



SPROUTS AND WHEATGRASS PRODUCTION AND MARKETING

HORTICULTURE PRODUCTION GUIDE

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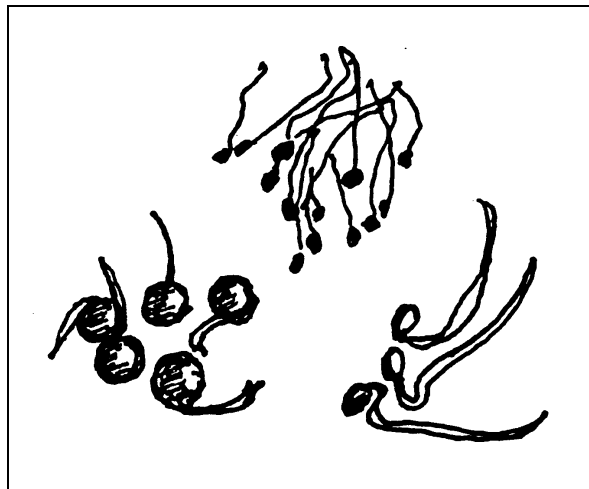
ABSTRACT

Sprouted vegetable seeds and cereal grains are increasing in popularity in restaurants and groceries. Two production methods are used, but each type of seed has optimal growth requirements. Food safety has become an issue because of several cases of bacterial contamination in recent years. Even as the new industry addresses these challenges, research has shown anti-cancer activity in some types of sprouts. Sources of seeds and of specific production information are included in this publication. Electronic and other resources are also listed.

Introduction

Sprouts have become a familiar item in salad bars and in the produce sections of grocery stores. Sprouts have been produced on a range of scales, from growers using trash cans and gallon jars on home-built racks to very high-tech, large-scale production using insulated rotating bins that are controlled by computers

and powered by solar panels. The difference in capital investment for these operations, of course, also varies from relatively low to very high.



Production

Sprouts are produced by first soaking the seeds of a selected vegetable at a particular temperature for a certain length of time. Each type of seed has different temperature and soak-time requirements. Sproutman Publications (1) offers the "Turn the Dial Sprout Chart" for about \$10. It provides

detailed information for most seeds. Other sprouting books listed in the "Books" section at the end of this letter also describe optimal growth conditions for common types.

After the soak period, seeds are drained and rinsed, and then begin to sprout. They must be rinsed at frequent intervals until they reach the desired size. Those sprouts for which color is a desirable marketing quality must be exposed to light toward the end of this period to develop chlorophyll in the seed leaves.

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When sprouts are ready for harvest, they must be quickly cooled and, in some cases, the hulls must be removed. Excess water is removed and they are packed for market. Storage of sprouts must be in the correct temperature range to completely remove "field heat" and to ensure a fresh product.

Every sprouting operation has its own modifications of these basic procedures. To learn more, a visit to a sprout business is very instructive. It's possible, however, that someone who has gone to the expense of developing a successful sprout-growing system may be reluctant to host a potential competitor and give away "trade secrets."

Organic Production

Growing sprouts organically depends entirely upon the ability of the producer to achieve adequate levels of sanitation using materials approved by the certifying organization. Until the development of consistent national organic standards, each individual must address this issue according to the rules under which he or she is currently certified. For more information, call ATTRA and request *Organic Certification*.

Sanitation

Careful attention to correct temperature, light, and moisture conditions is critical for consistent harvests. The environment necessary for sprout production is also favorable to the growth of fungal and bacterial contaminants. Therefore, sanitation during production and harvest are extremely important. In addition, since sprouts are very perishable, proper postharvest storage temperature, handling, and packaging are equally critical.

An increasing number of cases of foodborne illness have been traced to the consumption of raw sprouts. As a result, the Food and Drug Administration (FDA) issued an advisory in August, 1998, for children, the elderly, and those with compromised immune systems against eating raw sprouts.

Government regulations that apply to production processes and facilities are being examined and may become more stringent. Growing sprouts has been defined by the Food and Drug Administration (FDA) as a food processing activity, not an agricultural one. As a result, FDA (not USDA) regulates the production process and the facilities in which sprouts are grown. Further information on food safety related to sprout production can be found at <http://vm.cfsan.fda.gov/~mow/foodborn.html> or contact ISGA.

The International Sprout Growers Association (ISGA) (2), the trade association for commercial producers, has been closely monitoring the situation. This organization is in contact with the FDA and is funding research to help resolve it. Anyone considering commercial production should contact Jay Louie, vice president of ISGA, to learn more about the current status of these sanitation concerns.

According to the enclosed article from *The Sprouter's Journal*, contamination is often from the seed itself. *Salmonella* spp., *Bacillus cereus*, *Staphylococcus aureus*, and *Listeria* spp. have been found on seed coats. *Escherichia coli*, however, results from contaminated water or contact with manure from warm-blooded animals (rodents and birds) during production or storage or in the rinse water. Since bacterial populations thrive under normal sprout growing conditions, seed sanitation is absolutely essential to ensure a pathogen-free product.

Jay Louie of ISGA reports that the most successful seed treatment so far is seed chlorination. He suggests that a 20,000 ppm calcium hypochlorite solution is most reliable, but only California has approved use at this concentration. In most other states, the maximum concentration that can be legally used is 2,000 ppm. Mr. Louie noted that research has shown hydrogen peroxide and ozone treatments to be less effective, but irradiation looks promising. Attempts to use steam pasteurization have proved successful on larger

seeds. With alfalfa and other small seeds, however, germination is compromised at a temperature very close to that which destroys bacteria.

Brassica Sprouts

There is considerable interest in the use of broccoli and other brassica sprouts for health benefits. In the fall of 1997, research at Johns Hopkins Hospital proved that they contain sulphoraphane. This compound acts as an anti-cancer agent by encouraging the body to attack dangerous chemicals that can cause malignancy. Although this substance had previously been identified in brassica vegetables themselves, it has now been shown to be 50% more concentrated in the sprouts.

In response to increased consumer demand, the need for untreated broccoli seed suitable for sprouting also boomed. Almost immediately, however, Brassica Protection Products (BPP) of Baltimore, a company including the researchers who documented the presence of sulphoraphane, patented the process of harvesting all brassica sprouts. BPP claimed that they wanted to ensure high and consistent quality of sprouts in the marketplace.

ISGA hired a lawyer to investigate the legal ramifications of this patent on producers not certified by BPP. Jay Louie of ISGA reported that the patent appears to have been granted even though the harvest process had clearly been in use before that time. This legal concept, called "prior art," apparently would render a suit against uncertified harvest of broccoli sprouts impossible to win. Mr. Louie is not aware of any broccoli sprout producers that have been challenged by BPP.

Sprouted Grains

Cereal grains may be sprouted hydroponically as described above. An alternative method is to grow the seeds in shallow beds of soil. Wheat, oats, rye, and barley are most commonly grown this way, but buckwheat, sunflower, and amaranth seed are also suitable.

The production of sprouted grains begins with soaking the grain until the root radicle emerges from the seed coat. Seeds are then placed on a saturated mixture of soil and peat moss or vermiculite. The seeds grow in the dark at first and then, after two or three days, they are exposed to light. Harvest begins just before the second pair of leaves appears, usually about day 8. The result looks like a small, lush lawn. Sprouts are either cut with scissors or a knife just above soil level or are pulled out with the roots. If they are cut, there is often a second harvest during the next week. Several books on the subject are listed below.

Shallow trays are often used to grow these cereal "grasses." Sometimes production is in a greenhouse. The greenhouse method begins with laying thermal tubing on top of polystyrene, which rests on the ground. This is covered with black plastic. Thermal tubing distributes heat from hot water heaters and functions as a root-zone heating system. Next, a layer of compost or soilless potting mix is laid on top of the plastic about an inch deep. Soaked grains are spread on top of the compost mixture making sure each is in contact with the soil. The seeds are kept moist by watering as needed. Within a week the sprouted grains will be ready for harvest.

Kevin King (3) is a manager at Pines International, a large cooperative in Kansas which produces wheat grass juice tablets. In an article about the Pines operation, Mr. King distinguishes between the wheatgrass harvested at about one week to ten days and his product, which is harvested at the "jointing" stage. Mr. King is very knowledgeable about the entire production system, from growing the wheat in the field, through dehydration and storage, to the production of the tablets. Although he is a busy man, he will consult with people who have educated themselves about this type of enterprise but still have specific questions.

Additional literature references on hydroponic cereal production and sprouted grain nutrition and technology are listed in the books section below. These books are generally available at health food stores or directly from the publisher.

Marketing

In any sprouting business adequate marketing must complement attention to the details of production. The local grocer may be interested in selling sprouts, or a restaurant might want to serve them, once a reliable, year-around supply is guaranteed. The producer or a designated employee must personally create and sustain good business relationships in order to maintain these types of direct markets. Further information on these techniques can be found in the ATTRA publication *Direct Marketing*, available upon request.

If production is on a large scale, it may be necessary to sell through a wholesale market. I have enclosed a description of the sprout market from the *1998 Produce Availability & Merchandising Guide*. Also included is a list of wholesalers, separated by state. Current price information is available on the USDA Agricultural Marketing Service Website, <http://www.ams.usda.gov>. Click on "search," type in "sprouts," and find the information for your terminal market.

Further Information

There is little university research about growing sprouts. However, it may be productive to contact the state horticulture Extension specialist for available information. The county Extension office can provide that person's name and address.

ISGA, the International Sprout Growers Association (2), is a trade association for commercial producers. Membership includes a subscription to their newsletter, *Sprouter's Journal*. Other benefits of membership are briefly listed in the enclosed print-out of ISGA's home page on the World Wide Web. The organization seems determined to help its members meet the challenge of producing and marketing safe, pathogen-free sprouts. "Strategies for Food Safety" was the title of the ninth annual conference held in San Diego in August of 1998. In addition, ISGA has funded several research projects at US universities. A

visit to the ISGA website or a call to their toll-free number will provide further information. A membership in this organization will ensure continuing updates on sanitation and other issues facing the industry.

Some research has been funded by the companies that sell seeds and equipment for commercial sprout production, such as International Specialty Supply (ISS) (4). These companies also usually provide production information and consultation to their customers. A list of sprouting seed suppliers is provided at the end of this publication.

References:

- 1) Sproutman Publications
P.O. Box 1100
Great Barrington, MA 01230
(413) 526-5200 ext. 4
<http://www.Sproutman.com>
- 2) International Sprout Growers Assn.
P.O. Box 2214
Amherst, MA 01004-2214
(800) 448-8006
(413) 253-6965 (FAX)
<http://www.isga-sprouts.org>
- 3) Kevin King
Pines International
P.O. Box 1107
Lawrence, KS 66044
(913) 841-6016, ext. 427
<http://www.wheatgrass.com>
- 4) International Specialty Supply (ISS)
820 East 20th St.
Cookeville, TN 38501
(931) 526-1106
[http://www.ucbd.com/iss/catalog/
/catalog.html](http://www.ucbd.com/iss/catalog/catalog.html)

Enclosures:

Anon. 1998. Sprouts. 1998 Produce Availability & Merchandising Guide. The Packer, Overland Park, KS. p. 401-403.

B., L. 1993. A tale of two sprout growers: Florida business keeps expanding just to meet regional demand. *Growing for Market*. May-June. p. 1, 15.

Buescher, R.W. and Jau-Shone Chang. 1982. Production of mung bean sprouts. Arkansas Farm Research. January-February. 1 p.

Feng, Peter. 1998. A summary of background information and foodborne illness associated with the consumption of sprouts. The Sprouter's Journal. Summer. p. 14-15.

International Sprout Growers Association promotional materials. 2 p.

Meyerowitz, Steve. n.d. One week from seed to salad. Excerpt from "Turn the Dial Sprout Chart." 1 p.

Meyerowitz, Steve. n.d. Why alfalfa sprouts are still safe and healthy. 1 p.

Pugh, Terry. 1995. Markets germinating for sprouting seeds. Synergy. Winter. p. 16-18.

Seed Sources:

American Health & Nutrition
3990 Varsity Drive
Ann Arbor, MI 48108
(800) 992-1818 X 18 or 19
e-mail: ahn@organictrading.com

Caudill Seed Co.
1201 Story Ave.
Louisville, KY 40206
(502) 583-4402

Dover Sales
1111 Greenwood Dr.
Peidmont, OK 73078
(405) 373-2850
(405) 373-2853 FAX

Hazel Ridge Farm
P.O. Box 268
Shellbrook, SK
CANADA S0J2E0
(800) 263-4490
(306) 747-3618 FAX

International Specialty Supply
820 E. 20th St.
Cookeville, TN 38501
(800) 277-7688

Johnny's Selected Seeds
Foss Hill Rd.
Albion ME 04910
(207) 437-9294
(800) 437-4290
<http://www.johnnyseeds.com>
e-mail: sprouts@johnny-seeds.com

The Sprout House
17267 Sundance Drive
Ramona, CA 92065
(800) SPROUTS
(760) 788-7979 FAX

Equipment Sources:

Caudill Seed Co.
1201 Story Ave.
Louisville, KY 40206
(502) 583-4402

International Specialty Supply
820 E. 20th St.
Cookeville, TN 38501
(800) 277-7688

Creative Craftsman
38 Fourteenth St. Buckhead Ridge
Okeechobee, Florida 34974
(941) 467-6696
<http://www.autosprout.com>

Books:

(These books are widely available in health food stores. Otherwise, contact publishers at the phone numbers indicated.)

Braunstein, Mark M. 1993. The Sprout Garden. The Book Publishing Company, Summertown, TN. 128 p. ISBN: 1-57067-0730. \$12.95.

Call for availability: (800) 695-2241.

Kulvinskias, Viktoras P. 1979. Sprout for the Love of Everybody: Nutritional Values of Sprouts and Wheatgrass. Twenty-first Century Publications, Fairfield, IA. 155 p. \$8.95.

Call for availability: (800) 593-2665.

Larimore, Bertha B. 1975. Sprouting For All Seasons: How and What to Sprout, Including Delicious, Easy-to-Prepare Recipes. Horizon Publishers, Bountiful, UT. 139 p. ISBN: 0-88290-0552.

Meyerowitz, Steve. 1998. Sprouts: The Miracle Food: The Complete Guide to Sprouting. Sproutman Publications, Great Barrington, MA. ISBN: 1-878736-03-5. \$12.95.
Call to order: (800) SPROUTS.

Wigmore, Ann. 1986. The Sprouting Book. Avery Publishing Group, NY. 128 p. \$7.95.
To order: (800) 548-5757

Books on Cereal Grasses:

(These books are widely available in health food stores. Otherwise, contact phone numbers indicated.)

Meyerowitz, Steve. 1998. Wheatgrass: Nature's Finest Medicine. Sproutman Publications, Great Barrington, MA. ISBN: 1-878736-72-8. \$12.95.
To order: (800) SPROUTS

Seibold, Ronald L. 1990. Cereal Grass: What's in it for You! Wilderness Community Education Foundation, Lawrence, KS. 142 p. \$9.95.
To order: (800) 697-4637

Wigmore, Ann. 1985. The Wheatgrass Book. Avery Publishing Group, NY. 144 p. \$8.95.
To order: (800) 548-5757

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