

FORMULATION ON NEW SUNFLOWER SEED PRODUCTS

By

Douglas MacGregor
Intergalactic, Incorporated
Salt Lake City, Utah

On Christmas last, my youngest son received a coloring book filled with pictures to color, games and puzzles. One of the puzzles was to take the words "Merry Christmas" and find therein all the possible three letter words, four letter words, and so on. I assisted him with the three letter words, and when it came to the four letter combinations I started to explain them to him, but he said, "I know daddy-they are words like chit."

His mother and I looked at each other aghast, wondering where on earth he had learned a word like that, and shocked that he would come right out with it.

You can imagine our relief when he said, "you know, like in chit-chat!"

Just so, we at Terralab Division have been looking at the sunflower as a total plant, to see how we can take it apart and utilize the various parts of the plant to make useful and economically valuable products.

We are all well aware of the seed values and I will mention our work with seeds and seed products later. It is my hope that this necessarily brief report on the status of our various investigations will serve to bring to your attention the values that lie hidden in other portions of the plant as well, and will encourage you to examine your own work with the view of determining the commercial values to be found in sunflower by-products.

We first looked at the stalks left after harvest.

Stalks are easily processed and decolorized by existing pulping and fiber processing techniques. The stalk spicules tend to remain adherent to the surface fragments, and remain at right angles to the surface particles, thus yielding a porous mass which is readily processed into a mat having high strength and low weight.

One use of this particular material is in the production of lightweight acoustical ceiling tile. (1) We have found that sunflower acoustical tile weighs less than 60 per cent of standard acoustical tile, has better sound absorbency, (2) and has greater strength than standard tile. Needless to say, the light weight and greater sound absorbent properties are of considerable interest to weight-conscious architects and designers concerned with modern high rise and thin shell construction, and to designers desiring maximum sound absorption and low weight for aircraft. This application has an annual United States potential market of 680,000,000 pounds.

The high strength and low weight, coupled with modern resins and borate fire retardents and flame suppressors, make an ideal high-strength core for doors, partitions and similar construction. (3) We have fabricated

such a core which required four hours for burn-through by a high temperature torch, (4) and have built it into a veneer-covered door (5) which obtained a three hour fire rating when tested in accordance with ASTM E-152. (6)

To give you an idea of the quantities involved in this application, one local Salt Lake City manufacturer would use 12,000,000 pounds annually. The market estimate for the United States for this stem product alone is 750,000,000 pounds annually. A patent application for this process and product has been submitted.

Decorative privacy panels made from sunflower seed hulls embedded in translucent or transparent plastic have a great appeal to architects who have evaluated them for us; we have made attractive wallboard of the pressed bagasse type; (7) and wax-impregnated stalks for fire starters are among the practical applications we have investigated.

High volume uses include the use of finely chopped dried stalks as deburring and polishing abrasives in the metal manufacturing industry and an exceptionally high volume application of chopped and shredded sunflower stems is as a replacement for peat moss in plant starter mix used in nurseries. This mix provides better support and increased water retention than the standard mix. Estimates prepared for us by the Porter-Walton Company show that this use is a potential 240,000,000 pounds per year market. Chopped sunflower stalk spread on cleared land reclaimed for seeding into grazing and forage land is excellent for its water retention; for the first year it gives a water reserve to the land for good growth, and it decomposes to form a valuable organic content which greatly improves the tilth and growth potential in the soil.

Any consideration of total utilization of the plant should not overlook recovery of the pectin content of the heads.

It is impossible to investigate sunflowers without considering the edible properties of the seeds, and we have made some consideration of this facet of the sunflower gem.

A number of countries in South America and Asia are faced with a food crisis. A great deal of very good work has been done by a number of concerned people in many countries to try to provide protein supplements to the diets of these people. Unfortunately, people are just like my computer-- when I program my computer, the darn thing insists on doing what I tell it to do rather than what I want it to do. Similarly, people have dietary programs implated in them by their environments and cultures, and they will frequently rather subsist on a minimal diet close to starvation, than change their eating and food preparation habits.

Too often, dietiticians and nutritionists discover excellent supplements to poor diets which are economical, easy to prepare, and yet which the people reject because they find it too far removed from their accustomed fare in appearance, flavor and preparation.

We find that sunflower meal, mixed as a 45 per cent component with fish protein hydrolysate, and properly seasoned and spiced, can be cooked with beans to make a high protein additive for normal South American diets, which does not alter the acceptance of the frijoles. Sunflower meal flour added to corn meal makes tortillas and tamales which contain up to eleven per cent

additional digestible protein which does not alter either the taste or the preparation habits of the people. Limited field tests have provided sufficient proof of our theory. For example, we have conducted a number of field trials, one of which was made in a Salt Lake City restaurant specializing in Mexican food, and patronized by many Salt Lakers of Mexican descent. In the survey, each patron was asked to sample plain chili beans, and chili beans prepared with our sunflower-fish concentrate. They were then asked which dish they thought had a protein additive. (8) 22 per cent picked the plain dish as having the additive, 19 per cent picked the correct dish, and 59 per cent could not tell. Long term tests and economic evaluation need to be the next research steps in this sunflower application.

Similarly, sunflower seed meal, with meat and fish protein hydrolysates, with added carbohydrates and flavoring, compressed into bars, makes a superb high-energy emergency ration, readily suited to the needs of a reserve or emergency food supply. (9) The same bar, boiled with water, for example in a canteen cup in the field, makes a tasty hot soup with an exceptionally high satiety value. (10) This can be easily carried by sportsmen in the field, and if the hunting is poor, the eating is not.

Roasted sunflower seeds, ground fine and mixed with honey, salt, and butter, processed through a homogenizer, yields a bread spread which is highly acceptable to children, and exceptionally beneficial to their growth, and which, in field trials, they preferred ten to one over peanut butter.

Sunflower kernels, made into a mougat and shaped, make delicious centers for candy; crushed sunflower kernels, mixed with several center materials, and covered with chocolate make delectable candy bars.

(11) Cracked sunflower kernels, mixed with dough and baked into loaves of bread, make a nutritive and delicious addition which greatly enhances the taste of the bread; when toasted, the aroma overwhelms the salivary glands. In fact, I challenge anyone to eat just one piece of sunflower toast.

All of the applications mentioned thus far have been studied not only from the point of practicability and feasibility but also have been examined closely from the economic viewpoint, and all are commercially acceptable.

One difficulty we have encountered, which has caused misgivings on the part of potential users, lies in the short supply of sunflowers. We hope that this conference, and others, will generate a great deal of interest in growing sunflowers, and through your work, increasing yields.

Unfortunately, there has not been time to go into detail on any of these utilizations, but I do want to say that we feel that the sunflower plant offers industrial potential which is at least equal to its use as an oil seed.

An ideal crop is one in which everything is useable, used, and profitable. Sunflowers are very near that ideal.

Thank you for your attention.

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