Mass selection diagram

Plant breeders use different methods depending on the mode of reproduction of crops , which include:. The mode of reproduction of a crop determines its genetic composition, which, in turn, is the deciding factor to develop suitable breeding and selection methods. Knowledge of mode of reproduction is also essential for its artificial manipulation to breed improved types. Only those breeding and selection methods are suitable for a crop which does not interfere with its natural state or ensure the maintenance of such a state. It is due to such reasons that imposition of self-fertilization on cross-pollinating crops leads to drastic reduction in their performance. For teaching purpose, plant breeding is presented as four categories: Line breeding autogamous crops , population breeding allogamous crops , hybrid breeding mostly allogamous crops, some autogamous crops , clone breeding vegetatively propagated crops. Certain restrictions caused the mechanisms for self-fertilization partial and full self-fertilization to develop in a number of plant species. Some of the reasons why a self-fertilizing method of reproduction is so effective are the efficacy of reproduction, as well as decreasing genetic variation and thus the fixation of highly adapted genotypes. Almost no inbreeding depression occurs in self-fertilizing plants because the mode of reproduction allows natural selection to take place in wild populations of such plants. Critical steps in the improvement of self-fertilizing crops are the choice of parents and the identification of the best plants in segregating generations. The breeder should also have definite goals with the choice of parents. Self-fertilizing are easier to maintain, but this could lead to misuse of seed. Some of the agronomy important, self-fertilizing crops include wheat, rice, barley, dry beans, soy beans, peanuts, tomatoes, etc. This method of selection depends mainly on the selection of plants according to their phenotype and performance. The seed from selected plants is bulked for the next generation. This method is used to improve the overall population by positive or negative mass selection. Mass selection is only applied to a limited degree in self-fertilizing plants and is an effective method for the improvement of land races. This method of selection will only be effective for highly heritable traits. One shortage of mass selection is the large influence that the environment has on the development, phenotype, and performance of single plants. This can also be an advantage in that varieties can be selected for local performance. Stratified mass selection for ear size over 22 cycles [clarification needed] has drastically altered plant phenotype in the maize population Zacatecas Analysis of yield components revealed that C22 was superior to C0 in grain weight, number of rows per ear, number of grains per row, and total yield per unit area Table 3. Because the two genotypes were phenologically different, planting density optima are probably different for each population. Plant species where normal mode of seed set is through a high degree of cross-pollination have characteristic reproductive features and population structure. Existence of self-sterility, [1] self-incompatibility, imperfect flowers, and mechanical obstructions make the plant dependent upon foreign pollen for normal seed set. Each plant receives a blend of pollen from a large number of individuals each having different genotypes. Such populations are characterized by a high degree of heterozygosity with tremendous free and potential genetic variation, which is maintained in a steady state by free gene flow among individuals within the populations. In the development of hybrid varieties, the aim is to identify the most productive heterozygote from the population, which then is produced with the exclusion of other members of the population. It is the simplest, easiest and oldest method of selection where individual plants are selected based on their phenotypic performance, and bulk seed selection proved to be quite effective in maize improvement at the initial stages but its efficacy especially for improvement of yield, soon came under severe criticism that culminated in the refinement of the method of mass selection. The selection after pollination does not provide any control over the pollen parent as result of which effective selection is limited only to female parents. The heritability estimates are reduced by half, since only parents are used to harvest seed whereas the pollen source is not known after the cross pollination has taken place. This type of selection is a refined version of the mass selection procedure and differs as follows:. Selections are made based on progeny test performance instead of phenotypic appearance of the parental plants. Seed from selected half-sibs, which have been pollinated by random pollen from the population meaning that only the female parent is known and selected, hence the term "half-sib" is grown in unreplicated progeny rows for the purpose of selection. A part of the seed is planted to determine the yielding ability, or breeding value, for any character of each plant. The seed from the most productive rows or remnant seed from the outstanding half-sibs is bulked to complete one cycle of selection. A number of full-sib families, each produced by making crosses between the two plants from the base population are evaluated in replicated trials. A part of each full-sib family is saved for recombination. Based on evaluation the remnant seed of selected full-sib families is used to recombine the best families. Asexual reproduction covers all those modes of multiplication of plants where normal gamete formation and fertilization does not take place making these distinctly different from

normal seed production crops. In the absence of sexual reproduction, the genetic composition of plant material being multiplied remains essentially the same as its source plant. Clones of mother plants can be made with the exact genetic composition of the mother plant. Superior plants are selected and propagated vegetatively; the vegetative propagated offspring are used to develop stable varieties without any deterioration due to segregation of gene combinations. This unique characteristic of asexual reproduction helped to develop a number of cultivars of fruits and vegetables including grapes , apples , pears and peaches. The selection in these crops is restricted to the material introduced from other sources, such as field plantations. The improvement of asexually propagated plants through induced mutations has distinct advantages and limitations. Any vegetative propagule can be treated with mutagens and even a single desirable mutant or a part of a mutated propagule chimera can be multiplied as an improved type of the original variety. Selection, in the case of asexual plants, can be defined as the selection of the best performing plant and the vegetative propagation thereof. Because plants are not totally genetically stable, it can be expected that deviations would occur through the years. Selection is thus an ongoing process where deviants are selected or removed from the selection program. The main purpose of selection is to better the quality and yield of forthcoming plantations. Different approaches can be followed in the selection process of asexual plants, such as mass selection and clone selection from clone blocks. In mass selection there are some factors that must be considered when selecting plants in a mother block, e. Time of selection is a big factor, because you have to select when most of the characteristics of the plant are clearly showing. With asexual perennials the best time is just before harvest. For the best results the selected plant must be evaluated during the next season, when growth-abnormalities, leave disfigurations and virus symptoms are best visualized. Mass selection is done annually on the same plant for a minimum of three years. A plant that does not conform to the requirements in any given year of the selection cycle is discarded from the program. The development and registration of new clones take place by means of local clone selection in old plantations, as well as the importation of high quality clones from abroad, for local evaluation. A clone is the vegetative offspring of one specific mother plant; it does not show any genetic, morphologic or physiologic deviations from the mother plant. Evaluation takes place with the different selected clones after selection. From Wikipedia, the free encyclopedia. This article needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. Categories : Selection Plant breeding. Hidden categories: Articles needing additional references from September All articles needing additional references Wikipedia articles needing clarification from September Namespaces Article Talk. Views Read Edit View history. Help Learn to edit Community portal Recent changes Upload file. Download as PDF Printable version. Add links. This page describes how a mass spectrum is produced using a mass spectrometer. In fact, there are several different designs of mass spectrometer which differ in detail - this page looks at one which is easy to understand. If something is moving and you subject it to a sideways force, instead of moving in a straight line, it will move in a curve - deflected out of its original path by the sideways force. Suppose you had a cannonball travelling past you and you wanted to deflect it as it went by you. All you've got is a jet of water from a hose-pipe that you can squirt at it. Frankly, its not going to make a lot of difference! Because the cannonball is so heavy, it will hardly be deflected at all from its original course. But suppose instead, you tried to deflect a table tennis ball travelling at the same speed as the cannonball using the same jet of water. Because this ball is so light, you will get a huge deflection. The amount of deflection you will get for a given sideways force depends on the mass of the ball. If you knew the speed of the ball and the size of the force, you could calculate the mass of the ball if you knew what sort of curved path it was deflected through. The less the deflection, the heavier the ball. Atoms and molecules can be deflected by magnetic fields - provided the atom or molecule is first turned into an ion. Electrically charged particles are affected by a magnetic field although electrically neutral ones aren't. The atom or molecule is ionised by knocking one or more electrons off to give a positive ion. This is true even for things which you would normally expect to form negative ions chlorine, for example or never form ions at all argon, for example. Most mass spectrometers work with positive ions. Even if a few atoms in a sample of chlorine, for example, captured an electron instead of losing one, the negative ions formed wouldn't get all the way through the ordinary mass spectrometer. But it has been pointed out to me that there is work being done on negative ion mass spectrometers, although they use a different ionisation technique. The ions are then deflected by a magnetic field according to their masses. The lighter they are, the more they are deflected. The amount of deflection also depends on the number of positive charges on the ion - in other words, on how many electrons were knocked off in the first stage. The more the ion is charged, the more it gets

deflected. It's important that the ions produced in the ionisation chamber have a free run through the machine without hitting air molecules. The vaporised sample passes into the ionisation chamber. The electrically heated metal coil gives off electrons which are attracted to the electron trap which is a positively charged plate. The particles in the sample atoms or molecules are therefore bombarded with a stream of electrons, and some of the collisions are energetic enough to knock one or more electrons out of the sample particles to make positive ions. These positive ions are persuaded out into the rest of the machine by the ion repeller which is another metal plate carrying a slight positive charge. Where we are talking about the two plates having positive charges, these charges are in addition to that 10, volts. The positive ions are repelled away from the very positive ionisation chamber and pass through three slits, the final one of which is at 0 volts. The middle slit carries some intermediate voltage. All the ions are accelerated into a finely focused beam. Different ions are deflected by the magnetic field by different amounts. The amount of deflection depends on:. Ions with 2 or more positive charges are deflected more than ones with only 1 positive charge. Lighter ions are going to be more deflected than heavy ones. Only ion stream B makes it right through the machine to the ion detector. The other ions collide with the walls where they will pick up electrons and be neutralised. Eventually, they get removed from the mass spectrometer by the vacuum pump. When an ion hits the metal box, its charge is neutralised by an electron jumping from the metal on to the ion right hand diagram. That leaves a space amongst the electrons in the metal, and the electrons in the wire shuffle along to fill it. A flow of electrons in the wire is detected as an electric current which can be amplified and recorded. The more ions arriving, the greater the current. How might the other ions be detected - those in streams A and C which have been lost in the machine? To bring them on to the detector, you would need to deflect them less - by using a smaller magnetic field a smaller sideways force. If you vary the magnetic field, you can bring each ion stream in turn on to the detector to produce a current which is proportional to the number of ions arriving. The mass of each ion being detected is related to the size of the magnetic field used to bring it on to the detector. The mass is measured on the 12 C scale. The output from the chart recorder is usually simplified into a "stick diagram". You may find diagrams in which the vertical axis is labelled as either "relative abundance" or "relative intensity". Whichever is used, it means the same thing. The vertical scale is related to the current received by the chart recorder - and so to the number of ions arriving at the detector; the greater the current, the more abundant the ion. That means that molybdenum consists of 7 different isotopes. If you want to go straight on to how you use these mass spectra to calculate relative atomic masses you can jump straight to that page by following this link rather than going via the menus below. If this is the first set of questions you have done, please read the introductory page before you start. How a mass spectrometer works The basic principle If something is moving and you subject it to a sideways force, instead of moving in a straight line, it will move in a curve - deflected out of its original path by the sideways force. You can apply exactly the same principle to atomic sized particles. An outline of what happens in a mass spectrometer Atoms and molecules can be deflected by magnetic fields - provided the atom or molecule is first turned into an ion. The sequence is : Stage 1: Ionisation The atom or molecule is ionised by knocking one or more electrons off to give a positive ion. Stage 2: Acceleration The ions are accelerated so that they all have the same kinetic energy. Stage 3: Deflection The ions are then deflected by a magnetic field according to their masses. Stage 4: Detection The beam of ions passing through the machine is detected electrically. A full diagram of a mass spectrometer Understanding what's going on The need for a vacuum It's important that the ions produced in the ionisation chamber have a free run through the machine without hitting air molecules. Ionisation The vaporised sample passes into the ionisation chamber. Acceleration The positive ions are repelled away from the very positive ionisation chamber and pass through three slits, the final one of which is at 0 volts. Deflection Different ions are deflected by the magnetic field by different amounts. The amount of deflection depends on: the mass of the ion. Lighter ions are deflected more than heavier ones. Detection Only ion stream B makes it right through the machine to the ion detector. Detecting the other ions How might the other ions be detected - those in streams A and C which have been lost in the machine? What the mass spectrometer output looks like The output from the chart recorder is usually simplified into a "stick diagram". The stick diagram for molybdenum looks lilke this: You may find diagrams in which the vertical axis is labelled as either "relative abundance" or "relative intensity". Questions to test your understanding If this is the first set of questions you have done, please read the introductory page before you start. Slideshare uses cookies to improve functionality and performance, and to provide you with relevant advertising. If you continue browsing the site, you agree to the use of cookies on this website. See our User Agreement and Privacy Policy. See our Privacy Policy and User Agreement for details. Published on Jan 13, SlideShare

Selection may be practiced in each generations by eliminating undesirable plants. Mass selection permits a large pool of germplasm to be manipulated an carried along. The no. The variety from which the selection was made should also be included as a check to determine if there has been an improvement due to the selection. Improvement of local varieties 2. Purification of existing varieties 5. The phenotypic differences within a pure line is environmental and therefore non heritable. The pure line becomes genetically variable with time due to mechanical mixture, mutation, etc. Pure line selection achieves maximum possible improvement over the original variety. It is easier than hybridisation, required less skill. Used for developing inbreed line and pure line.

Presented by Patel Yogesh D. Mass selection 3. Main features 5. Genetic Basis 8. Types of mass selection 9. Improvement of Desi or local variety Application of mass selection. Purification the existing pure line variety. Steps of Mass selection:- From a variable population, plants with similar but desirable traits are selected ii. The seed from selected plant are composited i. The composited seed is planted in a preliminary yield trial along with standard checks ii. Phenotype of the selected population is clearly evaluated i. Promising selections are evaluated in coordinated yield trials at several locations ii. It out standing raised as a new variety. Seed multiplication for distribution. MERIT Rejection of inferior plants:- Inferior plant are removed before flowering. Use of composite pollen:-pollen are collected then bulked. Modification of mass selection Plant of single genotype Conclusion

Topic 3 mass haul diagram 1. Quantities of materials to be moved and the direction of movement. Areas where earth may have to be borrowed or wasted and the amounts involved. The best policy to adopt to obtain the most economic use of plan. Characteristics of Mass Curve Rising sections of the mass curve indicates areas where excavatingexceeds fill, whereas falling sections indicate where fill exceedsexcavation. Mass Haul Diagram Haul distance The distance from the working face of the excavation to the tipping d point. Average haul The distance from the centre of gravity of the cutting to that of the distance D filling. Freehaul The distance, given in the Bill of Quantities, included in the price of Distance excavation per cubic metre. Overhaul The extra distance of transport of earthwork volumes beyond the Distance freehaul distance. The sun of the product of each load by its haul distance. This must Haul equal the total volume of excavation multiplied by the average haul distance, i. Excess Overhaul payment will depend upon overhaul. Station Metre A unit of overhaul, viz. Borrow The volume of material brought

into a section due to a deficiency. Waste The volume of material taken from a section due to excess You just clipped your first slide! Clipping is a handy way to collect important slides you want to go back to later. Now customize the name of a clipboard to store your clips. Visibility Others can see my Clipboard. Cancel Save. Slideshare uses cookies to improve functionality and performance, and to provide you with relevant advertising. If you continue browsing the site, you agree to the use of cookies on this website. See our User Agreement and Privacy Policy. See our Privacy Policy and User Agreement for details. Published on Aug 25, Clone is the progeny of a single plant, produced by asexual reproduction Clonal selection is the selection of the most desirable members of a clone for continued vegetative propagation rather than for sexual reproduction. The members of a clone keep up genetic constancy. So by clonal selection and continued vegetative propagation, the desirable qualities of plants can be maintained for long. SlideShare Explore Search You. Submit Search. Home Explore. Successfully reported this slideshow. We use your LinkedIn profile and activity data to personalize ads and to show you more relevant ads. You can change your ad preferences anytime. Mass Selection. Upcoming SlideShare. Like this presentation? Why not share! Embed Size px. Start on. Show related SlideShares at end. WordPress Shortcode. Sijo A Follow. Published in: Science. Full Name Comment goes here. Are you sure you want to Yes No. Nitish Srinivas. Vipin Gupta. Venkata Didla. Show More. No Downloads. Views Total views. Actions Shares. No notes for slide. Mass Selection 1. Introduction 3. Negative mass selection 7. Positive mass selection 8. Features Advantages of Mass Selection Phenotype of these varieties is not as uniform as pure line varieties. Disadvantages of Mass Selection Applications of Mass Selection Procedure of Mass Selection: You just clipped your first slide! Clipping is a handy way to collect important slides you want to go back to later. Now customize the name of a clipboard to store your clips. Visibility Others can see my Clipboard. Cancel Save. What is Mass Spectrometry? Mass spectrometry is an analytical technique that involves the study in the gas phase of ionized molecules with the aim of one or more of the following:. Mass spectrometry consists basically of weighing ions in the gas phase. The instrument used could be considered as a sophisticated balance which determines with high precision the masses of individual atoms and molecules. Depending on the samples chemical and physical properties, different ionization techniques can be used. One of the main factor in choosing which ionization technique to be used is thermolability. For samples that are thermolabile such as peptides, proteins and other samples of biological interest, soft ionization techniques are to be considered. The name given to a particular mass spec technique is usually pointing to the ionization method being used. Atomic and molecular masses are assigned relative to the mass of the carbon isotope, 12 C, whose atomic weight is defined as exactly The actual mass of 12 C is 12 daltons, with one dalton is equal to 1. The mass of a molecule or an ion can be presented in daltons Da or kilodaltons kDa. The Mass Spectrometer. Mass spectrometry uses an instrument called a mass spectrometer. Samples can be introduced to the mass spectrometer directly via solids probe, or in the case of mixtures, by the intermediary of chromatography device e. Gas chromatography, Liquid chromatography, Capillary electrophoresis, etc Once in the source, sample molecules are subjected to ionization. Ions formed in the source molecular and fragment ions acquire some kinetic energy and leave the source. A calibrated analyzer then analyzes the passing ions as a function of their mass to charge ratios. The ion beam exiting the analyzer assembly is then detected and the signal is registered. Common ionization method acronyms include:. Ionization Methods. Although we can offer suggestions, it is your responsibility to understand and select the method s appropriate for your research compounds. Electron impact Ionization. EI ionization method is suitable for non thermolabile compounds. The volatility of the sample is required. Sample molecules in vapor state are bombarded by fast moving electrons, conventionally 70 eV energy. This results in ion formation. One electron from the highest orbital energy is dislodged, and as a consequence molecular ions are formed. Some of this molecular ions decompose and fragment ions are formed. The fragmentation of a given ion is due to the excess of energy that it requires within the ionization. Fragment ions can be odd electron or even electron. Molecular ions formed in electron impact ionization are odd electron ions. Odd electron fragment ions are formed by direct cleavage e. Even electron fragment ions are often formed by rearrangement e. Sample can be introduced to the EI source via a gas chromatography device, for example in the case of mixtures, or directly via a solids probe device. The quantities needed for an experiment is usually less than a microgram of material. EI mass spectra, in most of cases, contain intense fragment ion peaks and much less intense molecular ion peak. When the molecular ion peak is not observed in the mass spectrum, chemical ionization can be used in order to get molecular ion information. One helpful rule for determining whether an ion is a molecular ion is the Nitrogen Rule. Nitrogen rule: As indicated above, molecular ions formed in EI ionization are odd electron ions. If their observed mass to

charge ratio is odd, the molecule under investigation contains an odd number of nitrogen atoms. If that mass to charge ratio is an even number, that molecule contains no or even Nitrogen atoms. For organic chemists, Chemical Ionization CI is especially useful technique when no molecular ion is observed in EI mass spectrum, and also in the case of confirming the mass to charge ratio of the molecular ion. Chemical ionization technique uses virtually the same ion source device as in electron impact, except, CI uses tight ion source, and reagent gas. Reagent gas e. Sample ions are formed by the interaction of reagent gas ions and sample molecules. This phenomenon is called ion-molecule reactions. Reagent gas molecules are present in the ratio of about with respect to sample molecules. Positive ions and negative ions are formed in the CI process. Depending on the setup of the instrument source voltages, detector, etc In CI, ion molecule reactions occur between ionized reagent gas molecules G and volatile analyte neutral molecules M to produce analyte ions. These simple proton transfer reactions are true gas-phase Acid-Base processes in the Bronsted-Lowrey sense. To take place these ion molecule reactions must be exothermic. Proton transfer is one of the simple processes observed in positive CI:. One of the decisive parameter in this reaction is the proton affinity. For the reaction to occur, the proton affinity of the molecule M must be higher that the one of the gas molecule. The predominant reactant ions formed are given in the mechanisms shown below. Choice of reagent gas affects the extent of fragmentation of the quasi-molecular ion. In some cases, protonated dimers or other adducts might be seen; loss of H2O followed by protonation or adduct ion formation is seen for some classes of compounds. If the spectrum you observe does not seem to show the proper adduct ions, or shows extensive fragmentation, be wary when you try to interpret the results. Negative Ion Chemical Ionization. Molecular ions observed in negative ion chemical ionization mass spectra are usually M- or [M-H]-. Electrospray Ionization Method. This technique continues to be the method of choice for analyzing thermolabile chemicals. Its capabilities are well documented. It uses an electrical stress between the ESI probe exit e. The process results in the generation of highly charged droplets directly from the infused solution. ESI has been distinguished for its ability to produce multiply charged molecular ions from a large variety of polymers such as protein and DNA fragments; it allows also sensitive detection of singly charged low molecular weight polar species such as drugs and drug metabolites. The formation of positive or negative ions depending on the sign of the applied electrical field occurs in high yield. In the negative ion mode operation peaks corresponding to deprotonated analyte molecules are observed. ESI is described as a very "soft" ionization technique where the surrounding bath gas has a moderating effect on the internal and translational energies of desorbed ions. Soon there after this technique was able to analyze other type of biomolecules, such as oligosaccharides, glycolipids, nucleotides, and synthetic polymers. In this technique, samples are cocrystallized with a UV-absorbing substance called matrix. For example for proteins, the matrix of choice is often sinapinic acid. A nm radiation from nitrogen laser is most commonly used. The laser helps introducing energy into the molecular system in such a way preventing thermal decomposition. MALDI is often used with time-of-flights mass spectrometers TOF due to the pulsing nature of the technique, and the mass range capability. Molecular weights up to few hundreds of daltons could be measured. In my opinion these two techniques are not competitive but complementary. Just to name a few, for high molecular weight species, MALDI leads to the formation of singly charged molecular ions while ESI allows the formation of multiply charged molecular ions. APCI is a technique which creates ions at atmospheric pressure. A sample solution flows through a heated tube where it is volatilized in a mist and sprayed into a corona discharge with the aid of nitrogen nebulization. Sample molecular are ionized by ion molecule reactions from the ambient corona discharge ions. Ions are produced in the discharge and extracted into the mass spectrometer. APCI is best suited to relatively polar, semi-volatile samples. It is possible to use several different physical parameters to achive mass seperation. Common types of mass analyzers are discussed below. Each has advantages and disadvantages. Magnetic Sector Mass Spectrometer. The sector mass spectrometer was one of the most common types of mass analyser and probably the most familiar to the everyday scientist. In the 's, the first commercial mass spectrometers were sector instruments. They consist of some combination of a large electromagnetic, and some kind of electrostatic focussing device. Different manufactures use differing geometries. Figure 1 shows a schematic of a standard 'BE' geometry double focussing instrument. The BE configuration is also called reverse geometry sector mass spectrometer - that is, a dual sector instrument consisting of a magnetic sector followed by an electrostatic sector. Ions enter the instrument from the source bottom left where they are initially focussed. They enter the magnetic sector through the source slit where they are deflected according to the left-hand rule. Higher-mass ions are deflected less than lower-mass ions. Scanning the magnet enables ions of different masses to be focussed on

the monitor slit. At this stage, the ions have been separated only by their masses. Sector instruments had huge commercial successes in the 's and 's as they were the only practical way of obtaining high-resolution data. In the last 20 years or so, with the decreasing prices of FTMS and the development of high-resolution alternatives for example Q-Tof sector instruments are in decline. A time-of-flight mass spectrometer uses the differences in transit time through a drift region to separate ions of different masses. It operates in a pulsed mode so ions must be produced or extracted in pulses. An electric field accelerates all ions into a field-free drift region with a kinetic energy of qV, where q is the ion charge and V is the applied voltage. Since the ion kinetic energy is 0. This schematic shows ablation of ions from a solid sample with a pulsed laser. The reflectron is a series of rings or grids that act as an ion mirror. This mirror compensates for the spread in kinetic energies of the ions as they enter the drift region and improves the resolution of the instrument. The output of an ion detector is displayed on an oscilloscope as a function of time to produce the mass spectrum. The pulsing of the ion gate differentiates ion traps from "beam" instruments such as quadrupoles where ions continually enter the mass analyzer. The time during which ions are allowed into the trap, termed the "ionization duration", is set to maximize signal while minimizing space-charge effects. Space-charge results from too many ions in the trap that cause a distortion of the electrical fields leading to an overall reduction in performance. The ion trap is typically filled with helium to a pressure of about 1 mtorr. Collisions with helium dampens the kinetic energy of the ions and serve to quickly contract trajectories toward the center of the ion trap, enabling trapping of injected ions. Trapped ions are further focused toward the center of the trap through the use of an oscillating potential, called the fundamental rf , applied to the ring electrode. An ion will be stably trapped depending upon the values for the mass and charge of the ion, the size of the ion trap r , the oscillating frequency of the fundamental rf w , and the amplitude of the voltage on the ring electrode V. A quadrupole mass filter consists of four parallel metal rods arranged as in the figure below. The applied voltages affect the trajectory of ions traveling down the flight path centered between the four rods. For given dc and ac voltages, only ions of a certain mass-to-charge ratio pass through the quadrupole filter and all other ions are thrown out of their original path. A mass spectrum is obtained by monitoring the ions passing through the quadrupole filter as the voltages on the rods are varied. Two opposite rods ha. It is often used to analyze individual components in a mixture. This technique adds specificity to a given analysis. The product ions are then detected. This is a powerful way of confirming the identity of certain compounds and determining the structure of unknown species. Separation Methods for Coupling with Mass Spec. Info for Mass Spectrometry Tutorial Dr. Mass spectrometry is an analytical technique that involves the study in the gas phase of ionized molecules with the aim of one or more of the following: Molecular weight determination Structural characterization Gas phase reactivity study Qualitative and quantitative analysis of components in a mixture. The Mass Spectrometer Mass spectrometry uses an instrument called a mass spectrometer. Chemical Ionization For organic chemists, Chemical Ionization CI is especially useful technique when no molecular ion is observed in EI mass spectrum, and also in the case of confirming the mass to charge ratio of the molecular ion. Negative Ion Chemical Ionization Three mechanisms can be underlined: Electron capture reaction due to attainment of slow moving, low energy "thermalized" electrons which may be transfered more efficiently to sample molecules. Electron transfer from ionized reagent gas e. NH2- may transfer an electron to a molecule having a greater electron

sebo x4 parts diagram
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2004 silverado fuel line replacement

affinity than NH2. Reagent gas ions participate in true CI reactions e. This results in the ability of analyzing very high molecular weight species using the most available mass analyzers e. ESI is an atmospheric pressure process. Although it is best to remove them for better performance. Analysis of Ions It is possible to use several different physical parameters to achive mass seperation. Time-of-Flight Mass Spectrometry TOF-MS A time-of-flight mass spectrometer uses the differences in transit time through a drift region to separate ions of different masses. Theory : K. Components of the mixture are separated based on their affinity difference with the bonded phase. Retention times, molecular masses, and fragmentation patterns are recorded. CZE-MS: This method is based on diffrences of electrophoretic mobility of samples when the fused silica column is under a potential difference between injection side and detector side. It is based on diffrerences in isoelectric points of analytes.