (3-4 tons per acre),
- hemp has excellent opportunities for co- and by-products in seed and fiber processing, and
- hemp enhances environmental values on the farm, and thus is consistent with the objectives of using plants for energy.

Some value-added end uses for co- and by-products for industrial hemp include composites, fine paper, nitrogen-rich fertilizer, plastics, fabrics and polymers, as well as seed products destined for the nutritional, feed and industrial oil markets. Because of the wide range of quality products that can be developed and the fact that hemp can be grown in all fifty states, it is worth a hard look.

For Midwestern rural economies needing to diversify, for small family farms needing to create additional value from their produce, and for everyone sick of the choking smog

created by our millions of cars, biomass ethanol production deserves serious consideration. And for the overburdened taxpayers of our nation, ethanol investment appears to be money that could be very well spent.

Certainly, while more research needs to be done to bring costs of production down to a level competitive with petroleum-based products, and while government priorities need to be strengthened on the issue, there is a strong sense that this is only a matter of time.

Industrial hemp indeed has the intrinsic qualities and economic value-added potential to be a significant biomass contributor to a bio-ethanol-fueled future.

VH

#### Useful Links

Institute for Local Self Reliance - <http://www.ilsr.org/>  
The Carbohydrate Economy - <http://www.carbohydrateeconomy.org/>  
Biomass Research and Development Initiative - <http://www.bioproducts-bioenergy.gov/>

## Nutritional Profile and Benefits of Hemp Seed, Nut and Oil

by Gero Leson

Hemp foods are expanding onto the shelves of grocery and natural food stores across North America. By definition, these are foods containing whole hemp seeds or the oil, nut (hulled seed) and/or flour (ground seed cake) derived from the seeds. Examples of currently available hemp food products include salad dressings, nutrition bars, breads, cookies, granola, waffles, nut butter, chips, pasta, frozen deserts and cold-pressed oil supplements. These products are sold for much more than their "hemp cachet" alone; manufacturers promote hemp foods for their exceptional nutritional and taste benefits. Examining the composition of hemp seed will help explain these benefits.

Like other oil seeds, the hemp nut consists mainly of oil (typically 44%), protein (33%) and dietary fiber and other carbohydrates (12%, predominantly from residues of the hull). In addition, the nut contains vitamins (particularly the tocopherols and tocotrienols of the Vitamin E complex), phytosterols and trace minerals. Overall, hemp's main nutritional advantage over other seeds lies in the composition of its oil, i.e. its fatty acid profile, and in its protein which contains all of the essential amino acids in nutritionally significant amounts and in a desirable ratio.

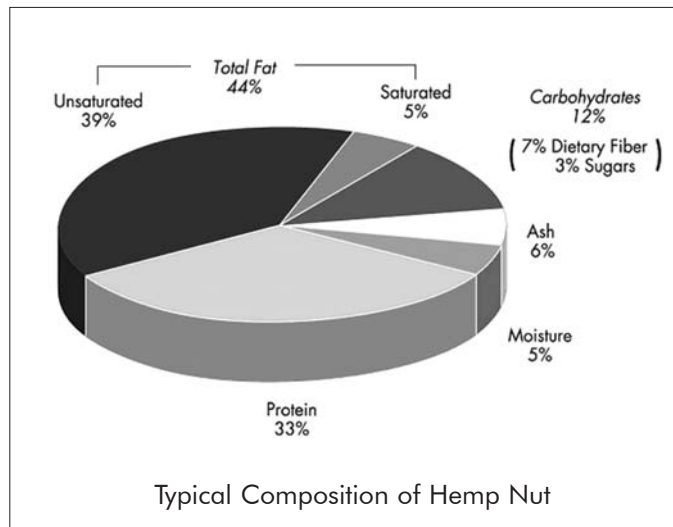
Most oil seeds contain plenty of linoleic acid (LA), an essential fatty acid (EFA) from the "omega-6" family, yet they offer little alpha-linolenic acid (ALA), the other EFA from the "omega-3" family. Health agencies around the world agree that humans should ingest these EFAs in an omega-6/omega-3 ratio of about 4:1. Since common seed oil and animal fat, both low in omega-3, account for most of our fat intake, Western diets typically have omega-6/omega-3 ratios of 10:1 or more, which is far too rich in omega-6 and cor-

respondingly too deficient in omega-3. Recent clinical research continues to identify this imbalance as a co-factor in a wide range of common illnesses, including cardiovascular diseases, arthritis, diabetes, skin and mood disorders. A 1999 workshop by the U.S. National Institute of Health (see [http://ods.od.nih.gov/news/conferences/w6w3\\_abstracts.html](http://ods.od.nih.gov/news/conferences/w6w3_abstracts.html)) demonstrated the impressive benefits of a balanced omega-6/omega-3 ratio in our diet: reduced risk of atherosclerosis, sudden cardiac death and certain types of cancers, decrease in the symptoms of rheumatoid arthritis, mood improvement in bipolar disorders and optimized development in infants.

In clinical studies, these benefits are often achieved using omega-3-rich fish and flax oil supplements. A more "holistic" approach consists of shifting our general dietary fat intake towards nuts and oils offering a better omega-6/omega-3 ratio. Hemp nut and oil offer an omega-6/omega-3 ratio of 3:1 or less, depending on plant variety. This exceeds the target ratio of 4:1

and compensates in part for omega-3 deficiencies in the rest of our diet. No other vegetable oil offers EFAs at such high concentrations and, more importantly, in such a desirable omega-6/omega-3 ratio.

Hemp oil also provides significant amounts of the more rare 'super' polyunsaturated fatty acids, notably gamma-linolenic acid (GLA) and stearidonic acid (SDA). These are not essential themselves, but our body only naturally produces them from the LA and ALA essential fatty acids, respectively.



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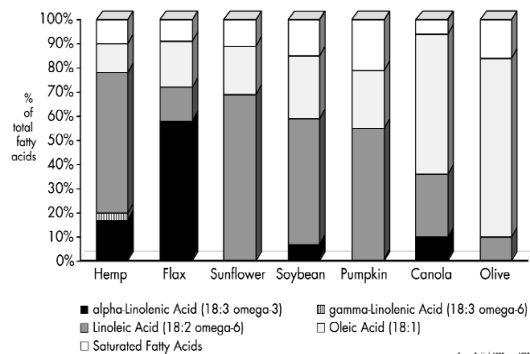
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www.HempStores.com  
Retail stores selling a variety of hemp products, searchable by location  
www.TestPledge.com  
Program assuring consumers that hemp foods from TestPledge companies are processed using high quality standards which eliminate the chance of a confirmed positive test for marijuana

Photo Credit: Mark Kane

Supplementation with GLA and SDA appears to alleviate the symptoms of atopic dermatitis and other skin diseases in some patients. Clinical trials of the putative benefits from ingested hemp oil are currently under way at the University of Kuopio in Finland to assess the extent of these potential benefits. GLA and SDA content in hemp seed vary considerably with variety and this needs to be considered when using hemp oil to treat such symptoms.

Hemp oil typically contains less than 10% saturated fatty acids, and no trans-fatty acids, which are particularly detrimental to our blood cholesterol balance. To avoid conversion of polyunsaturated fatty acids to unhealthy peroxides at higher temperatures, hemp oil and nut are best used for cold and warm dishes where temperature is kept below the boiling point (212° F). Hemp oil should not be used for frying. When using it for light sautéing, keeping the pan at low heat and with sufficient moisture in the bottom limits both temperature and the formation of peroxides and off-flavors. Hemp nut can be lightly toasted and baked in bread and pastry dough keeping in mind these temperature and moisture caveats.



Typical Fatty Acid Composition of Vegetable Oils

Hemp protein is also of exceptionally high quality in terms of amino acid (AA) composition and protein structure, the latter affecting digestibility and utilization by the human body. Hemp protein contains all of the essential amino acids in more nutritionally significant amounts and at a ratio closer to "complete" sources of protein (like meat, milk and eggs) than all other oil seeds except soy. Hemp protein consists of two globular proteins, albumin (33%) and edestine (67%), with a structure very similar to proteins manufactured in our blood and is thus readily digestible. Hemp protein appears to be free of antinutrients that are found in soy to interfere with protein uptake. So, eating hemp seed or nut delivers protein with a favorable AA composition and in a structure readily utilized.

Hemp's nutritional advantage over other sources of fats and protein thus lies in its highly desirable balance of basic nutrients. Simply put, when eating hemp seed, nut and/or oil, our body obtains much of what it needs without the caloric ballast of non-essential nutrients. Yet, unlike fish and flax oil supplements and assorted protein powders, properly processed hemp seed offers these benefits with the additional bonus of a nice flavor profile - hemp tastes good. Fresh cold-pressed hemp oil and hemp nut, particularly when toasted, add a nice nutty flavor to many dishes and packaged food products. Hemp nut and oil therefore are attractive both nutritionally and culinarily, rendering them truly modern food sources.

Editor's note: Also see page 15 for HIA's TestPledge quality control program for hemp nut and oil.

Gero Leson, D.Env. is an environmental scientist and consultant with extensive experience in food and fiber uses of hemp and other renewable resources.



## Resources

For a recent referenced overview of the benefits of hemp seed and oil by Darrell Tanelian, MD, see [www.freshhempfoods.com/pdf/forgotten.pdf](http://www.freshhempfoods.com/pdf/forgotten.pdf)

Gero Leson and Petra Pless, "Hemp Foods and Oils for Health," Hemptech, Sebastopol, CA



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Action Snack

# Hemp Body Care Products: Looking Good in the Mirror and the Marketplace

by Gretchen Monette

In North America, natural body care products continue to be a significant and growing market for industrial hemp. An increasing number of consumers enjoy the benefits of cosmetics containing hemp oil, and the range of available products is exhaustive: bar and liquid soaps, shampoos and conditioners, hand, facial and foot creams, salves, body lotions, shower gels, massage oils and lip balms. Most visible to consumers are the product lines released by mainstream companies such as The Body Shop, Revlon and Alterna. In the natural marketplace, for example, Dr. Bronner's Magic Soaps, Sun Dog, Raining Rose, Merry Hempsters, Nature's Gate, Jason Natural Cosmetics and Kiss My Face have all established successful hemp body care lines.

"The natural body care segment in the U.S. is a growing billion-dollar-plus market," reports Erik Rothenberg, President of Atlas Corporation, an importer of refined hemp oil. "Natural body care products using hemp oil in the U.S. will conservatively generate over \$30 million in retail sales this year." Hemp body care products can be found in the body care aisle at any of the 10,000-plus natural products stores across the country and have begun to successfully penetrate mainstream distribution and retail channels as well.

What is it about hemp oil that has so many consumers and manufacturers interested? More than 75% of its fatty acids are polyunsaturated essential fatty acids (EFAs). These impart excellent emollient, lubricating and moisturizing properties to both leave-on and rinse-off body care products. Furthermore, hemp oil contains a significant amount of the omega-6 derivative gamma linolenic acid (GLA). Clinical studies have shown that external application of these EFAs (and leave-on products containing them in sufficiently large proportions) can alleviate or even remedy common skin problems, such as dry, scaling or cracking skin, and even slow down skin aging.

One of the largest manufacturers of suntan lotions and protectors, California Tan, has been using hemp oil in some of their products for years. Many hemp oil-based sunscreen products have been developed by others as well. "When hemp was first brought to me," remembers Debbie Pierce, Vice President of Research and Technology at California Tan, "I thought it was a marketing gimmick. But research showed me how good it actually is, and as a scientist, hemp is something I can believe in." Recent Canadian research shows that hemp oil absorbs radiation in the UV-B and UV-C range, confirming its potential as a broad-spectrum UV skin protector.

Another firm believer in hemp for the body is Sue Kastensen, founder of Sun Dog Hemp Body

Care in Wisconsin. Kastensen produces eco-friendly lip balms, liquid and bar body soaps, body lotions and sulfate-free shampoos and conditioners, all incorporating hemp oil. She looks forward to the day hemp can be grown in the U.S., increasing the quality and consistency of supply and lowering the cost of hemp oil. "I would love to see hemp turn into just another commodity oil from which to choose," she states. What began in 1994 as a hobby for Kastensen has turned into a profitable business with hundreds of natural products stores and boutiques as customers, that, along with healthy internet sales, enable her to support the Native American causes she is passionate about.

One of the most successful and visible lines of hemp body care in the U.S. is that of The Body Shop. "We are always looking for new ingredients that are naturally inspired, effective and results-oriented," says company spokesperson Chad Little. "The Body Shop wanted to develop a new range of products for dry skin that offers the best in skin care solutions. Hemp oil contains an unusually high concentration of EFAs, making it an ideal natural ingredient for treating dry skin and hair." The company's Hemp Hand

Protector is currently one of their best sellers in the U.S., and the hemp line as a whole accounts for approximately \$6 million in sales here. The Body Shop sold an estimated \$40 million of hemp products worldwide last year.

An example of how hemp oil can help improve well-established body care products to the benefit of both manufacturer and consumer is Dr. Bronner's Magic Soaps, which manufactures the top-selling liquid and bar soaps in the natural marketplace. The company currently uses about 40,000 pounds of refined hemp oil and 2,000 pounds of unrefined hemp oil per year as a superfatting ingredient in their soaps. Company president David Bronner states, "The hemp oil's EFAs make the soaps much smoother and less drying, improving their afterfeel dramatically. We've seen a remarkable boost in sales volume over the past few years since we added the hemp oil in 1999. Our customers love it."

Millions of people, through a plethora of products for the body, experience the healing powers of industrial hemp oil every day. It is time to let our farmers and processors take advantage of this lucrative market.

Gretchen Monette is a communications consultant and freelance journalist living in Michigan.



## TestPledge: Addressing Marketplace Concerns About Drug Testing

The Hemp Industries Association (HIA) initiated the TestPledge program in August of 2001 to assure consumers that eating hemp foods cannot cause a confirmed positive drug test for marijuana. Virtually all manufacturers of hemp nut (i.e. shelled hemp seed) and oil products in North America have signed onto the TestPledge program. TestPledge companies commit to maintaining quality control measures which limit the amount of harmless trace residual THC in hemp oil and nut, thus eliminating the risk of a confirmed positive drug test.

Based on a study commissioned by a Canadian governmental research program and published in the *Journal of Analytical Toxicology* last year (Volume 25, Nov./Dec. 2001), TestPledge requires that pledging companies test every batch of their hemp nut and/or oil and commit to the following trace THC limits:

Hemp oil: 5.0 parts per million (ppm)  
Hemp nut: 1.5 parts per million (ppm)

These limits have been the de facto norm for hemp seed processors since mid-1998, after the Canadian Hemp Regulations went into effect. Unfortunately, the Drug Enforcement Administration (DEA) continues to use past drug-test interference problems from the mid-1990's as a pretext to harass the hemp industry. This policy is hypocritical, as the DEA has not attacked poppy seed bagel makers for promoting opium use, despite the fact that poppy seeds come from the same species as the opium poppy and contain

trace opiates which have historically interfered with narcotics drug-testing. The U.S. government has also not harassed fruit juice companies regarding trace alcohol in juice present through natural fermentation.

Hemp seed is one of the most perfect sources for human nutrition in all of nature. In addition to its excellent flavor profile, the nut protein supplies all essential amino acids in an easily digestible form and with a high protein efficiency ratio. Hemp oil offers high concentrations of two essential fatty acids (EFAs), omega-3 and omega-6, in a perfect ratio. This superior nutritional profile makes hemp nut and oil ideal for a wide range of functional food applications and as an effective fatty acid supplement. Not surprisingly, hemp nut and oil are increasingly used in natural food products, such as corn chips, nutrition bars, hummus, nondairy milks and cheeses, waffles, breads and cereals.

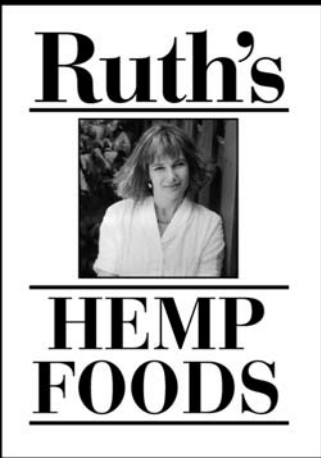
The high and balanced EFA content of hemp oil also makes it ideal as a topical ingredient in both leave-on and rinse-off body care products. In lotions and creams, the EFAs help soothe and restore skin and give excellent emolliency and smooth afterfeel to lotions, lip balms, conditioners, shampoos, soaps and shaving products.

Estimated retail sales for hemp food and body care products in the U.S. exceeded \$40 million in 2001, up from less than \$1 million in the early 1990s.

For further information on TestPledge, go to <http://www.TestPledge.com>



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# Hemp Textiles: Worth Working For?

by Arthur Hanks

Textiles are traditionally one of the most important high-value and well-known markets for hemp's long bast fiber. The English word "canvas" derives, ultimately, from the Latin word "cannabis," and the first Levi's jeans were made from hemp fabric. The canvas on the covered wagons of American pioneers heading west were hemp, as were the rigging and sails of every American ship that sailed the high seas during the 18<sup>th</sup> and 19<sup>th</sup> centuries.

The current annual U.S. market for hemp yarn and fabric is estimated to be in the \$15 million range, and the annual end retail market for finished hemp clothing and woven goods is valued at approximately \$80 million (source: Hemp Industries Association). Many small companies, such as Jus Naturale, Two Star Dog, Of the Earth and Hempys, are dedicated to hemp fabrics and fashions, and mainstream companies, such as Patagonia, Armani, Ralph Lauren and Men's Wearhouse, are finding hemp to be an important part of their fashion mix. Hemp fibers are also increasingly utilized in bed linens, rugs and carpets: the Fortune 500 carpet company Interface, Inc. is a global pioneer of sustainable industrial processes and carpet products, and has produced a prototype wall-to-wall all-natural carpet made of hemp fiber that is completely bio-degradable.

Some advocates believe that new technology under development called green decortication could explode the textile niche that hemp currently finds itself in by creating a better quality fiber that would be economically competitive to cotton. Others are working on developing cottonization technology so that hemp fibers can be easily mixed with cotton and spun on existing domestic yarn

machinery. Nonetheless, the processing of hemp textiles for the garment industry is currently a challenging endeavor.

Hemp cultivated for fiber is grown at high density that minimizes branching and encourages straight vertical growth of the plant. Plants for fiber are cut just before going to seed, and the stalks are then shocked in the field to dry. Within a week the stalks are bundled and taken to regional processing centers for water retting, a process of controlled natural decomposition. Retting is necessary as it allows natural bacteria to weaken the pectins that bind the plant's fiber together. This process is monitored

and can take a week or more; afterwards, the fiber is more easily separated. In fiber separation (decortication), the longer exterior fiber (bast fiber, making up about 1/4 to 1/3 of the total fiber volume) is separated from the inner woody core fiber (hurds). The core fiber is sent to other markets like animal bedding or construction, and the bast fiber is cleaned, combed and spun into yarn, which can then be woven or blended into various textile fabrics for the garment industry.

The major challenge facing hemp in this sector is that the conventional processing approach outlined above is to some degree archaic.

Because North American hemp prohibition last century has stunted research and development, hemp fiber processing technology has not kept pace with other fibers such as cotton or synthetics from petroleum (e.g., nylon and rayon). Current world cultivation of hemp fiber and production of textiles is thus concentrated in Eastern Europe and Asia, regions that never abandoned hemp textile production and where competitive economic advantage favors the initial labor intensive harvesting and water-retting practices.

For hemp textiles to be globally competitive, these practices must be replaced by automated harvesting, followed by a modern fiber separation technology (such as green decortication), followed by enzymatic or chemical retting to produce the necessary fine fiber which then can be open-end spun. The resulting textiles will have qualities superior to cotton

(such as improved moisture absorption/desorption and feel) and will effectively compete in the huge natural textile market currently dominated by cotton.

Geof Kime, founder and president of the Canadian fiber processing company Hempline, states that "there is a need for better hemp fiber refining equipment and processes to make the fiber consistently fine enough to spin, because using spinning equipment for other fibers to spin hemp as processed currently tends to lower the efficiency of the spinning process. And with the currently tight margins of the textile business

in North America, mill managers may not be able to afford this loss of productivity."

Importers of hemp textiles are in the meantime bringing excellent fabric and yarns from Asia and Eastern Europe to a welcoming North American marketplace. Barbara Fillipone has ten years of experience working with hemp. Fillipone got her start designing hemp apparel in the U.S., but moved into



Fine Hackled Hemp Fiber

working directly with foreign hemp textile processors to improve fabric quality and consistency, especially in terms of texture and color. She has worked with companies such as Dong Ping Textile Mill (China), Ecolution (Romania/U.S.) and Earthgoods (U.S.), and her current company, Envirotexiles, sources, formulates, manufactures and imports hemp textiles and yarns. Fillipone believes that hemp can satisfy the most

demanding garment manufacturers. "Last year, Ralph Lauren asked me to make hemp fabric that would suit their needs," she says. "You can pretty much make any fabric if you know the specifications."

Can hemp be reintroduced as a major textile fabric in 21<sup>st</sup> century North America as it was in the 18<sup>th</sup> and 19<sup>th</sup> centuries? The technical performance of hemp fiber is reason enough for the clothing industry; over the past ten years, hemp fabric has gained market share because of superior qualities such as UV resistance, distinctive feel, antibacterial properties, breathability, strength and endurance. In addition, hemp is one of the most ecologically sustainable crops to grow, requiring little to no pesticides and herbicides, while on the other hand commercially grown cotton is currently the most pesticide-intensive crop on the planet, requiring more than 25% of all the pesticides that are sprayed on agricultural crops worldwide.

And hemp walks its talk: consumers are increasingly desirous of items that carry environmental cachet, and corporate buyers are eager to use something seen as environmentally friendly. Because of a high awareness in the marketplace, there is room to grow. But more research and development in processing is needed to move hemp textiles forward. The necessary first step, allowing the crop to be grown domestically, will create the right business climate for companies to innovate and find the right answers.

*Arthur Hanks is a Canadian writer who covers food, agriculture and environmental issues. Read more of his writing at [HempReport.com](http://HempReport.com).*

VH

# Keeping the Trees in the Forest:

## Industrial Hemp as a Paper Alternative

by Gretchen Monette & Gero Leson

Apparently the introduction of the "paperless office" has not done much to curb the consumption of paper - nor is it expected to. The Technical Association of the Pulp and Paper Industry (TAPPI) projects that annual global consumption of paper will rise from 300 million tons in 1997 to over 400 million tons by 2010. Improving the productivity of forests and increasing the recycling of waste paper will only supply some of that growth. Nonwood or agricultural fibers are a much-discussed alternative for filling the gap, and no other pulp fiber source has created as much interest in recent years as industrial hemp.

Proponents praise hemp's high dry matter yield per acre and the strength of its bast fibers. It also offers several environmental benefits:

- ▶ the ability to replace trees reduces the need for non-sustainable clear-cutting;
- ▶ the low lignin content of hemp fibers facilitates the use of totally chlorine-free (TCF) bleaching sequences; and
- ▶ since hemp requires little to no pesticides and herbicides and improves soil conditions, it is a beneficial rotational crop.

### Characteristics of Hemp Fiber

Hemp stalks produce two different fibers for pulping. The outer bast fiber consists of longer fibers. Early European paper makers recovered these fibers from rags and beat them into a paper pulp. Over the last century, alkaline chemical pulping of decorticated bast fiber became the sole source of hemp pulp. Most of hemp's biomass (about 75%), however, is in the woody core fiber, or hurds. These consist of very short, bulky fibers that make a chemical pulp with tensile and burst strength comparable to that of hardwood kraft pulp. Adding just 10-30% of this pulp to softwood pulp improves mass uniformity, paper formation and printability in both fine and printing and writing (P&W) paper grades.

Hemp pulp producers accept up to 30% hurds in the bast fiber since they act as filler, improving smoothness and printability. Yet, the difference in morphology and lignin content between bast fiber and hurds currently requires mechanical separation (decortication) of the stalks. As with other nonwood sources of pulp, the complex logistics of harvesting, transporting and storing a bulky, seasonal commodity and the comparatively small throughput of existing nonwood fiber pulp mills have thus far kept hemp from becoming a cost-competitive source of pulp for P&W paper.

Several novel and promising technologies for nonwood pulping have emerged in recent years, however. These include various solvent extraction technologies allowing recovery of by-products and a chemical-mechanical technology using twin screw extruders. Moreover, novel technologies such as thermal depolymerization (TDP) may offer cost-effective recovery of cooking chemicals and dissolved organics from the cooking liquor. All these emerging technologies still await implementation on a production scale.

So far, with cheap wood pulps readily available, large industry players have shown limited interest in the use of bast fibers as a primary feedstock. A lack of capital and market uncertainty have also hampered the development of independent projects, which highlights the need for government incentives and the application of a longer-term perspective by the paper industry.

### Hemp in Specialty Papers

Like flax and abaca, hemp has a long-established historical niche in the production of specialty papers. Worldwide today, approximately 7,500 dry metric tons (MT) of hemp pulp are produced annually. Most of this is used for cigarette paper, and a smaller portion is used for other specialties, such as ultra-lightweight printing paper for Bibles. Due to their higher price, bast fiber pulps from hemp and flax have come under increasing pressure from softwood kraft pulp, and some cigarette manufacturers have switched to this cheaper supply.



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Because of this price pressure, global use of hemp in its traditional niche specialty paper market is not likely to increase significantly until the industry realizes economies of scale leading to a lower price point. As this occurs, hemp's future in this niche market should brighten considerably.

#### Nonwood Fibers for Printing and Writing Papers

Does hemp have potential as a nonwood fiber source for P&W and other mass-market papers? Today, the use of nonwood fibers is common in wood-limited countries. China and India, for example, are the two largest producers of nonwood pulp, which accounts for 80% and 60% of their total pulping capacity, respectively. Environmental controls are lacking, and color, runability and printability of the paper are often below Western standards, but clearly novel pulping and recovery technologies could offer particular benefits in these applications.

In contrast, Western suppliers increasingly offer recycled fibers and nonwoods to the growing market for "eco-friendly" papers. Early eco-papers had a high content of deinked pulp (DIP) from post-consumer recycled fiber. The use of various chlorine-free bleaching processes has become the rule. Small, yet growing, niches have developed for "tree-free" papers whose most popular fiber sources are hemp, kenaf, flax, bamboo, wheat straw, esparto and other grasses.

#### Getting into the Market

The higher cost of pulp and relatively higher manufacturing and marketing costs render most of these nonwood papers still considerably more

expensive than high-end wood furnished papers. So far, this limits their markets to ecologically motivated individuals and companies, primarily for use in high-end stationery and advertising. Expanding their share of the P&W paper market, for example into the publishing sector, has been the main challenge for producers of hemp-content papers. It will require increased awareness of hemp's environmental benefits and utilization of the strength inherent in bast fiber pulps, which can improve the quality of recycled paper blends. Most of all, though, it will require a reduction in price point and access to the retail customer, which can be achieved best through market economies and education leading to changes in consumer values.

Overall consumption of hemp-content paper is still small today, yet clearly growing. European

experience demonstrates that the stalks of hemp grown for both seed and fiber are quite suitable for pulp production. They can therefore provide an additional revenue source to farmers and, as a bonus by-product, need not demand a price that renders them uneconomical as a pulp source. As the various value-added markets for hemp develop, the increasing acreage and economies of scale will lead to reductions in price. Over time, as limited traditional wood sources for pulp are depleted, paper makers will be forced to more seriously consider nonwood sources. There will ultimately be no need to cut down another tree for paper pulp. Expect to see more hemp-content paper in the future.

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#### Living Tree Paper Sets an Example

Living Tree Paper Company employs all the methods outlined here for expanding the use of hemp-content P&W papers. The Eugene, OR firm recognized that tree-free papers will have a real impact in the wood-dominated paper market only to the extent that they become cost-competitive with wood pulp papers and find customers outside of established distribution channels. Blending of hemp pulp with less-costly deinked recycled pulp, realizing economies of scale through larger production runs and direct marketing to large companies for specialty uses have all contributed to growth in sales.

The company's Vanguard paper line, for example, includes a 10% hemp/90% post-consumer waste blend and is currently the most cost-competitive eco-paper

with nonwood content on the U.S. market. The paper has also tested successfully in offset and web presses and was used to print this issue of *The Vote Hemp Report*.

Living Tree's hemp-content paper has recently become available in Staples office supply stores nationwide. With increased mainstream distribution and exposure, the company expects sales to grow dramatically in the next five years. Other North American companies, like Crane in Massachusetts, and Ecosource Paper and Domtar in Canada, also sell hemp-content papers into the stationery, publishing and specialty art markets. In addition, at one time Crane even used hemp in the paper they supplied to the U.S. Treasury for printing currency.

Editor's note: see *Living Tree Paper's* ad on page 25.

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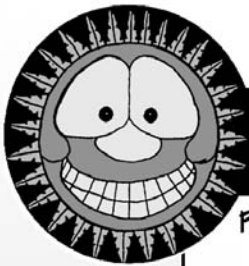
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# Performance-Based Industrial Hemp Fiber Will Propel New Technologies in the 21<sup>st</sup> Century

by Peter A. Nelson

Much discussion of industrial hemp has centered on the crop's history and uses created during and before the Industrial Revolution, such as textiles, twine and paper. It is time to view hemp fiber as a technologically advanced building block for sustainable manufacturing systems in high-value applications. Novel advanced applications for hemp fiber will create innovative opportunities that will utilize more fiber, which in turn will foster new technologies. Within a decade, global industrial hemp production, processing and utilization will look much different than they do today.

These prospects are supported by recent trends in the European hemp industry where the end uses of hemp look quite different from what they were only 10 years ago, when essentially all hemp fiber was used for textiles and specialty paper. Currently, hemp fiber is used by virtually all European car makers and their suppliers as reinforcing agents in composites, primarily interior panels for doors, columns, boot lining, seat backs and others. Hemp fiber is also increasingly used in other technical nonwovens, notably thermal insulation materials, which replace fiberglass mats, and horticultural substrates used to produce fresh arugula and cress sprouts for consumers. Hemp fiber is used in these products for both its technical and ecological benefits. Exciting applications in building products and other molded and extruded materials are also being developed.

Spurred on by market demand, new technologies will be influential in developing quality and application-specific fibers. These technologies will include breeding for specific fiber characteristics and advanced production methods such as precision planting/farming and diversified management. New processes now being developed by researchers are also leading to greater improvement in desired fiber characteristics. Several novel manufacturing technologies are also emerging, such as injection molded natural fiber composites. Indeed, all of these developments will help create myriad new, performance-based materials from industrial hemp fiber over time.

The automotive composites market currently offers hemp fiber the opportunity to achieve a sales volume that will allow processors to pursue additional, more lucrative value-added markets. Bast fibers, such as flax and hemp, are used in automotive composites as a replacement for fiberglass and other fibers, such as wood and

sisal. The switch is primarily motivated by technical and economic reasons such as lower weight, safety in accidents, acoustics, recyclability and manufacturing equipment wear. Currently, between 11-22 pounds of natural fibers are being used per automobile in manufactured parts.

For example, Johnson Controls is one of the world's largest independent suppliers of automotive seating and interior systems and is one of several major manufacturers of hemp-based composites. The company provides parts such as overhead systems and consoles, door panels, instrument panels and floor consoles to global customers including BMW, Daimler-Chrysler, Ford, General Motors, Honda and Volkswagen.

David Phillips, Director of Material and Process Development at Johnson Controls, has coordinated a team developing new interior products with natural fibers. "Our job is to position Johnson Controls competitively based on consumer trends and future growth areas," says Phillips. "We have experimented with sisal, industrial hemp and kenaf fibers, and we have finally developed a product that works for our applications." According to Phillips, Johnson Controls has developed a non-woven matting product made from industrial hemp (25%), kenaf (25%) and polypropylene (50%), which is used to manufacture molded door panels.



Photo: DaimlerChrysler

Indiana-based FlexForm Technologies is a Tier 2 supplier to the automotive industry. The company custom manufactures and supplies Johnson Controls and Findlay Industries with nonwoven products made from a hemp/kenaf/polypropylene composite. Many vehicles use these FlexForm products; the 2001 Sebring Convertible uses FlexForm substrate material for the molding of door panels, and the 2001 Dodge Stratus uses FlexForm material for door inserts. The company has also been producing a custom, trademarked product for Findlay Industries called Loprefin™, which is scheduled to be used in the Mercury Cougar as well as other automobiles.

Current trends demonstrate that natural fibers, with an increasing contribution from hemp, will continue to expand their role in both interior and exterior automobile components. They make good economic sense by offering properties more technically ideal for specific automotive parts, and also impact the environment less while contributing to our use of renewable natural resources. For example, Ford engineers compared the CO<sub>2</sub> emissions associated with hemp-

reinforced polypropylene to glass fiber-reinforced polypropylene for use in undershields in the Mondeo and found that the natural hemp fiber was associated with 31% lower emissions.

There is a significant push to utilize natural fibers in other nonwoven applications for a variety of reasons. Depending on the end product, natural fibers can improve strength, weight, moisture absorption and desorption, biodegradability, hypoallergenicity, freedom from static, other performance attributes and ultimately cost of production. Established and emerging uses of natural fiber-based nonwovens include:

- ▶ baby diapers, wipes and feminine hygiene products,
- ▶ batting for the furniture industry to replace foam,
- ▶ geotextiles for use in road reinforcement and weed blockage,
- ▶ insulation and sound-absorbing pads,
- ▶ horticultural growth substrates,
- ▶ oil-absorbing products, and
- ▶ specialty paper pulps.

Over the last decade, hemp fiber has emerged as a constituent for several of these applications, and North American companies have worked to develop technologies and systems to produce high-quality hemp fiber suitable for manufacturers. Two major producers of hemp fiber in North America are Hempline, Inc. of London, Ontario and Kenex, Ltd. of Chatham, Ontario in Canada. These companies pioneered the cultivation and use of hemp in North America, and have conducted intensive field and processing research since the mid-1990s.

Another leader in North America is Flaxcraft, located in New Jersey. Flaxcraft has an extensive background in the creation of hemp- and flax-blended textiles as well as high performance fiber-based materials including composites and nonwovens. Flaxcraft has assisted numerous manufacturers in developing fiber products. The company is also positioning itself to develop other value-added materials using hemp and other natural fibers.

There are several forces that favor the future expansion of hemp and other natural fibers in technical applications. Accelerating this process will require a close partnership between government, potential producers, industry purchasers and researchers. This will lead to better industry understanding of the full potential of hemp fiber, as well as help the farmer and producer better discern what processes and end markets a specific fiber can best penetrate and be adapted to. The leadership of major automotive suppliers and of smaller innovative manufacturers shows the great potential for industrial hemp as a fiber input in the 21<sup>st</sup> century.

Peter A. Nelson is President and Founder of AgroTech Communications, Inc. His web site is <http://www.agrotechcommunications.com>.



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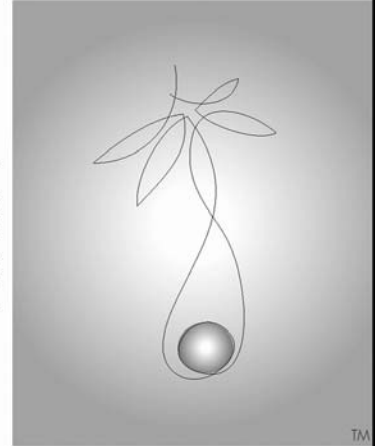
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# Quick Cropping Guide for Hemp in the 21<sup>st</sup> Century

Over the last decade, industrial hemp farmers and agricultural researchers in the European Union (EU) and Canada have gained extensive experience with "modern" methods for hemp farming. To ensure the success of a hemp crop and the quality of the produced fiber and seed, farmers need to consider several important factors:

**Soils:** Hemp can be grown in a wide variety of soil types. Hemp prefers a sufficiently deep, well-aerated soil with a pH of six or greater, along with good moisture and nutrient holding capacity. Poorly-drained and compacted soils are not ideal.

**Soil Preparation:** A fine, firm seedbed helps create fast, uniform germination of hemp seed. Conventional seedbed preparation and drilling are probably ideal. The seedlings will not emerge uniformly if the seed is placed at a depth greater than two inches.

**Nutrients:** Hemp requires high levels of nutrient availability. Typical plant needs include 80 to 100 pounds/acre of nitrogen, 35 to 50 pounds/acre of phosphate and 52 to 70 pounds/acre of potassium. Note that a hemp field produces a very large amount of plant material (biomass) in a short vegetative period. Much of this biomass remains in the field after harvest, where it returns to the soil, increasing organic matter and contributing to future field productivity.

**Weed Control:** Hemp is an extremely efficient weed suppressor. A properly-sewn normal stand of 200 to 300 plants per square meter shades out weeds, leaving the fields weed-free at harvest. As hemp is a low-maintenance crop, producers save on expensive inputs and applicants.

**Cultivars:** An increasing number of hemp cultivars achieve tetrahydrocannabinol (THC) levels of less than 0.3% and are now certified for commercial farming in Canada and the EU. Cultivars vary considerably with respect to the time of flowering, plant height (biomass yield), fiber content in the stalks, seed yield, fatty acid composition of the seed oil and THC content. Farmers choose a variety largely depending on whether the crop is grown for fiber or for seed (grain), or both. Most cultivars still originate from Europe. However, Canada has begun its own successful breeding programs.

**Time of Seeding:** Seeding should not begin until soil temperatures have reached a minimum of 42 to 46°F. Hemp seed germinates within 24 to 48 hours and emerges in five to seven days with good moisture and warm temperature. To maximize stalk yield, hemp grown for fiber should be seeded as early as possible, while hemp grown for seed can be seeded later to minimize the height of the stalk, making harvesting easier.

**Seeding Rates:** For hemp grown for fiber, seeding rates of 50 to 70 pounds/acre are ideal, depending on soil type, soil fertility and cultivar. Hemp grown for seed requires lower seeding rates in the range of 35 to 45 pounds/acre.

**Rotation:** Hemp responds well to most preceding crops. Because of hemp's considerable nitrogen demand, many farmers prefer to plant a nitrogen-fixing crop like soybeans the year before. If grown for seed, care should be taken not to have hemp follow spices or other seed crops.

**Harvest:** Harvesting for high-quality fiber should occur as soon as the last pollen is shed, which is normally 70 to 90 days after seeding. Harvesting for seed should occur about a month later when 60% of the seed has ripened. For fiber, the crop should be cut (usually into pieces two feet in length), dew-retted in the field, baled and stored or processed. For seed, combine headers should be raised with reduced speed, and waste straw should be cut later. In Germany, for example, a modified combine is used, allowing single-pass harvesting of seed and fiber. Combines are generally modified to minimize the risk of hemp's long fiber wrapping around rotating parts.

**Retting and Baling:** Good quality hemp fiber is obtained by retting - a natural microbial decay of pectin which connects fiber bundles and glues them to the woody core (hurds) of the hemp stalk. Retting begins after the stalks are cut and left in the field and takes 14 to 21 days, depending on the weather. Turning the stalks helps create an even ret and separates out the leaves and some of the loosened hurds. The finest textile grade fiber is obtained by water retting the stalks in pools or tanks of warm water. After retting, the cut stalks are baled into round or square bales using modified conventional equipment.

**Yield:** Under commercial conditions, hemp typically produces between 3 to 4 tons of baled hemp stalks per acre, with a typical fiber/hurd ratio of 1:3. Hemp seed yields are between 800 to 1,200 pounds/acre. In general, yields are sensitive to farming and harvesting methods, climate and cultivar. Experience as a grower helps; new producers should begin on a small scale.

*Special thanks to Kenex, Ltd. and Peter Dragla, M. Sc., Ridgetown College, University of Guelph, Kenex Research Associate*



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# Canada: Hemp Industry-In-Progress 1998-2002

by Arthur Hanks

Canada developed and implemented regulations for the cultivation and processing of industrial hemp in 1998. Alan Rock, Health Minister at the time whose office is in charge of the hemp program, stated: "This new crop has a tremendous potential for creating new jobs in agriculture, industry, research and retail."

Great expectations were raised. However, many cautioned that it would take time for the new crop to become established. Over the first five years, the growth of the Canadian hemp sector has been modest, and hemp has proven not to be immune to the struggles typical of many emerging crops and industries.

At this point, most hemp production in Canada is for seed. Field production has fluctuated markedly year-to-year, experiencing a high of close to 30,000 acres in 1999, and a low in the current year, estimated to be no more than 2,500 acres (complete statistics not available at time of publication). Despite the expanding hemp seed markets, this drop was due to initial overproduction, leading to stockpiled inventory.

Much of the overproduction in the early years is attributable to the ambitions of the poorly managed and now-defunct company Consolidated Growers and Processors (CGP), who promised too much too soon. Observers note that boom-or-bust scenarios are distressingly common with new crops; alternative crops such as echinacea, ginseng and borage have also experienced sim-

ilar growing pains.

The markets for hemp are growing, however, driving a steady increase in the processing of hemp and the corresponding development of many new businesses, products and marketing initiatives. Hemp foods and body care items are a lucrative common point of entry for new companies, and stiff competition is increasing product quality and consumer education.

Fiber production is concentrated in the province of Ontario where there are two processing plants, Kenex of Chatham and Hempline of Delaware. Both produce long hemp fiber for processing into nonwoven and composite materials, primarily for use in the automotive industry for parts such as dashboards and door panels. Kenex also has a seed processing division. Both companies have tapped into the significant and growing market for hemp hurd animal bedding. Hurds are the inner woody core of the hemp stalk and have superior moisture absorption and low dust levels, which are especially prized in animal husbandry.

In the west, the prairie provinces have concentrated on hemp seed production and processing. This is in line with the region's history of being one of the world's largest cultivators and processors of oil seeds, such as soy and canola oil. A lack of hemp fiber processing capability in the west has thwarted other kinds of develop-

In general, fiber processing in Canada faces hurdles including technology and infrastructure shortcomings, insufficient financing and unfamiliarity with end markets. However, there have been significant and promising developments. (Editor's note: These are discussed at length in Peter Nelson's article "Performance-Based Industrial Hemp Fiber Will Propel New

Technologies in the 21<sup>st</sup> Century" on page 21.) The large and growing automotive market in the U.S. for hemp biocomposites (primarily to replace fiberglass interior paneling) has the potential by itself to boost the Canadian hemp fiber processing infrastructure tremendously.

The unstable American regulatory situation regarding industrial hemp has had a significant negative impact on the development of the industry. The two countries are each other's largest trading partner, and potential corporate customers in the U.S. demand on-time delivery and cannot tolerate shipments being held up at the border. The deterioration of relations on hemp-related issues spurred the Canadian government to send a formal letter of complaint to the DEA in December of 2001, and forced the Canadian company Kenex to file a NAFTA Chapter 11 lawsuit against the U.S. in August of 2002. In March of 2002, as a result of Vote Hemp's efforts, the U.S. Ninth Circuit Court of Appeals issued a Stay of a DEA ruling purporting to ban hemp foods. The U.S. hemp food market thus continues its rapid growth, providing a significant market driver for the expanding Canadian industry.

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# European Hemp Industry: Fiber Demand for Novel Uses on the Rise

Recent trends in the Europe indicate promising developments in the use of hemp fiber by industry. According to the European Industrial Hemp Association (EIHA), between fifteen to twenty companies in the European Union (EU) and between five to ten companies in Eastern Europe are engaged in the primary processing of hemp.

In 2001, the seven largest companies had a total of about 25,000 acres under contracted cultivation, producing an estimated 20,000 to 25,000 metric tons (MT) of fiber, about one-third of global production. The average yield of dry stalks in 2001 was approximately 6.2 MT per hectare (2.7 tons per acre). This is somewhat lower than the 9 - 10 MT per hectare achieved in Hungary because hemp grown in the EU is increasingly cultivated for both fiber and seed, which generally reduces fiber yield but allows for greater returns per acre.

This amount of industrial hemp fiber was insufficient to meet the growing demand in the EU. The balance was supplied by the processing of hemp stalks and pre-decorticated fiber from previous years, which had been stockpiled due to lower demand. Most companies started the 2002 harvesting season with largely or completely depleted fiber stocks.

According to the EIHA, the rise in demand is due to the increasing establishment of hemp as an industrial fiber. Production by the top seven companies is predicted to grow by 40% next year.

The markets for products from industrial hemp fiber in the EU look much different from only six years ago, when virtually all bast fiber was used for specialty pulps. Since then, three markets have emerged which utilize particular technical, economic or environmental characteristics of hemp fiber. First and foremost, hemp's most visible application is in automotive composites, where its use has increased from 0 to 3,500 MT/year since 1996. In this case, hemp's share in a growing market has also increased relative to flax and other natural fibers.



Photo: Mari Kane

Second, particularly in Germany, hemp fiber is increasingly used in thermal insulation mats for homes, replacing fiberglass-based materials. Despite a higher cost, their ease of handling, low environmental life cycle impact, and superior moisture diffusion and sound proofing properties are stimulating demand in other EU countries as well.

The third emerging market is agro-textiles: hemp-based nonwoven growth substrates are expanding their use in the production of fresh cress and arugula sprouts, sold in retail grocery stores. Considerable growth is expected from the introduction of additional hemp agro-textile products for use in commercial horticulture.

All hemp processors have relied on the profitable sales of hemp hurds, the stalk's woody core formerly considered a waste product, as animal bedding, particularly for horses. This market and the use of hurds as construction material have been key to the growth of the industry. Although EU subsidies for hemp in the past favored exclusive cultivation as a fiber crop, processors increasingly grow hemp for both fiber and seed to increase revenues per hectare by taking advantage of the growing natural foods market for hemp seed products, as well as the birdseed market.

Innovation and growth in all relevant markets for European industrial hemp continues. Successful EU processors appear to be those who work actively with downstream firms to develop and launch new applications and products to become increasingly independent of gradually decreasing EU subsidies.

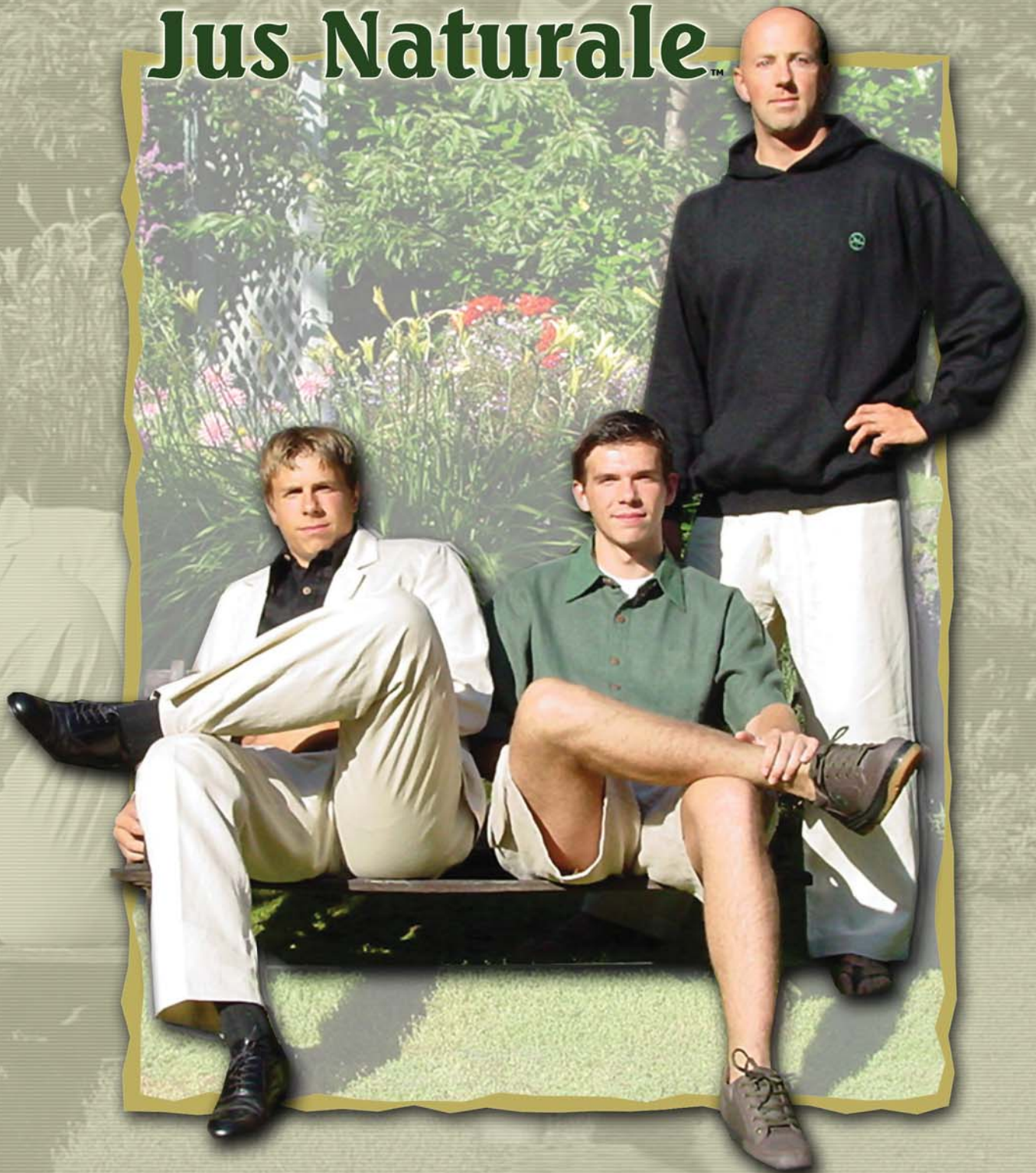
In Eastern Europe, the relevant traditional producing countries (Hungary, Poland, and Romania) are struggling to upgrade their traditional hemp farming and processing methods and establish modern capabilities. Romania is the primary European supplier of textile quality hemp yarn and fabric while Hungary produces high quality twine and hurd-based pressboard. In collaboration with Western partners, modern farming methods in Hungary and modern short fiber lines in Romania are being implemented. Thus, Eastern Europe may, in the medium term, become not only the remaining producer of textile-grade water retted hemp, but also a primary producer of less expensive short fiber for the emerging applications of hemp fiber in Europe.

Source: Michael Karus, European Industrial Hemp Association (EIHA); <http://www.eiha.org>



<b>Production and Markets for Hemp in the EU</b>	
<b>Bast Fibers</b>	
<b>Total EU production of hemp fiber</b>	<b>20,000-25,000 MT</b>
Specialty pulp (cigarette papers, other technical applications):	75.0%
Automotive industry (panels, other):	17.0%
Construction sector (insulation mats, other):	6.5%
Other applications (agro- & geo-textiles, mattresses, other):	1.5%
<b>Core Fibers (Hurds)</b>	
<b>Total EU production of hemp hurds</b>	<b>40,000 MT</b>
Animal bedding (95% for horses, 5% for other animals):	92.0%
Construction sector (pour-in insulation, composite board, bricks, other):	8.0%
<b>Seeds</b>	
<b>Total EU production of hemp seed</b>	<b>40,000 MT</b>
Animal feed (Birdseed, fish bait, other):	95.0%
Health food & bodycare (oil, nuts, i.e. hulled seed, other):	5.0%

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