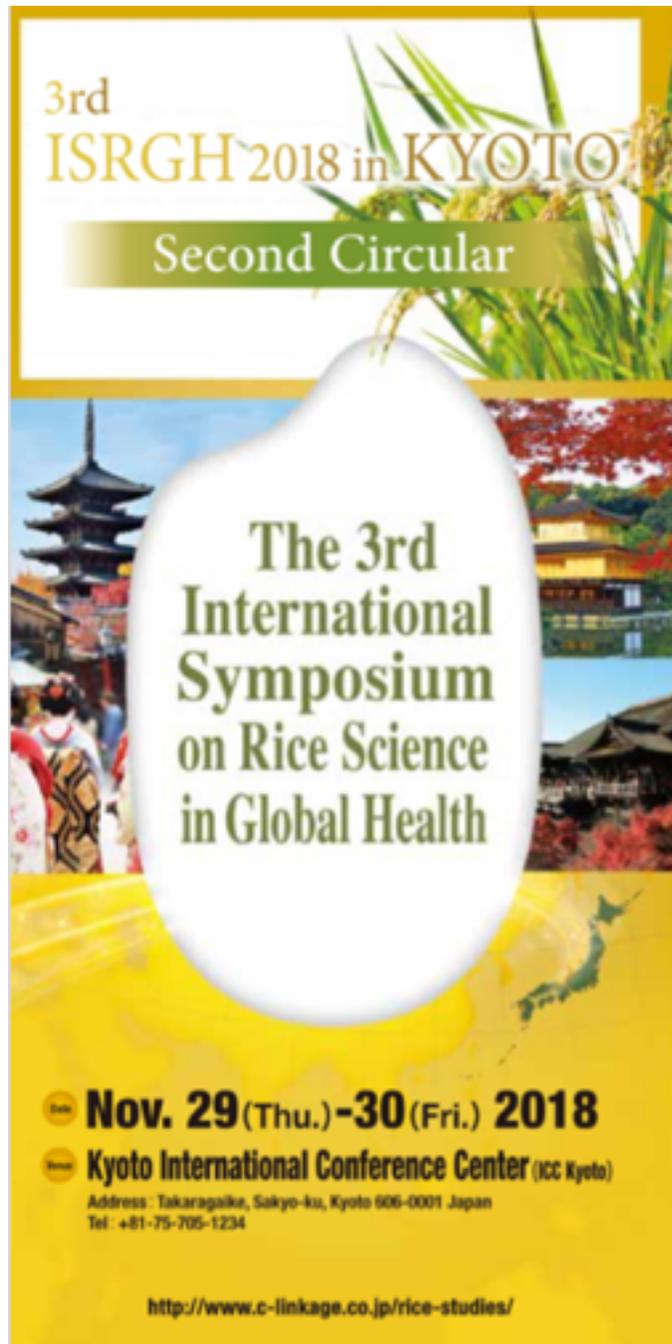


Highlights From The 3rd International Symposium on Rice Science in Global Health.

Nov. 29-30, 2018 Kyoto, Japan



Sponsored by TSUNO FOODS &
RICE CO. Wakayama, Japan

By Bill Sardi, Knowledge of
Health, Inc. USA

There is discussion in Japan over precisely what in the traditional Japanese diet is responsible for their superlative health and longevity. Rice is a common answer but as a presenter at the 3rd International Symposium on Rice Science in Global Health in Kyoto, Japan, I had the unique opportunity as an outsider to offer my take on that question.

The confusion at the rice symposium started with statements by presenters, like “rice is a staple food in Japan/Asia and is rich in tocotrienols.” No, tocotrienols (a form of vitamin E) is found in the bran (hull) of rice which is separated to make white rice. Bran, not white rice, is vitamin rich.

The fate of this highly industrialized society was established long ago by the fact it has no grasslands, except in Kobe region, to feed cattle. Japan has rice patties on every hillside as it has a history of starvation. While the Japanese are applauded for their consumption of fish and sea vegetables (seaweed), they have no choice. Even today there still isn't enough food to support the population without imports.

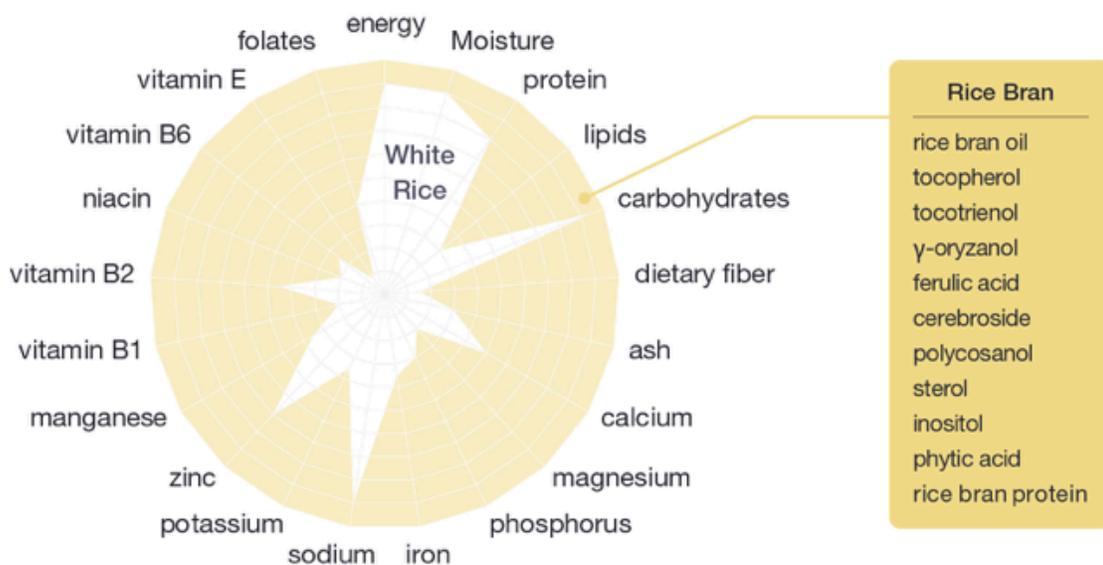
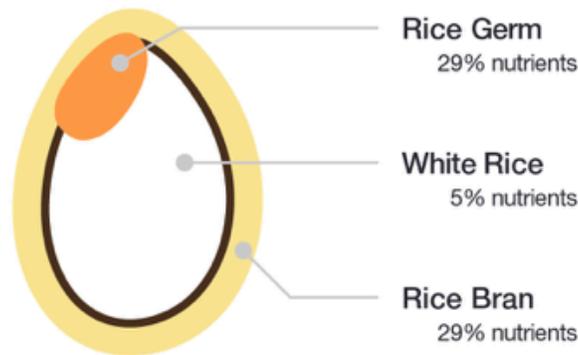
Countries with grasslands (Scandinavia, North America, New Zealand) consume dairy products and red meat, rich in calcium and iron, and have the highest rates of cancer and heart disease in the world. It is not what is in the Japanese diet, it is what is sparse in the Japanese diet: calcium and iron, that produces unusual health and long life.

I attest over-mineralization is the chief cause of human aging. During childhood growth all the calcium consumed is directed towards building bone all the iron towards production of new red blood cells whose red pigment, hemoglobin, requires iron. After full childhood growth is achieved (~age 18) the demand for iron and calcium subsides and humans begin to accumulate minerals, rusting and calcifying as they age. This simple fact seems to have escaped the minds of health authorities. Without an understanding of why humans age, proper measures to slow biological aging and its consequences would remain nebulous.

Rice Factoid:

Dr. Motoni Kadowaki of the Nigata Institute of Technology
notes the composition of rice bran:

12.6% protein
Oil 12.8%
Crude fiber 7.8%
Carbohydrate 40%
Moisture 10.5%
Ash 14.5%



It's the bran, not the rice

That is not to say rice doesn't play a strong role in health promotion, but it would be more appropriate to say rice bran, not just rice, along with soy are primary longevity factors in the Japanese diet. Because both soybeans and rice bran provide a key molecule that controls mineral absorption and utilization – inositol hexa-phosphate or IP6 (aka phytic acid or phytate). Ironically, there is a misdirected effort in Japan to produce low phytate rice which would only be appropriate for growing children and menstruating females.

There is even a guy online who espouses white rice over brown rice because the white kernel has far less IP6 in it. The stated problem is brown rice may be

difficult to digest because it still contains the germ and bran of the rice hull. One hundred grams of brown rice provides between 840 and 990 milligrams of IP6. Rice bran oil has several health promoting fractions including gamma oryzanol, vitamin tocopherols, tocotrienols, IP6, ferulic acid and inositol.

Historical use of rice bran

Dr. Teruo Miyazawa, organizing chairman of this 3rd International Rice Symposium in a keynote presentation, says rice bran oil was first used as medicine in Japan in the era 1603-1868 A.D. So Japan had an early start employing bran therapy. And it was Dr. Umetaro Suzuki of Japan who in 1910 first noticed a component of rice bran was effective in preventing beriberi. Dr. Suzuki discovered aberic acid, called thiamin or vitamin B1 in rice bran. It was the very first vitamin to be discovered.

Concentrated molecules in soups and teas

I also note that the Japanese diet features soups that simply serve to produce hot water extracts of whatever is added to the cooking pot. Tea is a hot water extract of tea leaves. Miso soup is not only a hot water extract of soybean but it is fermented. Therefore, it is not surprising to learn that rice intake is related to improvement in health through miso soup intake frequency.

These measures concentrate micronutrients by 1000-fold, from micrograms to milligrams. Fermented rice wine does the same.

Both soy and bran are loaded with a mineral-controlling molecule called IP6 (inositol hexaphosphate, aka phytate or phytic acid). This is a main reason why there is health and longevity in Japan.

What is WASHOKU?

I was surprised to learn at the symposium that a volunteer group of chefs led by Chef Kazuo Takagi visits schools to teach children the elements of a traditional Japanese diet. Traditional foods are prepared in schools rather than being served up by Kraft Foods in America, Japan's children being leaner and healthier.

Chef Kazuo Takagi presented WASHOKU cuisine to the audience of rice researchers. The traditional Japanese food is collectively known as WASHOKU. Takagi tours Japan to teach school cooks and students about the traditional Japanese diet. Chef Takagi notes there are similarities between WASHOKU and the Mediterranean Diet. He says one soup and three side dishes delivers for school lunches.

*Rice factoid: of 50 million households in Japan,
30% are now two-person households.
Small portion packaging is a trend.
In 11,880,000 households both husband and wife work.
So rice must be convenient to prepare.*

While there is a current and ongoing emphasis on achievement of healthy longevity that promotes independent living, it appears Japan is further along in accomplishing that goal than Western countries.

Wikipedia reports 65+ seniors in Japan are more likely to work than in any other developed country. That was achieved in 1987 when 36% of men and 15% of women were in the labor force. For comparison, about 19% of American seniors are still in the labor force. In fact, most of the rice farmers in Japan are men in their 60s and 70s.

A study in the 1980s revealed 90% of Japanese surveyed said they wanted to continue working after age 65. Again, for comparison, about 66% of Americans want to work past age 65. These long-living, long-working individuals in Japan certainly relieve the strain on limited healthcare dollars (yen actually). About Y400 billion is spent now on care of the elderly in Japan. Such expense can be crippling to a society.

Rice Factoid:

Average age of rice farmers in Japan: 66.7 years; 16% family farmers to 37% of (18,857) farmers are now corporate (18,857 are corporate farmers). The increase of corporate rice farmers is ongoing (2005: 8700; 2010: 12,500; 2015: 18,857); 37% of cultivated area is now corporately farmed.

Given that the world produces ~720 million tons of rice per year as a staple to feed over half of the world's population (90% of Asia), the demand is not only to increase production to ~1500 million tons per year as the world's population rises from ~7 billion to 10 billion, but to produce cultivars of rice, or engineer rice to be more nutritious with the goal in mind to prolong independent living of today's burgeoning population of oldsters, i.e. head off Alzheimer's disease.

Japan ranks at the top of longevity charts with male and female life expectancy in the 80s and 90s respectively. The Japanese attribute their traditional diet based around rice as a staple for their superlative health. Imagine how long Japanese men would be living if they backed away from drinking sake and smoking tobacco.

But then again, Japanese males who smoke are only 6.3 times more likely to develop lung cancer than non-smokers versus 40 times more for American male smokers. The inclusion of cancer-causing chemicals in American cigarettes, less use of activated charcoal filters and protective factors in the Japanese diet may explain this disparity between American and Japanese male smokers. Is it the IP6 provided in soy and bran that protects Japanese male smokers from lung cancer?

Ajay Kohli of the International Rice Research Institute in the Philippines notes that rice provides food for 400 million poor people.

Engineering better, more nutritious varieties of rice

There is a race in Japan to develop a “super rice” that will accommodate the changing demographics of Japan (households with two incomes) and a growing population of seniors.

A couple of presenters at the Rice Symposium showed how rice kernels or grains can be subjected to high water pressure to produce a more nutritious brown rice that doesn't require overnight soaking before cooking, or resistant rice that inhibits absorption of starch.

Under development is Golden Rice offering vitamin A via its beta carotene content. (Beta carotene converts to vitamin A when fat is also included in the diet.) However, the best intentions don't always pan out. The US Food & Drug Administration has declared Golden Rice has no health benefits because it offers so little vitamin A.

Dr. Kenishi Ohtsubo, Niigata University of Pharmacy and Applied Life Sciences, proposes the use of super-hard rice blended with black rice bran, which contains a high amount of resistant starch, produces a reduction of elevated blood glucose and a reduction in the production of beta amyloid, the plaque that pollutes the brain of Alzheimer's patients.

Super-hard rice increases GABA by 15 times over buckwheat and 30 times over soybean. GABA (gamma amino butyric acid) is a chemical in the brain that is known to relieve anxiety, improve mood and calms over-stimulation of excitatory factors in brain cells. Dr. Ohtsubo found that brown rice inhibits a marker for Alzheimer's disease by 20%; black brown and super hard rice by 40%.

Dr. Michio Hashimoto of Shimane University Faculty of Medicine, reported on use of ultra-high-pressure rice to improve digestibility of brown rice and reduce brain

plaque (Amyloid) levels. Dr. Hashimoto noted this type of rice provides 23 times more fiber than white rice, four times more GABA, 4.5 times more gamma oryzanol and 5.0-fold more magnesium while increasing inositol dramatically. This hard rice protects against bone/mineral loss also.

Super Hard Rice

Consumers are demanding easier to use rice offering better nutrients.

There are ~8000 types of rice. Researchers attempt to find special rice cultivars of rice that provide more nutrients and antioxidants.

Brown rice provides more nutrients but is normally very difficult to cook and is poorly digested and therefore is problematic for daily consumption. Overnight soaking of rice is often practiced to make brown rice more palatable.

One approach is to subject brown rice to high heat-moisture that increases absorption resistant starch. Rice grains subjected to high hydrostatic pressure are more shelf stable and the allergen content is reduced.

Combining nutrient dense cultivars of rice + 40% super-hard rice is one approach towards creating healthier rice. Putting rice under high water pressure is one such approach to creating by creating super-hard rice.

GABA is increased by 15-fold in super hard rice compared to buckwheat and 30 times for soybeans. GABA (gamma aminobutyric acid) blocks nerve impulses in the brain to control over-stimulation.

Jae-Sung Lee of the International Rice Institute spoke of efforts to genetically engineer rice to improve delivery of zinc and iron and increase antioxidants. But it needs to be noted that exposure to biological stressors (temperature stress, radiation stress, other environmental stressors) increases antioxidant defense in rice which is then transferred to humans during consumption. The environment rice is exposed to is more important than its genetic makeup.

Whoever wins this competition to produce a new kind of rice that will be adopted by the many countries in Asia will be a trillionaire.

**NUTRIENT CONTENT OF
POLISHED WHITE RICE VS PRESSURIZED BROWN RICE**

NUTRIENT	POLISHED RICE	PRESSURIZED BROWN RICE
Protein	6.6 grams	7.7 grams
Dietary fiber	0.3 grams	7.1 grams
Inositol	None	202 mg
Ferulic acid	None	12-50 mg
Magnesium	20 mg	110 mg
Phosphate	140 mg	290 mg
Potassium	110 mg	230 mg
Vitamin B1 thiamin	0.12 mg	0.51 mg
Vitamin B6	0.05 mg	0.32 mg
GABA	2.0 mg	9.1 mg

Changing diet like changing religion

It has been said the two most difficult things to change in a person is their religion and their diet. The two are intertwined in Asia where there are even religious ceremonies for the rice harvest. In this instance, rice is religion. Japanese people elect to buy rice based on quality rather than price. A paradox is, while the carbohydrate-centered Food Pyramid has been tossed out in the USA, rice is 90% carbohydrate and doesn't seem to produce the obesity and diabetes in Asia as other carbohydrates (bread, pasta, cereal) do in America.

Rice Factoid: Satoshi Sasaki of the University of Tokyo notes that consumption of rice is in decline in Japan (118.3 kilograms per person per year down to 54.6 kilograms per year over a period of 50 years – 1965-2015)

Rice consumption per capita in Japan (2011) is 52.2 kilograms (2.2 lbs.), not even ranking in the top ten nations worldwide. I submit it is not rice, but IP6 in rice bran and soy that is a hidden secret of health in Japan.

Presenters at the Symposium bemoaned the fact rice consumption in Japan is in decline while life expectancy is on the rise, a seeming paradox. The fact is, as mentioned above, it is not what is in the Japanese diet as much as what is not in it. But these contradictory facts have apparently escaped the minds of leading health authorities in Japan. Furthermore, rice is low in fiber, while health authorities are attempting to increase fiber intake.

Japanese remain independent for 9/10^{ths} of their lives

Professor Tamio Teramoto notes that Japanese culture is closely tied to food. If hamburgers represent American food culture, rice defines Japanese food culture.

Roughly 72% of men and 74% of women in Japan live a healthy lifespan.

Dr. Teramoto defines healthy life span as the number of years of independent living. In Japan, that is 72.1 years for men and 74.8 years for females. That is against life expectancy of 80.98 for males and 87.14 years for females.

Essentially, Japanese people as a whole live 9/10th of their lives in a healthy independent state. That is what America only gives lip service for. Dr. Teramoto notes that daily fish consumption (vs. once a week) reduces heart disease by 56%. Eating soy products reduces the risk for a heart attack by 61%.

Rice Factoid:

Dr. Yoko Fujiwara of Ochanomizu University, noted the saturated fat content of cooking oils is as follows: 17.3% in rice bran oil; soy 10.5%; canola 4.2%; corn 4.2%; sesame seed oil 9.3%; flaxseed 6.6%; lard 24.9%.

Dr. Motoni Kadowaki of the Nigata Institute of Technology notes that rice bran reduces the long-term measure of blood sugar (Hemoglobin A1c) from 9.0 to 6.5 in mice. Total lipid in the liver are reduced from 5.0 to 1.5 with rice bran.

Fatty liver: Total lipid 5.0 reduced to 1.5 with rice bran

Rice bran protein activates internal antioxidant proteins

Rice bran protein is an overlooked source of protein that could be used therapeutically and for prevention. Lin Yang of the Department of Food Science & Engineering at Harbin Institute of Technology, China, says rice protein activates an internal switch (Nrf2) to produce endogenous antioxidant enzymes such as catalase, glutathione and superoxide dismutase. The precise amino acid for this antioxidant activation in rice protein is L-arginine. This antioxidant effect is not attenuated by aging.

- Nrf2 is a sensor of oxidative stress
- Nrf2 activates internal antioxidants
- Rice protein increases endogenous antioxidant activity
- The endogenous antioxidant capacity exerted by rice protein cannot be attenuated by aging



“The price of medicines, including new medicines, is rising rapidly, which puts the social security and health care systems in many countries at risk. It is also happening in Japan. We should work toward creating a society where people can enjoy longevity till 80, 90, and 100 years old or more with proper food intake, not relying too much on the medication.”

- Teruo Miyazawa

Facts about rice protein

- Rice is superior in protein nutrition to wheat and corn because of the balance of amino acids; glutelin being preferred over prolamin in wheat and corn.
- White rice is 6.1% protein; 15.5% water; 77.1% carbohydrate
- Rice actually contributes 13% of protein in Japanese diet, more than milk or eggs.
- Rats fed rice bran protein exhibit less fat in their liver.
- Rice bran protein restores strength and structure to bone.
- Rice bran protein has application for diabetes, obesity, diabetic kidney disease and immune enhancement.

- The biological property of rice protein responsible for internal antioxidant activity is its superior amino acid profile.
- Arginine in rice induces antioxidant response to prevent oxidative stress via stimulation of glutathione synthesis and activation of Nrf2 pathway
- Rice consumed as white rice is over 90% starch, little dietary fiber, vitamins or minerals and has a high glycemic index.
- Rice with a resistant starch (non-absorbable) would be preferred

Rice Factoid:

Rice is a carbohydrate but doesn't produce obesity like other carbs (bread, pasta) do.

Antipsychotics versus rice bran gamma oryzanol

Masahiko Fujii, clinical professor of Geriatrics at the School of Medicine at Tohoku University and board chairman of the Japan Dementia Emotional Therapy Association, presented convincing data on the effect of rice bran gamma oryzanol to improve the behavior of over-medicated older patients with dementia (mental decline). Dr. Fujii indicts antipsychotic drugs for acceleration of memory impairment and other behavior problems typically observed among older adults.

Dr. Fujii's search for less problematic molecules led him to gamma oryzanol. Few geriatric physicians admit to the limitations and side effects posed by antipsychotic drugs. Dr. Fujii boldly discontinued drugs used by geriatric patients with mental decline and replaced them with gamma oryzanol with spectacular results. This convincing data, only limited by a small number of subjects, strikingly improved measures of mental function without drugs! Sadly, the integrity of this researcher will not likely influence physicians to take their patients off of troublesome drugs and replace them with rice bran molecules. Please examine the data below.

Reduction of Medication & Improvement In Mental Score With Gamma Oryzanol

Subject	Age	# PILLS		MENTAL SCORE	
		Before	After	Before	After
1	86	7	0	19	29
2	79	4	0	13	22
3	68	9	0	17	28
4	66	12	0	15	27
5	84	17	3	0	13
6	74	25	0	0	12

Source: Gamma-oryzanol for behavioral and psychological symptoms of dementia. Psychogeriatrics March 18 (2): 1451-52, 2018

*Dr. Teruo Miyazawa, chairman of the Rice Symposium,
said the price of medicines is rapidly rising
that we need to create a society that lives longer
not reliant on medication.*

IP6 and cancer



*Ivana Vucenik, PhD, University of Maryland School of Medicine
Pioneer IP6 rice bran cancer researcher*

Ivana Vucenik, PhD, associate professor at the University of Maryland School of Medicine, reported on her landmark animal studies that employed IP6 derived from rice bran to treat cancer. IP6 does not interfere with chemotherapy, actually reduces side effects of chemotherapy and improves the quality of life and survival of laboratory animals. More importantly, IP6 did not result in a the commonly occurring decline in white blood cell count when given with chemotherapy.

Even when IP6 was topically applied to the breast of women who had undergone chemotherapy for breast cancer, it prevented or reduced treatment side effects.

- IP6 prevents calcifications.
- IP6 prevents blood clots by inhibition of blood platelet clumping.
- IP6 reduces circulating blood cholesterol levels
- IP6 does not affect normal cells

Dr. Vucenik emphasized, while fiber is highly recommended for health promotion, only fiber with IP6 shows a negative correlation with colon cancer. IP6 is relatively rich in nuts, corn, rice, beans, seeds, oats, barley, sesame and particularly rice bran. All mammalian cells contain IP6.

Dr. Vucenik report of a dramatic decrease in colon cancer with the use of IP6 in the animal lab when administered prior to instillation of tumor cells.

In breast cancer, the percentage of laboratory rats with 5 tumors was as follows:

	% rats with 5 tumors
Control	17.5%
IP6	5.3%
Inositol	2.5%
IP6 + inositol	0.0%

There was a 49-fold decrease in tumor size.

IP6 satisfies all of the categories of cancer preventive action

IP6 is safe, does not affect normal cells, acts synergistically with chemotherapy and affect principal pathway of malignancy and regresses metastatic (spreading) tumors. IP6 affects all principal pathways of malignancy

Dr. Vucenik describes IP6 and inositol as fascinating molecules

Tocotrienols for cancer

IP6 is not the only anti-cancer molecule in rice bran. Rice bran tocotrienols, a family of vitamin E four molecules (alpha, beta, delta, gamma), inhibit abnormal new blood vessel formation (called angiogenesis) that facilitates the growth of cancer. This property of tocotrienols may also benefit diabetics who face loss of vision due to diabetic retinopathy.

Experimental implantation of tumor cells @10 mg tocotrienols per animal decreased tumor volume by 64%. Tocotrienols also induce apoptosis, natural cell die off of cancer cells. And tocotrienols inhibit telomerase needed for cellular growth and survival.

MYO INOSITOL FOR THE PREVENTION OF GESTATIONAL DIABETES



Dr. Rosario D'Anna, Messina, Italy

Convincing data was presented by Rosario D'Anna of Messina, Italy in the use of rice bran derived inositol in the prevention and treatment of gestational (pregnancy) diabetes. D'Anna has published nine studies dating back to 2011 about the positive effects of inositol to address gestational diabetes that is ever too common among pregnant females. Overall he reports. A 60% reduction of gestational diabetes, a reduction of oversized newborns (macrosoma) and less hypertension as well a fewer preterm births with the use of inositol.

Myo-inositol treatment in early pregnancy is associated with a reduction in the rate of gestational diabetes mellitus and in the risk of preterm birth and macrosomia in women who are at risk for gestational diabetes mellitus.

INCIDENCE OF GESTATIONAL DIABETES

INOSITOL		NO INOSITOL
6 of 99 women (6%)	Family History of Type II Diabetes	15 of 98 women (15.3%)
15 of 97 women (15.5%)	Obesity	36 of 104 women (34.6%)
11 of 95 women (11.6%)	Overweight	28 of 105 women (27.4%)
32 of 291 women (11%)	Gestational Diabetes	77 of 304 women (25.3%)

Comparison of Clinical Outcomes of Births Of Similar Gestational Age

	INOSITOL GROUP	NO INOSITOL
<i>Pre-term delivery</i>	3.4%	7.6%
<i>Overly large infant</i>	2.1%	5.3%
<i>Large fetus for gestational age</i>	4.8%	8.9%
<i>Gestational high blood pressure</i>	1.4%	3.9%

American Journal Obstetrics Gynecology 219 (3): e 300, 2018

Industrial use of rice bran resin as ink base: The end of bisphenol A?



Hiro Sakamoto, Sales Division, Tsuno Food Industrial, Co. Ltd., shows resins derived from rice bran that can serve as a base for inks.

Researchers at Tsuno Food Industrial Co. Ltd., led by Takuo Tsuno, presented resins from rice bran as a replace for bisphenol A (BPA) in inks used for retail cash register receipts.

BPA is a chemical that has been used in industry for various purposes including its inclusion in ink. Bisphenol A is transferred from retail store cash register receipts to humans via skin contact. BPA has been shown to produce unwanted effects on hormones, metabolism and other functions. BPA's link with human health problems has been established. BPA is found in urine samples of 81% of Americans.

Research indicates that a worker handling paper cash register receipts will inadvertently consume between 300 and 5,000 nanograms per kilogram of body weight per day (nanograms/kilograms-body weight/day) of BPA and/or BPS (a nanogram is one-billionth of a gram). Therefore, workers could consume these chemicals in amounts that exceed the BPA limit set by the European Food Safety

Authority of 4,000 nanograms/kilogram-body weight/day, especially when taking into account that they encounter the chemicals in other ways outside their jobs. (The FDA's limit is 50,000.)

A novel use of fatty acids found in rice bran is their use as a resin base for inks for cash register receipts and printing on food packaging. Such a novel use of rice bran derivatives would reduce raw material delivered from petroleum.

Rice Economics

Shoichi Ito of Kyushu University, spoke about rice economics. Dr. Ito notes that as consumers eat more wheat, corn, soybeans, there is less demand for rice and the price drops.

Since corn is used to produce ethanol (food becomes fuel), that impacts the price of rice. Essentially, rice prices move with oil prices. The higher food prices for grain will increase production; as farmers work to make the most profitable crops

If oil prices remain low, rice prices will too. Will a worldwide shortage of food occur as world population increases? Does starvation lie ahead? Dr. Ito says "a food crisis never comes! Unless man sabotages!"

Medical Uses Of Rice Bran Molecules

Inside Cells Endoplasmic Reticulum Protein Folding: Oryzanol

Endoplasmic reticulum stress

ATF6

CHOP

PERK

IRE1

TAR2

RXN

NF- κ B

Cleaved ATF6

ATF6

UPR target genes

Protein degradation

- ANXIETY**
Inositol
- PINEAL GLAND**
IP6
- CALCIFIED AORTA**
IP6
- LUNGS (PREMATURE BABIES)**
Inositol
- FATTY LIVER**
IP6
- KIDNEY (STONES)**
IP6
- INTESTINES**
IP6
- SKIN HEALTH**
Ferulic Acid
- IRON OVERLOAD (RED BLOOD CELLS)**
IP6

OTSUO
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