

rBST – FRIEND OR FOE?

DR MARK CHIMES BVSc

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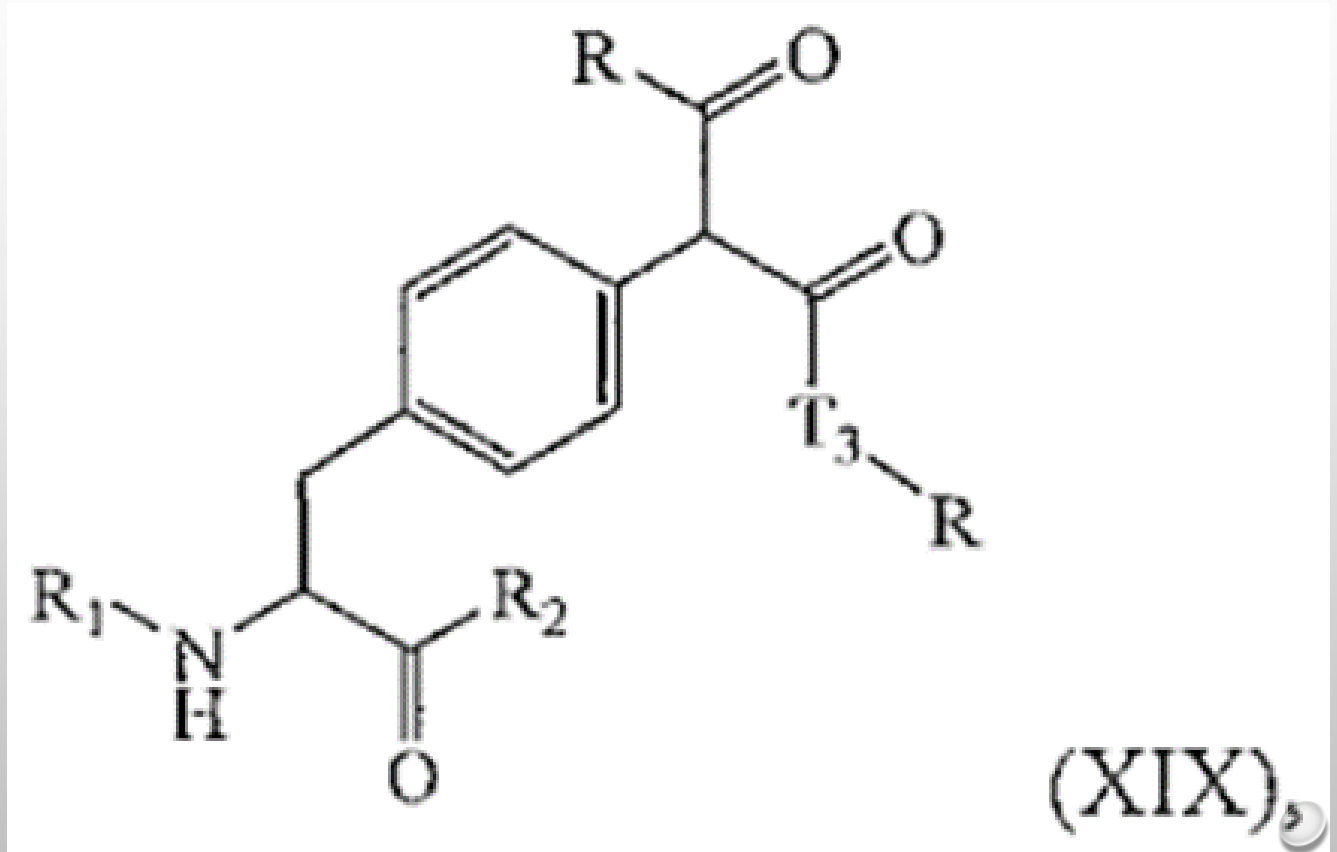
WILL PAY MORE FOR rjSP FREE MILK

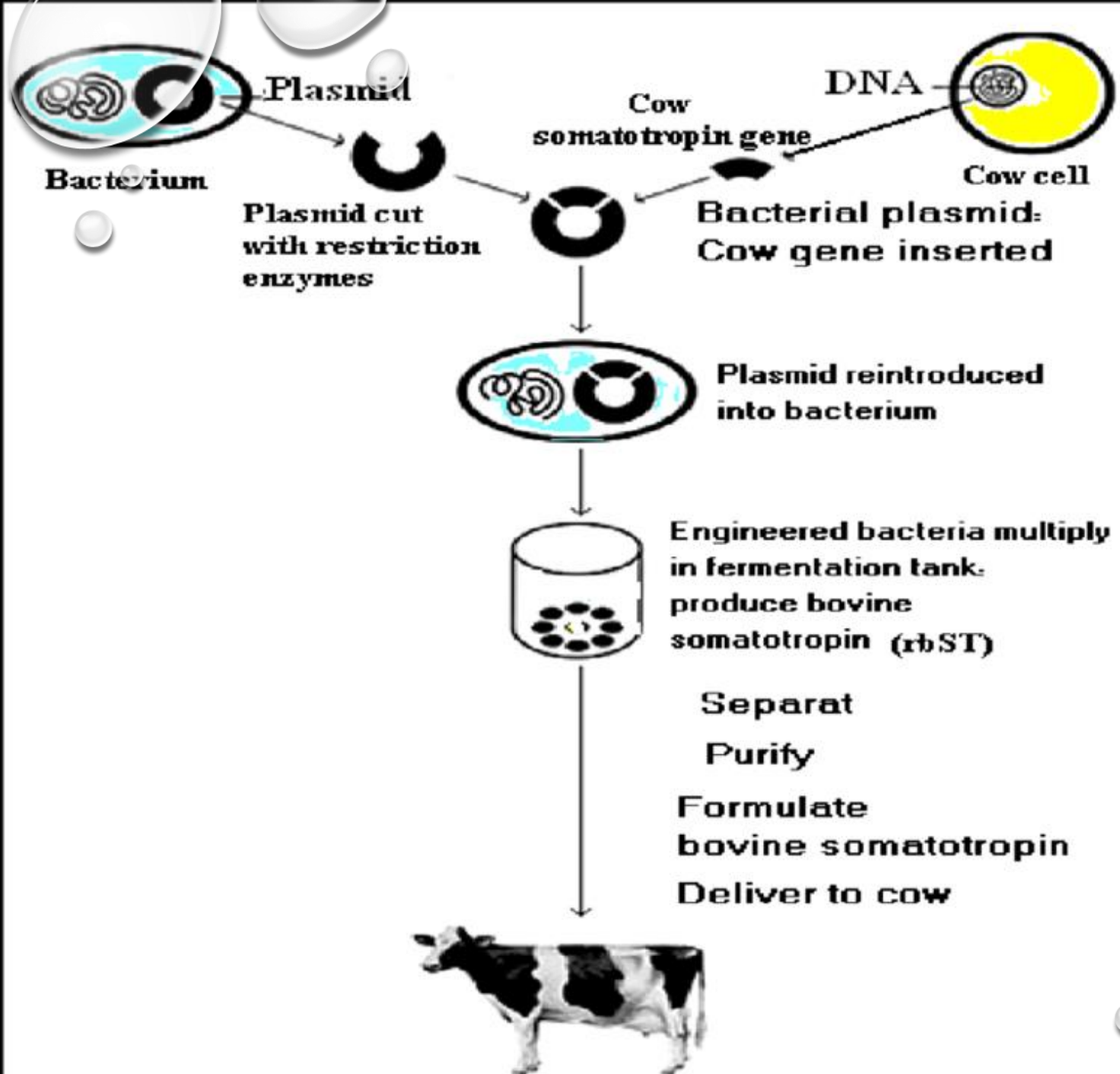


- Telephonic survey of 300 respondents – March 2011
- 10% said they would pay more for rjSP-free milk
- 9% said they will pay more for rBST-free milk
- Purchasing decisions are based on:
 - Price – 30%
 - Freshness – 29%
 - Quality – 14%
 - Hormones, rBST, Organic – 1%
- Hormone or rbST use, as well as organic were of very little or no concern to most consumers and only counted for 1% as a decision factor
- People were more concerned about antibiotic residues
- “It is not a consumer issue, it is an industry issue and a marketing tag line”

WHAT IS BST?

- BOVINE SOMATOTROPIN
- ALSO KNOWN AS BOVINE GROWTH HORMONE
- SECRETED BY THE PITUITARY GLAND
- PROMOTES GROWTH THROUGH THE EFFECT OF IGF-1
- ADMINISTRATION OF RBST PRIOR TO PEAK PRODUCTION, IN COWS THAT ARE WELL-FED, SLOWS THE RATE AT WHICH THE NUMBER OF MAMMARY CELLS DECREASES, AND INCREASES THE AMOUNT OF NUTRIENTS DIRECTED AWAY FROM FAT AND TOWARD THE MAMMARY CELLS, LEADING TO AN EXTENSION OF PEAK MILK PRODUCTION.
- IT DOES THIS BY COORDINATING THE METABOLISM OF BODY TISSUES SO THAT MORE NUTRIENTS CAN BE USED FOR MILK SYNTHESIS
- PHYSIOLOGICAL EFFECTS IN MAMMARY TISSUE INCLUDE INCREASED UPTAKE OF NUTRIENTS USED FOR MILK SYNTHESIS, INCREASED ACTIVITY IN THE SECRETORY CELLS, AND INCREASED MILK SYNTHESIS





WHAT IS rBST?

- RECOMBINANT BST
- RECOMBINANT = PRODUCED BY GENETICALLY MODIFIED BACTERIA
- THE RBST GENE IS INSERTED IN E COLI BACTERIA TO PRODUCE THE HORMONE

DEVELOPED FOR DWARFISM IN HUMANS



- Given orally and injected
- Clinical studies in the 1950s attempting to treat human dwarfism with BST found neither a growth response nor any adverse health effects
- The chemical structure of BST differs substantially from that of human somatotropin

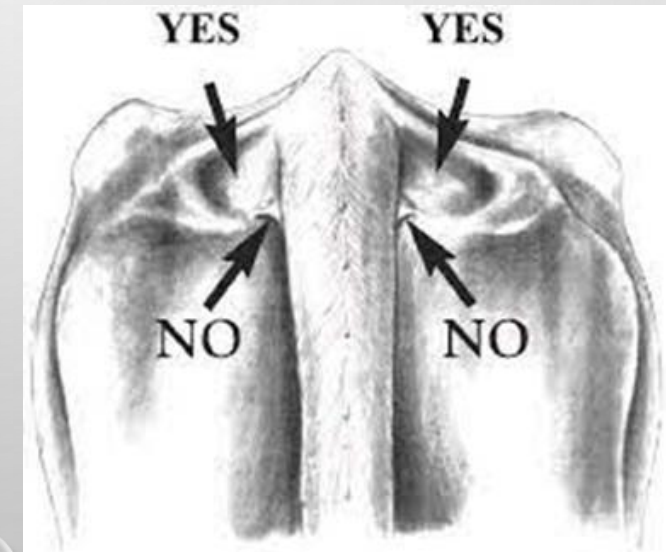
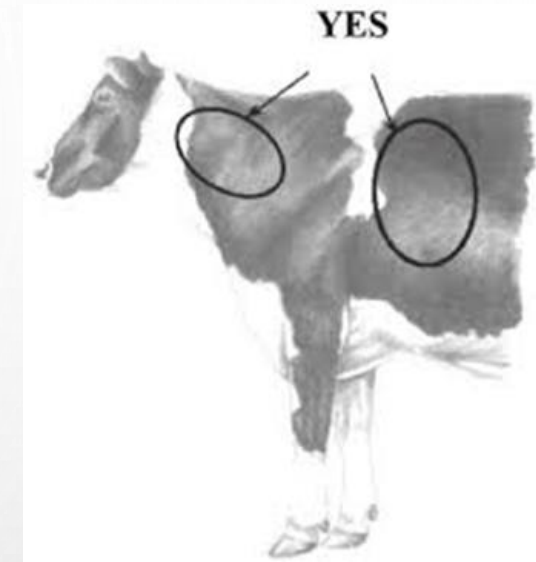
SOUTH AFRICA WAS THE FIRST COUNTRY TO APPROVE ITS USE IN DAIRY COWS IN 1988

- APPROVED FOR USE IN MORE THAN 20 COUNTRIES WORLD WIDE INCLUDING USA.
- NOT APPROVED FOR USE IN CANADA, THE EU, AUSTRALIA, NZ, JAPAN, ISRAEL
- IT IS IMPORTANT TO NOTE THAT ALL COUNTRIES, INCLUDING CANADA AND THE EU, THAT HAVE AFFIRMED THE SAFETY OF MILK FROM RBST-SUPPLEMENTED COWS, ALLOW IMPORTED MILK OR DAIRY OR MEAT PRODUCTS FROM THESE COWS.



HOW IS rBST USED IN DAIRY COWS?

- 500MG IS INJECTED EVERY 2 WEEKS FROM THE 9TH WEEK OF LACTATION UNTIL THE END OF LACTATION
- HAS AN EFFECT ON THE MILK PRODUCING CELLS IN THE UDDER BY EXTENDING THEIR LIFE CYCLE AND BY ACTIVATING MORE CELLS TO PRODUCE MILK
- COWS USE MOST OF THEIR ENERGY TO PRODUCE MILK
- RBST CAUSES THE COW TO USE EVEN MORE ENERGY AND THUS THEY NEED TO EAT MORE

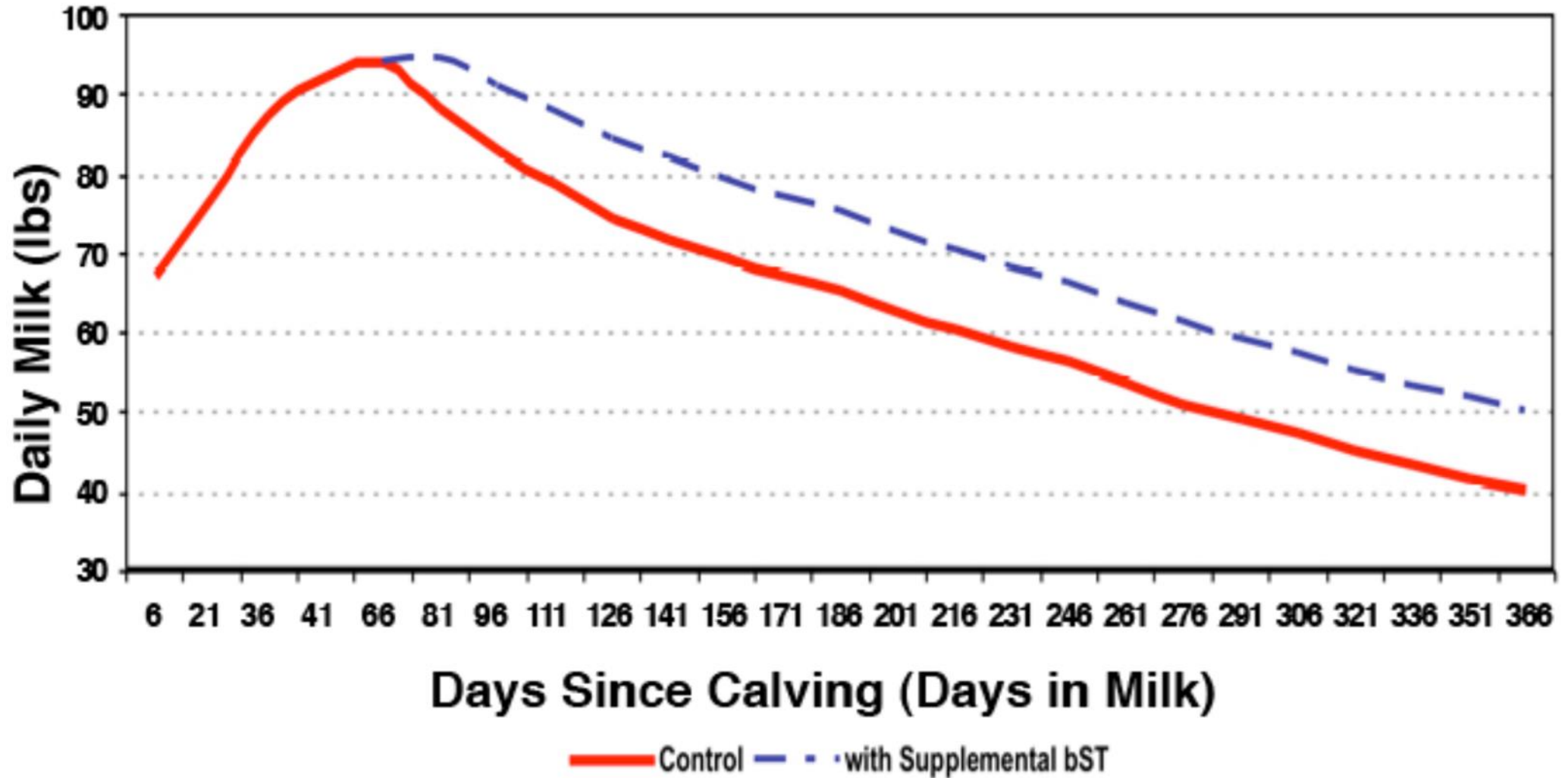




EFFECT OF rBST ON MILK

- MILK PRODUCTION WILL INCREASE BY 10 – 15% ON AVERAGE
- RBST HAS NO EFFECT ON THE COMPOSITION OF MILK. PROTEIN, BUTTERFAT, LACTOSE, MINERALS AND SCC REMAIN THE SAME
- YIELD OF MILK FAT AND PROTEIN IMPROVED SIGNIFICANTLY WITH USE OF RBST, PRIMARILY DUE TO INCREASED MILK YIELDS
- THE MANUFACTURING QUALITIES OF MILK ARE NOT INFLUENCED BY RBST, INCLUDING CHEESE-MAKING PROPERTIES SUCH AS YIELD, COMPOSITION, AND SENSORY CHARACTERISTICS OF RESULTING CHEESES
- THE COMPOSITION OF ALL MILK – ORGANIC, RBST FREE AND CONVENTIONAL – IS INDISTINGUISHABLE

LACTATION CURVE



DAIRY FARM AUDITS AND rBST



- Farmers sign an agreement that they will not use rBST in their herd
- Some farmers do not even know what rBST is?
- During dairy farm audits we check whether the farmer uses rBST
 - Medicine cupboard and fridge
 - Invoices
 - Dustbins and rubbish dumps
 - Milk production records and lactation curves
 - Physically inspect cattle for signs of injections



IS RBST SAFE IN HUMANS?

- RBST HAS ZERO EFFECT IN HUMANS EVEN IF INJECTED
- THE HUMAN BODY DOES NOT HAVE CELL RECEPTORS FOR BST
- RBST IS A PROTEIN THAT IS DIGESTED IF INGESTED
- BST IS DENATURED BY HIGH TEMPERATURES, E.G. BY COOKING OR PASTEURIZATION
- NATIVE SOMATOTROPIN EXISTS IN BOVINE MILK AND THEREFORE HUMAN CONSUMPTION OF BST IS NOT NEW.
- THERE IS NO SIGNIFICANT CHANGE IN THE CONCENTRATIONS OF TOTAL BST DETECTED IN MILK AND TISSUES OF RBST-TREATED COWS WHEN COMPARED WITH UNTREATED CONTROLS
- THE HUMAN SAFETY OF DAIRY PRODUCTS ORIGINATING FROM COWS RECEIVING RBST HAS BEEN CONFIRMED IN MORE THAN 50 COUNTRIES AND RECOGNIZED BY NUMEROUS MEDICAL ASSOCIATIONS AND SCIENTIFIC SOCIETIES
- CANADA AND THE EU ACCEPTED RBST AS SAFE IN HUMANS AND BANNED ITS USE ON POSSIBLE ANIMAL WELFARE EFFECTS, NOT HEALTH CONCERNS

IT IS VERY IMPORTANT TO DIFFERENTIATE BETWEEN A PROTEIN HORMONE LIKE BST, WHICH CONSISTS OF DIGESTIBLE AMINO ACIDS, AND STEROID HORMONES LIKE OESTROGEN, TESTOSTERONE, PROGESTERONE AND ANABOLIC STEROIDS THAT ARE DIRECTLY ABSORBED INTO THE HUMAN BODY AND WILL CAUSE HORMONE-RELATED EFFECTS IN OUR BODIES.



INSULIN GROWTH FACTOR 1

IGF-1 - Insulin Growth Factor 1

- RAISED LEVELS OF IGF-1 IN HUMANS IS ASSOCIATED WITH CERTAIN CANCERS – BREAST AND PROSTATE CANCER
- HUMANS PRODUCE THEIR OWN IGF-1. SAME AS THE BOVINE ONE.
- EVEN THOUGH RBST INCREASES IGF-1 IN MILK THE AMOUNT OF IGF-1 THAT IS PRESENT IN MILK FROM RBST-SUPPLEMENTED COWS DOES NOT EXCEED THE RANGE THAT OCCURS IN HERDS AND DAIRY COWS NOT SUPPLEMENTED WITH RBST
- A STUDY BY THE JOINT EXPERT COMMITTEE ON FOOD ADDITIVES (JECFA) INDICATED THAT THE DAILY INTAKE OF 1.5 LITERS OF MILK PER DAY WILL PROVIDE AN AMOUNT OF IGF-1 THAT IS EQUAL TO LESS THAN ONE ONE-THOUSANDTH (OR 0.009 PERCENT) OF THAT PRODUCED BY THE HUMAN BODY ON A DAILY BASIS
- 270 GLASSES OF MILK IS EQUIVALENT TO THE HUMAN DAILY PRODUCTION OF IGF-1
- IGF-1 IS A PROTEIN AND MOST IS DIGESTED.
- THE AMOUNT OF IGF-1 IN MILK – EITHER FROM COWS WITH OR WITHOUT RBST SUPPLEMENTATION – DOES NOT CAUSE ANY MEASURABLE CHANGE IN THE AMOUNT OF IGF-1 THAT IS PRESENT IN A NORMAL HEALTHY HUMAN BEING. IGF-1 CONCENTRATION IN MILK VARIES WIDELY IN LACTATING COWS AND IS INFLUENCED BY PARITY, STAGE OF LACTATION, NUTRITIONAL STATUS, SEASON AND SOMATIC CELL COUNTS OF THE MILK

DIABETES TYPE 1

- THERE IS NO DIFFERENCE IN THE INCIDENCE OF DIABETES TYPE 1 IN CHILDREN THAT CONSUME MILK FROM RBST COWS AND MILK FROM UNTREATED COWS.
- INSULIN IS RECOMBINANT – PRODUCED BY GENETICALLY MODIFIED BACTERIA





ANTIBIOTIC RESIDUES

- THE FEAR EXISTS THAT RBST INCREASES MILK PRODUCTION AND MAY LEAD TO MORE MASTITIS CASES, THAT ARE TREATED WITH ANTIBIOTICS
- ANTIBIOTIC RESIDUES IN MILK HIGHLY UNLIKELY
- MORE ANTIBIOTIC USE COULD LEAD TO MORE ANTIBIOTIC RESISTANT BACTERIA THAT COULD INFECT HUMANS.
- 99.9% OF BACTERIA KILLED BY PASTEURISATION.
- NO KNOWN CASES OF RESISTANT BACTERIAL DISEASE IN HUMANS FROM INGESTING MILK.
- ANTIBIOTIC-RESIDUE DETECTED IN BULK MILK TANK TRUCKS IN 2012 WAS ONE FIFTH THE LEVEL THAT IT WAS IN 1996 DUE TO BETTER MANAGEMENT ON FARMS

WELFARE EFFECTS OF rBST

- THE DATA IS INCONCLUSIVE – SOME RESEARCH SHOWS INCREASED INCIDENCE OF DISEASE AND OTHERS PROVE THE OPPOSITE
- THE PACKAGE INSERT FOR rBST, AS REQUIRED BY THE FDA, LISTS 16 DIFFERENT HARMFUL HEALTH EFFECTS THAT MAY INCREASE IN COWS RECEIVING IT. THESE INCLUDE REDUCED PREGNANCY RATES, LOWER BIRTH WEIGHT OF CALVES, AND INCREASED RATES OF INDIGESTION, DIARRHEA, SOMATIC CELL COUNTS AND MASTITIS
- COWS INJECTED WITH POSILAC® MAY HAVE REDUCED PREGNANCY RATES AND INCREASED DAYS OPEN
- OTHER RESEARCH HAS SHOWN THAT HEALTH PROBLEMS COMMON TO ALL MILK-PRODUCING COWS, SUCH AS ACIDOSIS, LAMENESS AND MASTITIS ARE OBSERVED IN RBST SUPPLEMENTED COWS AT THE SAME LOW FREQUENCY AS THAT WHICH OCCURS IN UNSUPPLEMENTED COWS PRODUCING THE SAME AMOUNT OF MILK

ANIMAL WELFARE AND RBST

- A survey done in the USA for the period since 1996 has shown the following:
 - Antibiotic-residue detected in bulk milk tank trucks in 2012 was one fifth the level that it was in 1996
 - SCC declined steadily from 316,000 cells per mL of milk in 2001 to 224,000 cells/mL in 2010 and 206,000 cells/mL in 2011
 - Mammary health has improved over this period despite the use of rBST
- Increased energy needs could lead to subclinical ketosis, subclinical acidosis and laminitis.
- Canada and the EU prevented the use of rBST on animal welfare grounds.





RBST SIDE EFFECTS IN COWS

- DROP IN BODY CONDITION SCORE DUE TO NEGATIVE ENERGY BALANCE
- INCREASES BODY TEMPERATURE.
- GREATER HEAT STRESS WAS ASSOCIATED WITH THE HIGHER MILK PRODUCTION OF COWS ADMINISTERED BST
- A MILD TRANSIENT SWELLING OF 3-5 CM IN DIAMETER MAY OCCUR AT THE INJECTION SITE BEGINNING APPROXIMATELY THREE DAYS AFTER INJECTION, PERSISTING UP TO SIX WEEK



BENEFITS

- INCREASES MILK PRODUCTION BY 10-15%
- INCREASES INCREMENTAL (MARGINAL) PROFITS
- LESS ANIMALS TO PRODUCE THE SAME AMOUNT OF MILK – BENEFITS THE ENVIRONMENT.
- LOW PRODUCING COWS SEEMS TO BENEFIT MORE FROM THE USE OF RBST THAN HIGH PRODUCING COWS
- USING RBST COSTS MONEY AND ITS USE PROVIDES NO BENEFIT ON FARMS WHERE THE PERFORMANCE OF THE HERD IS LIMITED BY INADEQUATE NUTRITION OR POOR QUALITY OF MANAGEMENT
- “THERE SEEMS TO BE THIS FIXATION — HOW MUCH MILK YOU’RE PUTTING OUT, WHEN YOU SHOULD BE CONCENTRATING ON HOW MUCH MONEY YOU’RE MAKING”

RBST USE IN SOUTH AFRICA

- USE IS MOST SUITED TO FARMS ON FULL-FEED SYSTEMS
- FARMS ON PASTURE AS IN KZN, E CAPE AND SOUTHERN CAPE WILL NOT BENEFIT AS MUCH FROM RBST
- IF YOU USE RBST YOU MUST HAVE EXCELLENT MANAGEMENT AND NUTRITION IN PLACE
- IT IS ESTIMATED THAT APPROXIMATELY 10% OF FARMS IN SA USE RBST. SINCE THEY TEND TO BE THE LARGER FARMS IT COULD ACCOUNT FOR UP TO 40% OF MILK PRODUCED.
- THE OVERWHELMING MAJORITY OF THE LARGE MILK BUYERS IN SA REQUIRE THEIR FARMERS TO SIGN AN AGREEMENT THAT PREVENTS THEM FROM USING RBST





CONCLUSION

- NO TEST CAN DIFFERENTIATE IN MILK FROM ORGANIC, PASTURE BASED OR FULL-FEED SYSTEMS AND RBST TREATED COWS.
- TESTING FOR RBST IN MILK HAS PROVEN TO BE PROBLEMATIC.
- NO EVIDENCE THAT MILK FROM RBST-TREATED COWS IS UNSAFE TO CONSUME
- THE EFFECT ON ANIMAL WELFARE IS STILL OPEN TO DEBATE
- RETAILERS ARE SUPPLYING WHAT THE CONSUMER DEMANDS
- IT IS VERY LIKELY THAT THE USE OF RBST WILL BE PROMOTED IN FUTURE DUE TO ITS ENVIRONMENTAL BENEFITS AND INCREASED DEMAND DUE TO A GROWING GLOBAL POPULATION



THANK YOU

