SOYFOODS 101:
A Culinary Curriculum

Prepared for The Soyfoods Council

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SOYFOODS 101

Objectives

After studying this curriculum, you will be able to:

- Summarize the history of the soybean from its origin to its introduction and popularity in the US.
- Describe the soy plant and the essential components of the soybean.
- Summarize the health and nutrition benefits of soy.
- Explain how soymilk is made and its role as a base for other soy products.
- Compare and contrast the two main types of tofu, how they are made, and their culinary applications.
- Describe in general how cultured and fermented soy products, soy flakes, soy flour, soy protein concentrates and isolates are made, and meat alternatives are made, their role in food manufacturing, and their culinary uses.
- Differentiate among the various types of soybean oil, how they are made and used commercially and in culinary.
- Explain the concern over trans fats, what causes them, their sources, and how new soybean oils provide a solution to them in food manufacturing and in culinary application.
- Understand the following terms and how they relate to soyfoods.

Terms

Listed in alphabetical order

- Complete protein
- Essential fatty acid
- Hydrogenation
- Koji aspergillus
- Linoleic acid
- Meat alternatives
- Miso
- Nigari
- Okara
- Partial hydrogenation
- Soybeans
    - Whole
    - Edamame

    - Soynuts
- Soymilk
- Soy protein
    - Soy protein concentrate
    - Soy protein isolate
    - Textured soy protein (TSP or TVP)
- Tempeh
- Tofu
    - Water-packed
    - Silken
- Trans fats

A Rich Soybean History

Soybeans are one of the world's most important crops. Soy, like wheat and corn, plays a substantial role in feeding large numbers of people throughout the world.

Soybeans have been part of the Chinese diet for at least 5,000 years. Indeed, many Asian countries have been consuming a wide range of soy products for centuries, and it is often to the soy-rich diets of these cultures that scientists now attribute their populations' heart health and longevity. Because many soy products originated in Asia, they have Asian names

America has grown soybeans for only a fraction of the time that they have been cultivated in Asia. Soybeans were introduced in the U.S. in the mid-1700's, but their acceptance as a food crop was slow: Soybeans were valued almost exclusively as animal feed.

That opinion started to change in the early 1900's when people like Henry Ford began to explore soy's role as a source of human nutrition. As the 1900's progressed, soy slowly began to enter the American diet. Americans were hesitant to accept soy primarily because many of the soy products back then were designed for the largely unfamiliar Asian palate or were poorly made.

Within the last 30 years, this has all changed. The quality of soy products has increased dramatically. Increasing numbers of soy products are being developed and produced specifically for American palates and lifestyles.

There is also a growing body of credible scientific research supporting the **beneficial health effects of soy**:

- According to The Food & Drug Administration's 1999 unqualified health claim, eating **25 grams of soy protein per day** as part of a diet low in saturated fat and cholesterol may **reduce the risk of heart disease.**
- Soy shows great promise in **reducing the risk of certain cancers** including breast and prostate cancer.
- Evidence suggests that isoflavones in soybeans **may reduce bone loss** in post-menopausal women, and **relieve menopausal symptoms**.
- Soy is also perfect for **lactose- or gluten-free diets** since soy contains neither or them.
- Ongoing research indicates that soyfoods may help diabetics **control their blood sugar** and lower their risk of complications of the disease, like kidney disorders.

These two developments—the improved quality of soyfoods and the increasing evidence of significant health benefits—are responsible for increasing soyfoods' appeal to American consumers and consequently their accelerated entry into the mainstream American diet.

Getting to Know the Soybean

The Plant

Soybeans thrive in the hot, wet climate of the Midwest, which is why most (two-thirds, in fact) of the American soybean crop is grown in the heartland states of Iowa, Illinois, Indiana, Minnesota and Nebraska. Twenty-six more states make up the remaining one-third of all soybean-growing states, which include Tennessee, Kentucky, the Dakotas and Kansas.

Soybean plants take 70 to 80 days to grow from seed to harvest. The mature plant is about 18 inches tall and bears slightly fuzzy, three- to four-inch pods, each encasing two to five soybeans. The look a little like sweet-pea pods, only longer, plumper, and more rugged in texture.

The soybean plants are harvested mechanically with a combine, and, depending on their variety, the harvested beans can range in color from light to dark shades of yellow, black and green. These beans are the only part of the plant that humans eat.

The Bean

Soybeans are legumes like peas, beans, lentils and garbanzo beans. Unlike other legumes (or any kind of vegetable), soybeans "fix" their own nitrogen which allows them to produce all of the nine amino acids essential to human life. Soybeans also contain the two essential fatty acids.

These two qualities—the amount and quality of protein ("complete" protein) and fat.—are what make them one of nature's most beneficial and unique crops, and truly unique in the plant kingdom:

The Protein

Soybeans contain about 38% protein, which is a high percentage for plants. (By comparison, wheat is no more than 15% protein.) Additionally, all that protein is ***complete* protein**, meaning that it contains all the amino acids in the correct proportions necessary to sustain human life, as described above.

Complete proteins are most commonly found in meat sources, which also contain cholesterol. For this reason, and because soybeans are a cholesterol-free protein, soy makes a nutritionally sound alternative to meat in most American diets, and an ideal protein source for vegetarians.

The Fat, the Fiber & the Carbs

In addition to the quantity and quality of its protein, soybeans are also an excellent source of fat. Soybeans contain about 18% oil and it's the kind of oil that has a positive effect on health and well-being.

Soy oil is cholesterol free, very low in saturated fat and high in mono- and polyunsaturated fats. In addition, soy oil contains important amounts of both essential fatty acids: linoleic acid and linolenic acid. An ***essential* fatty acid** is essential to support human life but cannot be produced by the human body—we can only get it from the food we eat. Sufficient intake of these essential fatty acids is crucial for optimal health. Soybean oil also contains **lecithin**, an emulsifier used extensively in food manufacturing.

The balance of soybeans is moisture (14%) and **carbohydrate** (30%). Soybeans are considered an excellent source of **dietary fiber** because half of their total carbohydrate (15% of total soybean composition) is dietary fiber. The rest is soluble carbohydrate.

Whole Soybean Products

Whole soybean products—**edamame**, **yellow** and **black** soybeans, **soynuts**, etc.—enjoy strong consumer acceptance in the U.S.. The reason is simple: Whole soybeans look like other vegetables and dry beans that Americans are familiar with. Because of their broad appeal, whole soybeans are perfect for introducing people to soy. Chefs are eagerly embracing whole soybeans (especially edamame) and are serving them in creative ways on their menus.

Edamame (ehd-ah-MAH-may)

Edamame are quickly becoming the most appealing whole soybean product on the market, particularly for chefs: they look great on the plate, and they taste more like a fresh sweet pea, lima or fava bean than a starchy legume.

Edamame are not simply immature or under-ripe soybeans. They are a specific variety, and the only green variety of soybean. They are a traditional Japanese snack, and thus their name. The U.S. currently produces only a small amount of edamame compared to the more common yellow and black soybeans.

It's important to note that ***edamame taste different from all other varieties of soybeans*****:** They taste and eat more like fresh green vegetables than dried legume. For this reason, edamame are cooked more like a green vegetable than a dried bean.

What makes edamame so characteristically sweet is partially due to how they are harvested and processed. They are picked when only 80% ripe, and are blanched and frozen immediately, usually within six hours of harvest. This is because edamame behave like green peas or corn once picked. Immediately, the sugars inside the beans begin converting to starch, protein and oil. The only way to stop this transformation is to quickly blanch and deep-freeze the edamame. This is why most edamame are sold frozen, either shelled or in the pod, and are very high quality. Fresh edamame in the pod are marketed, but they have a very, very short shelf life—they should be eaten almost immediately to avoid developing a starchy, "old" taste.

The Japanese traditionally serve steamed edamame in the shell as a snack food. Most foodservice establishments and home cooks prefer the shelled frozen edamame because they are as easy to use as frozen peas. Chefs value edamame's intense green color, dense texture and sweet flavor. And, like many soy products, edamame are a versatile ingredient.

Some common usages for edamame include:

- Snack food (steamed in the pod, traditionally with sea salt)
- Sautéed as a stand-alone vegetable or in combination with others
- On salad bars
- In soups, either as puréed or in broth-based soups like chicken
- In plated salads, both entrée and sidedish

Whole Mature Soybeans

Like edamame, whole soybeans also enjoy considerable consumer acceptance. Whole soybeans differ from edamame in that they come from different soybean varieties and they are harvested when completely ripe. Whole soybeans range in color from the palest shades of yellow to the darkest, deepest black. They are purchased either dried or canned.

Dried soybeans are cooked much like other varieties of dried beans. They are first soaked in cold water overnight. They are then simmered in liquid for several hours until tender. (It should be noted that soybeans, like other varieties of dried beans, should not be cooked with salt or acidic ingredients until late in the cooking process. Adding salt or acidic ingredients to the liquid too early in the cooking process will cause the cooking times to increase dramatically. Similarly, adding baking soda may reduce the cooking time, but destroys some of the beneficial nutrients in the beans.)

The disadvantage of dried soybeans is the long cooking times. Often, professional kitchens do not have the stove space (or time) to cook dried beans. Instead, they use the more convenient canned soybeans which are already cooked and ready to eat.

Whole cooked soybeans can be used just like any other dried beans, and can often be substituted for legumes like navy or garbanzo beans, kidney or black beans. Combining different colored soybeans (especially with the addition of edamame) yields particularly attractive presentations. Examples of how whole yellow or black soybeans can be used include:

- Refried beans (yellow soybeans)
- Black bean dip (black soybeans)
- Black bean soup (black soybeans)
- Hearty broth-based vegetable and bean soups (combine black and yellow soybeans for maximum effect)
- Thick pureed bean soups (yellow soybeans)
- Vegetable medley side dish (combine black and yellow soybeans along with edamame)
- Mixed bean or bean & corn salads (any color)

Soynuts

"Soynuts" is the name given to roasted dry whole soybeans. Because soynuts have gained popularity as a snack food, they are more readily available across the U.S. than in the past years.

Soynuts come in many different flavors, including salt-free, salted, maple, Cajun, barbecue, ranch-style, honey, hot 'n' spicy and wasabi. Soynuts should be

stored in an airtight container at room temperature to avoid rancidity. (Rancidity occurs when the oils in the soybean react with oxygen.) To make your own soynuts, follow these steps:

1. Soak yellow dried soybeans in lukewarm water for 3 to 4 hours.
2. Remove from water and spread on sheet tray.
3. Bake in 350° F oven for about 30 minutes, stirring every 5 minutes, until lightly browned and crunchy.

While most people eat soynuts as a snack, they have many other culinary uses, including these:

- In baked goods like muffins and breads instead of nuts
- On salad bars
- In salads
- In meat preparations like meatloaf and sausages

Soymilk

Now that soymilk is available **fresh and chilled** in the dairy case, it has gained tremendous national acceptance. In 2004, U.S. consumers bought $800 million of soymilk, up 63% from 2000. Of course, soymilk can still be found in shelf-stable **aseptic packages**, but Americans perceive these packages as less convenient because the must still be refrigerated once opened.

Soymilk is a liquid derived from soaking ground soybeans in hot water, much like coffee grounds or tea leaves are steeped to create an infusion. Because soymilk comes from a plant source rather than animal, it does not have the lactose or cholesterol fat found in dairy milk.

To make soymilk, soybeans are soaked overnight in water, then ground and mixed with cold or hot water. The slurry mixture is brought to a boil and simmered during which time the soybeans infuse their protein, fats, and starches into the water. This soy "infusion" is strained to separate the solid remains of the ground soybeans from the liquid. The liquid is the soymilk, and the solids are **okara** (oh KAHR rah), a type of soy fiber that is a rich source of dietary fiber. It's most often used in commercial baking and has a coconutty flavor and texture.

The soymilk that is strained from the okara is not naturally sweet. If it remains unsweetened, it's marketed as "**Plain**." Because American palate tends to prefer sweeter flavor profiles, soymilk producers often sweeten soymilk or add **flavorings** like chocolate, almond, coffee or vanilla.

To compare most favorably with dairy milk, soymilk is usually fortified with **calcium and vitamin D**. Soymilk is also now available in **reduced-fat** or "light" versions, again to compare more favorably with dairy milk.

In most recipes, soymilk can substituted directly for dairy milk, in a 1-to-1 ratio. Be sure to choose the correct type of soymilk for the specific culinary application. For instance, using sweetened vanilla flavored soymilk to make a savory sauce would be disastrous.

Some culinary applications for soymilk include:

- Thickened white sauces, soups and savory baked products using plain (unsweetened) soymilk
- Hot breakfast cereals, sweet baked goods and custards using sweetened soymilk (with or without an added flavor)

Soymilk is also the beginning point for **coagulated soymilk products** and some **cultured soy products**, making it as important in the soyfoods industry as dairy milk is to the entire dairy industry.

Coagulated Soymilk Products

There is really only one coagulated soymilk product: **tofu**.

Tofu

Tofu is a classic soyfood that has existed 2,000 years or more, starting in China but now well established in Korea, Japan, Vietnam and other Asian countries. To many Asians, tofu is valued as highly as meat is valued in Western cultures. In fact, the Chinese consider tofu to be the cheese of the orient.

While tofu has a long Asian history, it is a relatively new product to the average U.S. consumer. As a result, many Americans are unfamiliar with tofu and are often confused by the variety of textures and their respective culinary uses. Despite this, tofu remains one of the most versatile soyfoods.

Simply put, tofu is **soymilk** that has been coagulated into a homogenous mass. In many ways, it mirrors the cheese making process. Tofu begins with soymilk. A small amount of **nigari** (magnesium chloride) or calcium sulfate dihydrate is added to coagulate the soymilk. (Traditionally, the Japanese used nigari, which is derived from saltwater.) This resulting mass has the texture of "just set" baked custard.

From here, the custard-like mass is handled in either of two different ways, one producing pressed (aka "water-packed") tofu and the other producing silken tofu. Each category of tofu is best suited to entirely different types of culinary preparations.

Water-Packed (Pressed) Tofu

Water-packed tofu is made by placing the mass of coagulated soymilk into a perforated mold lined with cheesecloth. It is then subjected to varying degrees and durations of pressure, expelling liquid and leaving a progressively firmer tofu. (Water-packed tofu is also known as "**cotton**" tofu because of the imprint of the cheesecloth on the finished tofu.) The longer and/or harder the tofu is pressed, the more water is pressed out and the firmer the final tofu:

- Soft water-packed tofu has been lightly pressed.
- Medium or firm water-packed tofu has been pressed a little harder.
- Extra-firm water-packed tofu has been pressed the hardest.

The final texture of water-packed tofu is also affected by the temperature of the soymilk, how the coagulant is added, and how the coagulated soymilk is manipulated or handled before pressing. All these conditions can affect the size and tightness of the curds as they form, and thus, the fineness of the end texture.

Water-packed tofu is packaged in a small amount of water that keeps it moist. It must be refrigerated in this package because it is a perishable protein. It should be used shortly after purchase—never use it if it is out of date.

Package labels will not always say “water-pack,” just the degree of firmness. Look for the cheesecloth imprint on the tofu itself—that will be your best indication that the tofu is water-packed.

Silken Tofu

The other broad tofu category is silken tofu. Like water-packed tofu, silken tofu is sold as soft, firm, and extra-firm. But unlike water-packed tofu, silken tofu is never pressed—it still has all its. As a result, it is much more delicate. Silken tofu tends to disintegrate if handled, and will fall apart easily if used like water-packed tofu.

The way silken tofu becomes firmer is by adding larger amounts of nigari or calcium sulfate dihydrate to the soymilk before it starts coagulating. This causes the soymilk to set up into a firmer curd, but still with a very delicate texture because none of its water is pressed out.

Silken tofu is most often sold in aseptic packages that provide a sterile, shelf-stable environment that does not require refrigeration. However, once these packages are opened, they are no longer sterile and must be refrigerated. To make things easier on the consumer, some marketers are stocking aseptically packaged silken tofu in the refrigerator cases next to the water-pack tofu, even tho’ they don’t require refrigeration at this point. Likewise, some producers are packing their silken tofu in water just like water-packed tofu. This package is not aseptic, is as highly perishable as is water-pack tofu, and must be kept refrigerated.

Package labels on silken tofu usually say “silken” along with the degree of firmness. If the tofu is aseptically packaged, or if it has no cheesecloth imprint on its exterior, chances are good that it’s silken tofu.

Culinary Applications

All tofu is not suited for every application. Choose the appropriate type based on these guidelines: Pressed or water-packed tofu is drier, acts like a sponge, absorbs flavors well, and is generally sturdier than silken tofu. Silken tofu is the delicate of the two, and requires gentle handling. It does not absorb flavors well since it is not as dry and absorbent as water-packed tofu.

Water-Packed Tofu:

Best for applications that will retain the shape of the tofu and promote flavor absorption:

- Grilling
- Sautéing
- Stir-frying
- Poaching
- Steaming

- Braising
- Deep-frying

The choice between the different degrees of firmnesses depends on the desired texture of the finished product. For example, soft water-packed tofu incorporates well into a stuffing for meats or vegetables, and also works well as additions to broth soups like the traditional Japanese miso soup. A firmer tofu is better suited for grilling or braising because the tofu will better retain its shape.

To the Western palate, tofu is considered bland, but water-packed tofu readily absorbs other flavors. For that reason, pressed tofu is often first marinated. Think of it as a sponge: The drier the sponge, the more liquid it can absorb. ***The drier and firmer the tofu, the thirstier it is and the more flavor it will absorb.*** [Note: always marinate under refrigeration.]

Some sources recommend freezing and thawing water-packed tofu before marinating it, or wrapping it in a clean towel and pressing it under heavy weight for several hours. These techniques remove additional moisture from the tofu and will increase its flavor-absorbing capacity. Take note, however: Frozen and thawed tofu is crumbly rather than smooth and slightly resistant to pressure. Frozen tofu is best suited to recipes calling for crumbles.

Besides pressing and freezing, there are several other pointers for increasing water-packed tofu's flavor absorption:

- Give the tofu sufficient time to soak up flavor, from several hours to 24 hours, depending on the size of the tofu and strength of the marinade.
- Prepare marinades that are richly flavored. Wine, fruit juices, spices, fresh herbs, garlic and onion are excellent additions.
- Before marinating, cut the tofu into the smallest pieces possible for the desired application. This increases the surface area in contact with the marinade.
- Rub thin slices of tofu with a dry rub. This is particularly suitable for tofu that will later be sautéed, grilled or smoked.
- Add salt to the marinade or dry rubs.
- When tofu is poached or braised, the cooking liquid will provide additional flavor as the tofu cooks—consider that when creating your marinade.

Some tofu producers are now selling pre-flavored tofu. These flavored tofus are sometimes marketed as baked, grilled or braised tofu. An increasing variety of flavors make these tofus suitable for a wide range of recipes. Some flavors include: barbecue, teriyaki, Italian, Thai, Hawaiian, and tomato garlic.

<u>Silken Tofu</u>

Best for applications where it will be handled gently, blended or puréed:

- Cubed and dropped into soups shortly before serving

- Crumbled onto salads
- Puréed as replacement for cream and eggs, and as a base for dressings and dips

Unlike water-packed tofu, silken tofu is rarely marinated—it's very delicate and does not absorb flavor like water-packed tofu since none of its liquid has been pressed out. As a result, it is not as thirsty and will not absorb marinade like its water-packed relative.

Silken tofu is perfect to purée. Place the tofu in a blender and process until smooth. Puréed silken tofu has tremendous culinary value: It can replace some of the eggs in baking and pastry preparations, and can be made into beverages, salad dressings, dips, and spreads. Puréed silken tofu can also be added to hot savory sauces and ground meat preparations.

	Characteristics	Applications
Water-Packed Tofu	*Rich in both high-quality protein and B vitamins and is low in sodium.* *Sold refrigerated and packed in water.* *Perishable protein that should be kept refrigerated and used shortly after purchase.* *Holds shape during cooking.* *Sold in varying levels of firmness, firm tofu is higher in protein, fat and calcium than other forms of tofu.*	*Water packed tofu has multiple applications such as: grilling, sautéing, stir-frying, poaching, steaming, deep-frying, braising.*
Silken Tofu	*Rich in both high-quality protein and B vitamins and is low in sodium.* *Silken tofu is never pressed and contains more water.* *Most often sold aseptically packaged, meaning it doesn't have to be refrigerated until opened.* *Once opened, it must be refrigerated and used immediately.* *Fragile texture. If not handled delicately, will disintegrate.* *Excellent pureed.* *Sold in varying levels of firmness, firm tofu is higher in protein, fat and calcium than other forms of tofu.*	*Best in applications where it will be handled gently, blended or puréed. Cubed and dropped into soups shortly before serving, crumbled into salads, puréed as replacement for cream and eggs.*

Cultured or Fermented Soy Products

Cultured and fermented soyfood products are made by adding living organisms to soymilk or soybeans. Depending on the product, yeast, bacteria, and/or mold are added to soymilk or soybeans. The process of inoculating soy products with living organisms creates complex layers of flavor.

Soy Cheese

Soy-based cheese is made from soymilk by a process similar to that of making dairy cheese. Soymilk is coagulated with the addition of acid or bacteria. The curds are salted, compressed, and sometimes aged. There are a growing variety of soy cheeses. Like soymilk, soy cheese does not have the cholesterol, lactose or amount of saturated fat that dairy cheeses do.

Some soy cheese producers here in the U.S. and abroad (France, in particular) have begun to make cheeses that combine soymilk with dairy proteins (casein). The resulting cheeses have an excellent flavor and improved functional cooking characteristics.

Food manufacturers are using more soy cheese in their product formulations for pizzas, frozen entrees and sandwiches, and other fresh, frozen and shelf-stable products.

Soy Yogurt

Like soy cheese, soy yogurt is prepared like its dairy counterpart. Soymilk is inoculated with the same strains of bacteria that produce dairy yogurt. The resulting soy yogurt has excellent flavor and texture and can be used just like dairy yogurt. Because it is plant-based, soy yogurt does not contain cholesterol, lactose or the levels of saturated fat. **Soy yogurt**, along with **soymilk** and **tofu**, are used to manufacture **soy smoothies** and other soy **beverages**.

Soy Sauce

While soy cheese and yogurt are relatively new products, soy sauce has a long and rich history. In China, soy sauce has been produced for over 2,500 years. Because soy sauce has a high salt content, it is often used to season food in place of salt. But soy sauce contributes much more than just salt to a recipe. It also adds a complex mix of flavor and **umami**. (Umami is the fifth taste sensation and is described as savory, full, and satisfyingly delicious.) Foods rich in umami also tend to have intense flavor.

There a two ways of making soy sauce: naturally brewed and non-brewed. Naturally brewed soy sauce is the traditional method. It takes months to make and has a complex flavor. Non-brewed soy sauce is the “modern” technique. It

takes much less time to produce (only one to several days), but it does not have the flavor complexity of its naturally brewed counterpart.

The process of making **naturally brewed soy sauce** begins by mixing steamed soybeans with a mold called koji aspergillus (koh GEE ahs pehr GIHL uhs). Often, defatted soy flour and wheat are also added. For three days, this mold grows on and reacts with the grains. Then salted water is added and the mixture is allowed to mature slowly for several months. During this time, a combination of beneficial bacteria, molds and yeasts produce a soy sauce that is brown and highly flavorful. At the end of the maturation process, the soy sauce "brew" is strained from the solids, pasteurized and bottled.

Non-brewed soy sauce is made very differently. Using a chemical process that lasts about one day, protein is extracted from the soybeans. This protein extraction is then mixed with sugar, salt and caramel color. At this point, koji aspergillus may be added and the mixture matured for a very short period before being bottled.

Worldwide, there are many different types of soy sauce. Almost every Asian country makes some type of soy sauce. The results can range from the very sweet Indonesian ketchup, to the pungent Chinese mushroom soy sauce. Some soy sauces can be very light in color, while others can be almost opaque. In addition, salt levels vary dramatically from country to country and even region to region. Specially produced **low-salt** or **reduced salt soy sauces** have a portion of the salt removed from the soy sauce before bottling. Because of the variation among soy sauces, it is important to know the character of a particular soy sauce before cooking with it—taste it first!

Soy sauce is added to many recipes because of its umami, flavor and saltiness. Common applications include:

- As-is for Asian dipping sauces and sushi accompaniment
- In Western-style stews & soups
- In marinades
- In sauces & glazes
- In vinaigrettes & dips
- Snack foods

Miso

Miso (mee SOH) is a fermented soybean paste that is usually not pasteurized. This lack of pasteurization means that miso generally contains many beneficial microorganisms that many people believe contribute to overall health. Like soy sauce, miso has elevated levels of salt and often replaces salt in recipes. Also like soy sauce, miso is rich in **umami** and has a complex flavor profile.

Miso also starts out by mixing steamed soybeans and other grains with koji aspergillus. Once the mold is matures on them, more cooked soybeans, salt,

liquid, bacteria and yeasts are added. (Traditionally, a small amount of finished miso would be added instead of cultured bacteria and yeast to provide the microorganisms, much like making sour dough starters or yogurt.) The miso is then allowed to mature for several months to two years. During this time, the miso undergoes many chemical reactions as the molds, bacteria and yeasts create new flavorful compounds.

There are many varieties of miso. Miso can be made from rice, barley, soybeans, or a combination of grains. In general, lighter colored miso (referred to as white miso) will have the sweetest and mildest flavor. Darker colored miso (red of brown miso) tends to be fuller flavored and saltier. Before using a particular miso, taste it to understand its salt and flavor levels.

Miso, like soy sauce, is added to many different culinary preparations. When added to stews, sauces and gravies, it contributes depth of flavor. It can be used as a marinade for chicken, fish, pork, and shellfish, as part of a salad dressing, and in meat glazes and BBQ sauces.

Tempeh

Tempeh (TEHM pay) is a fermented soybean cake. It originated in Indonesia and is part of traditional Indonesian cuisine. Tempeh is unique in that the fermentation process causes the soybeans to knit solidly together into a mass, giving tempeh a chewy and dense texture.

The tempeh-making process begins by soaking soybeans overnight, then simmering, draining and cooling them to body temperature. Then they are inoculated with a culture, packed into a brick-shaped mold, and left in a warm place for several days to ferment. During this time, a nutty, musty, mushroomy flavor develops and a white mold weaves its way through the developing soybean cake. This mold becomes the glue that holds the soybeans together. When this culturing process is over, the tempeh is packed and refrigerated until needed.

Tempeh is not pasteurized, so the mold continues to grow over time. As with a high quality Brie, the white mold will darken the longer the tempeh ages. Eventually, small dark spots will appear on the surface of the tempeh, signaling a well-aged tempeh. These spots can be trimmed off, if desired, or left and enjoyed as part of a rich tempeh experience. If the tempeh is too old, it will smell like ammonia and should be discarded.

As with miso and soy sauce, there are many types of tempeh. Tempeh made exclusively from soybeans has the most assertive flavor. Other types of tempeh combine the soybeans with ingredients like **vegetables**, **wild rice**, **rice**, **seaweed** and **assorted grains**, opening the door to tremendous culinary creativity.

Tempeh should be simmered in water for about 20 minutes before cooking with it. This poaching process removes a slight bitterness and softens the tempeh.

Once it is poached, tempeh can be prepared in a number of ways:

- Dry heat:
  - Sautéing
  - Grilling
  - Roasting
  - Deep-frying
- Moist heat
  - Braising or stewing
  - Poaching or steaming

Moist heat cooking will produce the supplest result. Simmering tempeh in a flavorful liquid allows the tempeh to absorb additional flavors as it, in turn, flavors the cooking liquid.

Tempeh can also be chopped into small pieces and added to stuffings or combined with ground meats for burgers, loaves or sauced dishes like chili, pasta sauce or sloppy joes. Because of its mushroom-like flavor, tempeh combines well with full flavored meats like beef and pork, and is excellent with root vegetables.

	Characteristics	Applications
Tempeh	*Fermented soybeans compressed into a solid "brick." Tempeh has an assertive flavor that is reminiscent of nuts and mushrooms.*	*Tempeh performs extremely well in moist heat cooking processes. After blanching it can be added to sautés or stir-fries.*
Soy Sauce	*Liquid condiment that ranges is color, salinity, and flavor.*	*Widely used as a natural flavor enhancer and source of salt. Soy sauce is often added to soups, dressings, sauces, stews, marinades, and stir-fries.*
Miso	*Smooth, thick paste condiment that ranges is color, salinity, and flavor.* *Made form soybeans and a grain such as rice, plus salt and a mold culture, and then aged in cedar vats for one to three years.* *Should be refrigerated.*	*Used to flavor soups, sauces, dressing, marinades, and pâtés.*

Soy Flour

Soy flour is made from lightly toasted **defatted soy flakes**. (Soy flakes are what's left behind after soybeans are crushed for oil.) Soy flour has a slightly yellow color, the texture of whole-wheat flour, and can be used successfully in baking and savory breadings for sautéed or deep-fried foods.

Soy flour is different from wheat flour in three key ways:

- Protein content: Soy flour has, on average, 50% protein vs. 15% for high-protein wheat flour (all-purpose wheat flour has much less than that).
- Protein composition: Soy flour *does not* contain gluten (required for dough formation and elasticity). Wheat flour *does* contain gluten.
- Fat content: Various amounts of soybean oil are removed from soy flour to create flours with different functional properties:
    - Full-fat (no oil removed), with rich flavor but short shelf-life
    - Low-fat (1/3 the amount of full-fat)
    - Defatted (virtually oil-free), with long shelf-life, practically insusceptible to rancidity

Gluten is a very important protein in baking since it makes dough strong and elastic. Because of their elasticity, doughs rich in gluten are then capable of trapping bubbles created from yeast, baking powder, or baking soda. The ability to trap air results in products like cakes, muffins and breads. Generally, the higher the gluten content, the stronger the dough. Because soy flour doesn't contain gluten, it is **almost always combined with wheat flour in baking** applications in these proportions:

- Yeast dough: Replace 15-20% of the wheat flour with soy flour.
- Batters, quick breads and cookie dough: Replace up to 40% of the wheat flour with soy flour.

If soy flour percentages exceed these recommendations, the end product tends to be heavy and dense.

Soy flour tends to brown more quickly than wheat flour. Baked products made with soy flour often require lower temperatures than the standard.

Sometimes **roasted soy flakes** are used to make **full-flat roasted soy flour** which is used for its darker color and robust flavor. It is still quite perishable since it has none of the soybean oil removed.

Soy Protein Concentrates and Isolates

Like soy flour, soy protein concentrates and isolates are made by further refining **soy flakes,** in this case, to increase protein percentages.

Soy protein concentrate is a soy powder that contains 60-70% protein, and is used most widely in food manufacturing to improve moisture retention, or to increase protein levels. These products are getting more attention from chefs and home cooks, however, for these very same properties. Here they are being used primarily in ground meats (makes them juicier) and baked goods (more protein).

Soy protein isolate is a soy powder that is 90-95% protein. It is most commonly used in food manufacturing to increase protein levels and decrease carbohydrates (e.g. high-protein shakes, specialty baked goods, pastas, etc.). These end products are finding their ways into culinary applications as whole foods or bases for new recipes with healthier profiles and good taste.

Textured Soy Protein (TSP or TVP)

Like soy protein concentrates and isolates, **textured soy protein** (TSP, sometimes called TVP) is made from **defatted soy flakes**, which are processed, combined with water and flavors, then cooked and formed into a wide range of shapes, sizes, colors, aromas and flavor profiles.

Textured soy protein is one of the principle ingredients used to make meat alternatives. A **meat alternative** is a soy-based product that is formulated to look, taste, and chew like a traditional meat product, generally chicken, beef or pork.

In its early days, TSP earned a less-that-desirable reputation because it didn't compare favorably with the meats it was mimicking. However, intense research and tremendous technological advances have now improved its quality to highly acceptable levels. As a result, there are more successful TSP products on the market than ever before, and the variety continues to grow.

Dried TSP products are typically sold as crumbles or strips, and must be re-hydrated in hot water before using in a recipe. Frozen TSP products are ready to use immediately after thawing. (**Tofu** can also be used to make meat alternatives, particularly those made in a culinary or home kitchen. This generally involves replacing the meat ingredient in a recipe with the appropriate type of tofu as described in the section on Tofu.)

Meat alternatives provide a way for people to try soyfoods in a familiar context, and can be less expensive and healthier than their meat counterparts.

	Characteristics	Applications
Soy Flour	*Gluten-free* *High in protein, is 50% protein. All soy flour gives a protein boost to recipes.* *Browns quickly which may require lower baking temperatures.* *Made from roasted soybeans ground into a fine powder.* *Three kinds of soy flours:* - *Natural or full-fat, which contains the natural oils found in the soybean.* - *Defatted, which has the oils removed during processing.* - *Lecithinated, which has had lecithin added to it.*	*Yeast dough: Replace 15-20% of wheat flour with soy flour* *Batters and cookie dough; Replace up to 40% of wheat flour with soy flour*
Soy Protein Concentrate	*Soy protein concentrate comes from defatted soy flakes.* *Contains 60-70% protein while retaining most of the bean's dietary fiber.* *Highly digestible source of amino acids.*	*Used most widely in food manufacturing to improve moisture retention or to increase protein levels*
Textured Soy Protein	*Contains 50% protein as well as the dietary fiber and soluble carbohydrates from the soybean.* *Meat alternative*	*Replaces meat in dishes.*

Soybean Oil

Soybean oil is one of the most common and versatile edible oils in the world. Typically marketed to consumers as "vegetable oil," soybean oil accounts for 75% of all vegetable fat and oil consumed in the U.S. It is made by refining the whole soybean, either by pressing or chemical extraction, a process that leaves **soy flakes** as a valuable by-product.

What makes soybean oil such a popular choice is that it has so many attractive and beneficial qualities:

- Light color
- Neutral flavor and aroma
- Very high smoke-point (450 degrees F.)
- Ample supply
- Readily and reliably available
- Cost-effective
- High in unsaturated fats
- Contains both essential fatty acids needed to sustain human life
- Excellent source of Vitamin E
- Naturally free of cholesterol and trans fats

Soybean oil's high smoke point and neutral flavor makes it an excellent oil for frying, grilling and sautéing. Its neutral sensory qualities (flavor, color and aroma) also make it ideal for salad dressings, marinades, and batters. Food manufacturers also use **lecithin**, a naturally occurring component of soybean oil, as an emulsifier, stabilizer and anti-oxidant in a wide range of products.

There are currently four kinds of soybean oil on the market:

- Regular soybean oil (aka "vegetable oil", and available at retail, in foodservice and for commercial food applications)
- Hydrogenated soybean oil (primarily used in commercial applications)
- *Partially* hydrogenated soybean oil (shortenings, margarines, fryer oils, commercial ingredient)
- New low- or no-trans fat soybean oils (primarily foodservice and commercial applications, not generally available at retail)

Hydrogenated Oils

Because soybean oil is rich in unsaturated fats, it has a relatively short shelf-life. As with other unsaturated vegetable oils, soybean oil can be hydrogenated or *partially* hydrogenated to make it more stable. Adding hydrogen changes the oil from a liquid to a solid (full hydrogenation) or semi-solid fat (partial hydrogenation). Partially hydrogenated soybean oil, in particular, is used broadly in margarines, shortenings, baked products, baking mixes and many other manufactured foods.

These hydrogenated soybean oils retain most of the beneficial qualities of the regular liquid oil: neutral flavor, color and aroma, high smoke point, unsaturated fatty acids, lecithin, Vitamin E, and no cholesterol. And, when fully hydrogenated, they also remain free of trans fats. *Partial* hydrogenation, however, creates trans fats. **This is true for *any* kind of vegetable oil, not just soybean oil.**

New research tells us that trans fats increase the "bad" cholesterol and decrease the "good", which makes them a serious risk factor for heart disease. More serious, experts say, than saturated fats. Starting in January, 2006, the Food & Drug Administration is requiring all food manufacturers to include trans fats on their nutrition facts labels. Consequently, many manufacturers are looking for alternatives to partially hydrogenated oils—soybean oils and others—that have low- or no trans fats per serving AND low or no saturated fats.

New Reduced-Trans and No-Trans Fat Oils

Innovative thinkers in the soybean industry have developed new soybean oils that function like *partially* hydrogenated oils but have extremely low or no levels of trans fats. **And, unlike some other low- or no-trans fat oils, these new soybean oils remain virtually free of saturated fatty acids.**

These new oils are made either by refining soybean oil from a specially-bred variety of soybean (a "low-lin" bean that is low in linolenic acid and therefore does not require hydrogenation) or by treating regular soybeans to a process called interesterification which creates a shortening-like fat that perform like a partially hydrogenated shortening, but without hydrogenation and thus, without the high levels of trans fats.

"Low-lin" soybean oils are excellent for pan-frying, sautéing, deep-frying, and a wide variety of manufactured foods. The more shortening-like **interesterified soybean oils** are used in baking applications like cookies and pastries, as well as for deep-fat frying. Confectioners also use interesterified soybean oils in candy coatings.

As more of these soybean oil solutions to trans fat are commercialized, the amount of partially hydrogenated oils used in our foods will drop significantly.

	Benefits	Characteristics	Applications
Low-linolenic	*Zero-grams trans fats.* *Excellent quality deep fryer oil.* *Functions like partially hydrogenated oils while not being a partially hydrogenated oil*	*Neutral flavored, clear liquid oil.*	*Deep-frying, pan-frying, sautéing.*
Interesterified	*Zero-grams trans fats.* *Used in applications where a fat with a semi-solid, plastic texture is required.*	*Opaque, white, and semi-solid texture.*	*Used wherever soft, pliable fats are needed as in many baking applications*

Review Questions

1. How is edamame different from yellow or black soybeans?
2. Why do many restaurants and consumers choose to buy canned yellow and black soybeans instead of cooking dried yellow and black soybeans?
3. Detail how soynuts are made.
4. Describe the relationship between okara and soymilk.
5. How are soymilk and tofu related?
6. What are the two distinct types of tofu?
7. Tofu puree is routinely made from which type of tofu?
8. Why do some people press tofu before marinating it?
9. What is the difference between a coagulated and a cultured soy product?
10. What is the difference between soy yogurt and dairy yogurt?
11. Why is it necessary to taste a soy sauce before using it in a recipe?
12. How is miso different from soy sauce?
13. How is tempeh different from tofu?
14. Why is tempeh first blanched before using in a recipe?
15. Why should soy flour be combined with wheat flour in baked products?
16. What is the difference between soy protein concentrate and soy protein isolate?
17. How are defatted soy flour and textured soy protein related?
18. How are soybean oil and textured soy protein related?
19. What is a meat alternative?

20. Describe the trans-fat issue, and how it is affecting food manufacturers.

21. What is a “lo-lin” soybean oil, and why is it important?

22. What is the advantage of using interesterified soybean oils, and what are their best applications?

23. Does soybean oil in any form contain cholesterol?

24. Is soybean oil an unsaturated oil, or saturated oil?

25. Does soybean oil ever contain trans fats? If so, under what conditions? If not, why not?

Student Activities

1. Compare edamame, canned yellow and canned black soybeans:
   - Place each on separate plates and have students compare appearance, flavor and texture in their own words.
   - Repeat, first heating each variety in a small amount of butter.

2. Discuss recipes that use cooked dried beans and discuss how cooked yellow or black soybeans could be substituted.

3. Make soymilk using whole soybeans.

4. Compare types of tofu:
   - Cut cubes of silken and water-packed tofu using at least two different textures of silken and water-packed tofu (i.e. soft silken tofu, firm or extra-firm silken tofu, soft water-packed tofu, firm or extra-firm water-packed tofu).
   - Place the cubes on labeled plates and pass the plates around for the students to touch (and taste if desired) the different tofu samples.

5. Compare functional differences between silken and water-pack tofu:
   - Sauté soft silken tofu cubes and firm water-packed tofu cubes in separate (and preferably non-stick) sauté pans using a small amount of soybean oil. Stir the tofu with a wooden spoon or spatula so as to brown the tofu cubes evenly.

6. Compare flavors of soy sauce, miso and salt:
   - Make beef stew, assigning 1/3 of the class season the standard recipe using table salt, another 1/3 substituting a small amount of soy sauce for the salt, and the last 1/3 substituting a small amount of red miso for the salt. Taste all three versions side-by-side.

7. Compare flavors, textures, appearance and nutritional content of chili:
   - Prepare two chili recipes from the same recipe, assigning half of the class the standard recipe ground or cubed beef, the other half using TSP crumbles or chunks (rehydrate dried TSP and thaw frozen TSP before using). Taste the two versions side by side.
   - Run a nutritional analysis and cost analysis of each recipe.

RECIPES

Soy Gouda Soup

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3 T. soybean oil
1 large Spanish onion, sliced thinly (12 oz)
7 oz diced leek (white and light green portion only) (2 ½ c.)
8-½ oz. diced celery root (2 c.)
7 c. chicken stock
2 c. unsweetened soymilk
1 bay leaf
3 thyme sprigs
8-12 oz chopped or grated soy gouda cheese
salt and white pepper to taste

1. In a large saucepan, sauté onion, leek and celery root in soybean oil. Sauté over medium heat so that the vegetables do not caramelize.
2. When the vegetables are soft, add chicken stock, soymilk, bay leaf, and thyme. Bring to a boil, reduce heat, and simmer.
3. Cook for 30 minutes or until the vegetables are very soft.
4. Remove the bay leaf and thyme. Process the soup in a blender until smooth. (Be very careful, as the soup is hot. Hold a towel on top of the blender so that the soup does not come out of the blender.)
5. Place the soup back into a saucepan. Bring to a boil and reduce heat to a bare simmer. Add cheese and stir until the cheese is completely melted. Verify seasoning and serve.

Serves 6

CALORIES 220; FAT 13g; PROTEIN 8g; CARBOHYDRATE 21g;
CHOLESTEROL 0mg; SODIUM 1040mg;

Mashed Potatoes

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3 lbs. peeled potatoes, diced into large pieces
½-1 c. hot soy milk
1 ½ c. pureed soft silken tofu
6-9 T. flavored fat (extra virgin olive oil, butter, or butter substitute)
Salt and white pepper to taste

1. Cook potatoes in boiling salted water until very tender.
2. Drain potatoes and mash or whip.
3. Add tofu and small amounts of hot soy milk; mix until desired consistency is achieved. Add fat, season and serve.

Serves 8

CALORIES 290; FAT 15g; PROTEIN 5g; CARBOHYDRATE 36g;
CHOLESTEROL 0mg; SODIUM 10mg;

Miso Marinated Salmon with Edamame Soy Stir-Fry

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1 c. mirin
¼ c. sake
5 T. white miso
2 t. tamari
2 pinches cayenne
4 6 oz portions of salmon

1. Bring mirin and sake to a boil in a small saucepan. Remove from heat and add miso, tamari and cayenne.
2. Whisk until miso is dissolved. Allow to cool.
3. Slice the salmon pieces in half horizontally to make thinner pieces of salmon. This may not be necessary if the salmon portions are cut from the tail of the fillet.
4. Place salmon in marinade and place in cooler for 12-24 hours.
5. At service, sauté salmon in a small amount of soy oil in a non-stick pan. Be careful as the salmon is susceptible to scorching due to the sugar content in the marinade. Keep the salmon medium rare. Place on edamame soy stir-fry and encircle with miso sauce.

Serves 4

CALORIES 510; FAT 19g; PROTEIN 36g; CARBOHYDRATE 27g; CHOLESTEROL 100mg; SODIUM 720mg

Edamame Stir Fry

2 t. sesame oil
2 t. soy oil
2 t. minced fresh ginger
1 clove garlic, minced
¼ c. julienne red pepper
8 spears of asparagus, boiled, shocked, and cut into 1-inch pieces on the bias
1 c. boiled and shocked edamame
½ c. cooked (canned) soy beans
2 large scallions, cut into thin slices on the bias

5 t. Tamari
½ T. mirin
several pinches cayenne

1. In a hot wok, quickly stir fry ginger and garlic in sesame and soy oils.
2. Add red pepper and cook for 2 minutes.
3. Add asparagus, edamame, soy beans, and scallions and stir fry until hot.
4. Add tamari, mirin and cayenne and stir fry for 1-2 more minutes.

Serves 4

CALORIES 160; FAT 9g; PROTEIN 9g; CARBOHYDRATE 13g; CHOLESTEROL 0mg; SODIUM 100mg

Miso Sauce
¾ c. demi-glace
2 t. White miso
1 T. mirin
salt and white pepper to taste

1. Bring demi-glace to a boil.
2. Remove from heat and add remaining ingredients.

Serves 4

CALORIES 30; FAT 1g; PROTEIN 1g; CARBOHYDRATE 3g; CHOLESTEROL 0mg; SODIUM 190mg

Soy Based Salad Dressings

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Creamy Herb Dressing
1 T. and 1 t. red wine vinegar
½ c. pureed soft silken tofu
1 ½ T. extra virgin olive oil
1 T. water
1 t. salt
1 ½ t. black pepper
1 T. finely chopped chives
2 ½ T. chopped assorted fresh herbs

1. Whisk all ingredients together except for the herbs.
2. Add the herbs. Taste for seasoning and balance.

CALORIES 35; FAT 3.5g; PROTEIN 1g; CARBOHYDRATE 0g; CHOLESTEROL 0g; SODIUM 0mg;

Soy-Based Ranch Dressing
1 c. pureed soft silken tofu
1 c. unsweetened soy milk
1 t. red wine vinegar
Appropriate amount of ranch seasoning mix (for 2 c. mayonnaise and milk—follow manufacturer's directions

1. Mix all ingredients together and serve.

CALORIES 30; FAT 1.5g; PROTEIN 3g; CARBOHYDRATE 2g; CHOLESTEROL 0mg; SODIUM 0mg;

Serving size: 2 T per salad

Roast Pork Tenderloin stuffed with Tofu, Spinach and Soy Nuts

8 oz firm tofu cut into 4, ¾" x ¾" strips
2 t. extra virgin olive oil
3 cloves minced garlic
2 shallots, minced
¾ c. dry Marsala
2 t. minced fresh rosemary
½ t. salt
¼ t. black pepper
1 t. Tamari

1. In a small saucepan, sweat garlic and shallots until they begin to soften.
2. Add Marsala, rosemary, salt, pepper, and tamari. Bring to a boil. Add tofu. Remove from heat.
3. Once the mixture is cool, place in refrigerator and let marinade for a minimum of 6 hours. Turn the tofu strips periodically in the marinade.

5 oz. raw spinach
¼ c. salted roasted soy nuts
2 pork tenderloin
1 clove garlic, minced
1 T. extra virgin olive oil
½ t. minced fresh rosemary
2 t. minced parsley

1. In a very hot sauté pan, sauté spinach in 2 t. olive oil until softened. Season with salt and black pepper. Reserve.
2. Trim last 2 inches of the tip end of the tenderloins. Open the remaining pieces of tenderloin using a pinwheel style cut along the length of the tenderloin. When completely cut, the tenderloin should be one rectangular piece of meat about 1/3-inch thick. Place the tenderloin between sheets of plastic wrap and flatten slightly with a mallet.
3. Rub the inside of the meat with garlic, 1 t. olive oil, rosemary, and parsley. Season well with salt and black pepper. Refrigerate for a minimum of 4 hours.
4. After 4 hours, position half of the marinated tofu lengthwise down the center of the tenderloin. *Reserve the extra tofu marinating liquid.*
5. Mix soy nuts and spinach. Arrange a row of this soy nut/spinach mixture next to the tofu.

6. Roll the tenderloin so that meat completely encases the tofu, soy nuts, and spinach. (It may be helpful to roll the meat in plastic wrap.) Tie the tenderloin securely with butcher's twine.
7. At service, season the exterior of the tenderloin liberally with salt and black pepper. Brown in a hot pan. Place the meat in a 350° oven until it reaches an internal temperature of 155°. Let rest in a warm place for 5 minutes before slicing.

Serves 8

CALORIES 241; FAT 9.2g; PROTEIN 27g; CARBOHYDRATE 6g; CHOLESTEROL 73mg; SODIUM 225mg

Edamame Walnut Salad

½ heaping teaspoon Dijon mustard
2 tablespoons wine vinegar or balsamic vinegar
½ cup extra virgin olive oil
1 teaspoon grated fresh ginger
½ teaspoon salt
½ teaspoon brown sugar
½ teaspoon freshly ground pepper
Juice from 1 orange, divided
11 oz can mandarin oranges, drained
12 ounces shelled cooked edamame
½ cup walnut halves, toasted

Combine first 7 ingredients with juice from **only** one-half of orange, whisk together until emulsified. Squeeze juice from remaining half of orange over edamame and mandarin oranges. Just before serving, gently toss salad with about half of the vinaigrette, adding more if necessary. Taste for salt and pepper and adjust as necessary. Crumble toasted walnuts on top and serve.

Yield: 8

CALORIES 223; FAT 4.3g; PROTEIN 5.6g; CARBOHYDRATE 35g; CHOLESTEROL 10mg; SODIUM 238mg;

Warm Tofu Salad with Frisee, Oven dried tomato and Miso Dressing

¾ " slice firm tofu
1 Tbsp lemon juice
2 Tbsp low sodium soy sauce
Dijon mustard
Fine chopped soy nuts
Procedure;

1. Marinate tofu with lemon juice and soy sauce
2. Brush with Dijon mustard and coat with chopped soy nuts
3. Bake in 350-degree oven 10min.
4. Place on top of salad greens

CALORIES 70; FAT 2g; PROTEIN 8g; CARBOHYDRATE 7g; CHOLESTEROL 0g; SODIUM 1090mg;

Miso dressing
¼ cup soybean oil
¼ cup water
¼ cup white miso
1 ½ Tbsp brown rice vinegar
2 Tbsp brown rice syrup
Procedure;
Blend all ingredients in food processor

CALORIES 110; FAT 8g; PROTEIN 1g; CARBOHYDRATES 9g; CHOLESTEROL 0mg; SODIUM 280mg;

Salad ingredients;
Frisee lettuce
Radicchio
Sliced fennel
Oven dried tomatoes
Note: Slice Roma tomatoes ½ " thick. Sprinkle with sea salt and place in 225 degree oven for approx 45 minutes.

Molasses-Glazed Pork Tenderloin with Edamame

¼ cup finely chopped prosciutto or 2 slices bacon, coarsely chopped
1 – 12 oz. package frozen edamame (sweet green soybeans)
½ cup chopped onion
¾ cup water
1 tbsp. olive oil
12 oz. pork tenderloin, cut into 1/2 inch thick slices (11 to 12 slices)
½ cup orange juice
3 tbsp. molasses
1 tsp. cornstarch
½ tsp. salt
¼ tsp. pepper
2 tbsp. snipped fresh parsley
Steamed spinach or turnip greens (optional)

1. In a large skillet, cook prosciutto or bacon over medium heat until crisp-cooked; drain and set aside. In the same skillet cook beans and onion in ¾ cup water according to package directions. (Do not over cook.) Drain beans, set aside.

2. Add oil to same skillet; cook tenderloin in hot oil over medium-high heat 4 to 5 minutes or until just barely pink in center, turning once.

3. Meanwhile, in a small bowl stir together orange juice, molasses, cornstarch, salt and pepper. Add to meat in skillet. Cook and stir until thickened and bubbly. Cook and stir about 2 minutes more. Stir beans into skillet mixture, heat through.

4. To serve, divide steamed spinach (if using) between four plates. Spoon meat and bean mixture over steamed spinach. Top with the bacon or proscuitto; sprinkle with parsley. Makes 4 servings.

Yield: 8

CALORIES 324; FAT 6g; PROTEIN 29g; CARBOHYDRATE 38g; CHOLESTEROL 52mg; SODIUM 460mg;

No-Bake Chocolate Cookies

¾ cup sugar
2 tablespoons unsweetened cocoa powder
¼ cup fat-free vanilla soy milk
1 tablespoons soft butter
¼ cup roasted soynut butter
1 ¼ cups rolled oats
½ cup soynuts, coarsely chopped
1 teaspoon pure vanilla extract

Line a baking sheet with waxed paper; set aside. Combine sugar and cocoa in a medium saucepan. Stir in soy milk and butter. Bring to a full rolling boil over medium heat, stirring constantly. Stir in soynut butter, oats, soynuts and vanilla. Remove from heat. Stir until well blended.

Drop warm oat mixture by spoonfuls onto waxed paper. Chill until firm. Refrigerate leftovers.

Yield: About 20 cookies.

CALORIES 78; FAT 3g; PROTEIN 2g; CARBOHYDRATE 12g; CHOLESTEROL 0mg; SODIUM 27mg

Fresh Apple Bread

If you like moist quick breads, you'll want to make this one often.
¼ cup soft margarine
½ cup packed light brown sugar
½ cup (4 oz.) soft tofu, drained and pureed
½ cup fat-free vanilla soy milk
1 2/3 cups all-purpose flour
1/3 cup soyflour
2 teaspoons ground cinnamon
½ teaspoon ground cloves
1 teaspoon baking soda
½ teaspoon baking powder
¼ teaspoon salt
1 cup shredded apple, tossed with 1 tablespoon fresh lemon juice

Preheat oven to 350 F (175C). Spray a nonstick 9 x 5-inch loaf pan with nonstick cooking spray.

Beat together margarine, brown sugar, tofu, soy milk and vanilla in a medium bowl. Combine flour, cinnamon, cloves, baking soda, baking powder and salt in a small bowl. Add flour mixture to tofu mixture and beat until combined. Stir in apple with juice. Pour batter into prepared loaf pan.

Bake about 1 hour or until top springs back when lightly pressed. Cool in pan 10 minutes on a wire rack. Turn out of pan and allow to cool completely before slicing.

* Makes 1 loaf, about 9 slices.

CALORIES 207; FAT 6g; PROTEIN 4g; CARBOHYDRATE 35g; CHOLESTEROL 0mg; SODIUM 283mg;

Great Plains Harvest Soup

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2 oz butter
9 oz diced onion
6 oz diced carrot
2 oz diced celery
4 oz. diced leek
2 garlic cloves, sliced
12 c. chicken stock
2 bay leaves
8 branches of fresh thyme
1 ½ t. rubbed sage
1 c. cooked wild rice
15 oz. tan and black cooked soybeans
8 oz edamame, shelled
1 t. white pepper
1 T. salt
½ c. cream
¾ c. MicroSoy Super Spud
¼ c. MicroSoy Super Spud (toasted)
2 T. chopped parsley

1. In a large pot, sweat onion, carrot, celery, and leek in butter.
2. When the vegetables are very soft, add garlic and cook for another 3 minutes.
3. Add stock, bay leaves, thyme, and sage. Bring to a boil and reduce heat to a simmer. Cook gently for 30 minutes.
4. Add wild rice, black and tan soybean, edamame, salt, pepper, and cream. Continue simmering until all the ingredients are hot.
5. In a blender, combine MicroSoy Super Spuds with 1 qt. of strained stock from the soup. Allow to sit for 2 minutes in the blender. Then, blend until smooth.
6. Add the mixture from the blender to the soup. Bring to a simmer, skim to remove excess fat and serve immediately. This last step is best done just prior to serving the soup. Sprinkle with chopped parsley.

Serves 10

CALORIES 240; FAT 12g; PROTEIN 13g; CARBOHYDRATES 21g;
CHOLESTEROL 20mg; SODIUM 880mg;

Meatball Stew with a Soy Crust

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6 oz mushrooms, sliced
4 oz onion, thinly sliced
2 cloves garlic, minced
20 ADM meatballs
¼ c. flour
¼ c. red wine
¼ c. tomato sauce
2 c. brown stock
1 t. salt
1 t. soy sauce
½ t. black pepper
Soy crust (see below)
Grated Gruyère or Swiss cheese

1. Saute mushrooms in olive oil.
2. Add onions and sweat until tender.
3. Add garlic and meatballs and cook until the garlic is cooked through.
4. Add flour and cook for several minutes.
5. Add red wine, tomato sauce and stock. Bring to a boil and simmer for 20 minutes. Let cool.
6. Fill shallow containers with meatball stew. Top with a ½ inch layer of soy crust. Sprinkle cheese on top of the soy crust.
7. Bake in a 350° oven until browned.

Soy crust (makes enough to cover 2 entrée portions)
1 c. water
¾ c. MicroSoy Super Spuds
¼ t. salt
1/8 t. white pepper
1 t. minced chives
1 ½ T. cream
1 T. butter

1. Bring water to boil in a microwave.
2. Add MicroSoy Super Spuds and stir.
3. Microwave for 2 minutes.

4. Add remaining ingredients.

Yield: 2 entrée portions

CALORIES 540; FAT 19g; PROTEIN 36g; CARBOHYDRATE 55g; CHOLESTEROL 20mg; SODIUM 1180mg;

Spicy Tofu and Mushroom Spaghetti Sauce

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8 oz. Italian marinated firm tofu, cut into ½" cubes
¼ c. olive oil
4 oz. assorted mushrooms, sliced
1 ½ oz (1/3 c.) minced onion
2 clove garlic
1 t. chile flakes
16 oz. tomato sauce (the higher the quality, the better)
3 T. chopped Italian black olives
¼ c. chopped fresh basil

1. In a sauté pan (non-stick works best), sauté tofu in 2 T. olive oil until lightly browned. Remove from pan.
2. Saute mushrooms in the same sauté pan in 2 more T. of olive oil.
3. When the mushrooms are ¾ cooked, add the onion. Continue cooking until translucent.
4. Add garlic and cook 1 more minute.
5. Add chile flake and cook 1 more minute.
6. Add tofu and tomato sauce and bring to a simmer. Continue cooking at a simmer for 20-30 minutes.
7. Just before serving, add the olives and the basil.
8. Serve over soy spaghetti pasta with a grating of Parmesan cheese.

Serves 3

CALORIES 300; FAT 22g; PROTEIN 9g; CARBOHYDRATE 19g;
CHOLESTEROL 0mg; SODIUM 1020mg

Lemon Poppy-Seed Muffins

¾ cup all-purpose flour
¼ cup soyflour
2 teaspoons baking powder
½ teaspoon baking soda
¼ teaspoon salt
1 cup soy yogurt
¼ cup honey
¼ cup soft margarine
¼ cup fresh lemon juice
1 tablespoon grated lemon zest
2 tablespoons poppy seeds

Preheat oven to 425F (220C). Spray 12 muffin cups with nonstick cooking spray. Combine flours, baking powder, baking soda and salt in a medium bowl. Beat yogurt, honey, margarine and lemon juice in another bowl until smooth. Stir yogurt mixture into flour mixture until just combined. Stir in lemon zest and poppy seeds.

Spoon batter into prepared muffin cups. Bake 15 to 20 minutes or until tops spring back when lightly pressed.

Make glaze, if using, and drizzle over muffins. Cool muffins in pan 10 minutes before serving or cooling completely on a wire rack.

Lemon Glaze (optional)

¼ cup fresh lemon juice
¼ cup sugar

Stir together lemon juice and sugar in a small bowl. Spoon over muffins in pan.

Note: White whole-wheat flour is available by mail from the King Arthur Flour Company and is also available at most Trader Joe's Stores.

Yield: 12 muffins
CALORIES 110; FAT 5g; PROTEIN 2g; CARBOHYDRATE 15g; CHOLESTEROL 0mg; SODIUM 240mg