

Table 16.1 Examples of different chemical biocides and their uses.

Biocide group	Examples	Spectrum of activity	Mode of action	Formulation issues	Commercial uses
Acridines	Aminacrine Acriflavine Proflavine	G + ve and G - ve cells Not sporicidal	Interfere with nucleic acid function	More effective at alkaline pH	Limited use in treatment of infected wounds
Alcohols	Ethanol Isopropanol Benzyl alcohol Bronopol Chlorbutanol Phenethyl alcohol Phenoxyethanol	G + ve and G - ve cells and fungi Not sporicidal and have low virucidal activity	Disrupt cell membranes	High concentration exponents Inactivated by organic matter Flammable	Widely used as antiseptics and preservatives
Aldehydes	Formaldehyde Glutaraldehyde Orthophthalaldehyde	Good activity against G + ve and G - ve cells endospores, fungi and viruses	Cross link proteins by interacting with amino and other group	Relatively high toxicity, particularly glutaraldehyde	Formaldehyde and orthophthalaldehyde used as disinfectants for medical equipment
Amidines	Propamidine Dibromopropamidine	Mainly G + ve cells and fungi Less active against G - ve cells and spore formers	Mode of action uncertain Inhibit oxygen uptake and induce amino acid leakage	Activity reduced by low pH and in blood and serum	Limited use in topical wound treatment
Biguanides	Chlorhexidine Alexidine Polyhexanide	Good activity against G + ve but less against G - ve cells and fungi Not sporicidal	Disrupt cell membranes	Incompatible with negatively charged excipients in formulation	Widely used as medical and veterinary antiseptics
Chelating agents	Ethylenediamine tetra-acetic acid	G - ve cells only	Increase permeability of cell wall of G - ve bacteria	Potentiates the effects of several antibacterial agents	Limited use as antibacterial agents Used to stabilize formulations

(continued)

acridines: ال مهم نحفظ ال aminacrine

alcohols: ما بقدر اعقم جرح بكحول وحوليه دم، هاد
inactivated by organic matter هو معنى

aldehydes: مشكلتها كتيبير سامة، ويتحول البرةتين لاشي ثاني
عشان هيك بستخدموها بالتحنيط
ولما بدي استخدمها بتعقيم المعدات للزم اتبع بروتوكولات معينة

amidines: بشتغلوا بوسط قاعدي

biguanides: chlorhexidine نحفظ اول واحد بس
وشحنتها موجبة

chelating agents: edta اختصار المثال

الاكشن تبعهم ضد الاورجانسم كتيبير خفيف

chelation: بتمنع انه المعادن والايونات من انها

تخرب المستحضر

Table 16.1 (Continued)

Biocide group	Examples	Spectrum of activity	Mode of action	Formulation issues	Commercial uses
Esters	Methyl, ethyl, butyl, propyl and benzyl parabens	Mainly G + ve bacteria and fungi Less active against G - ve cells	Not well understood Disrupt membrane transport processes; inhibit nucleic acid synthesis and inactivate key enzymes	Activity increases with alkyl chain length but solubility decreases Partition into oil phase of emulsions	Widely used as preservatives in pharmaceutical industry
Halogens	Chlorine Hypochlorites Iodine Iodophors	Broad antimicrobial spectrum Sporicidal	Cause enzyme and protein damage by interacting with amino and thiol groups	Can be irritant and staining	Used in skin disinfection and as general disinfectants
Isothiazolones	Range of commercial mixtures	Broad spectrum antibacterial, fungicidal	Inhibit active transport and glucose oxidation by binding to thiol groups on enzymes	Water soluble, pH stable and biodegradable	Mainly used as preservatives
Metals	Copper Mercury Silver Phenylmercuric nitrate (PMN) and Phenylmercuric acetate (PMA) Thiomersal	Phenylmercuric nitrate (PMN) active against G + ve and G - ve cells and fungi Not sporicidal	Silver binds with thiol groups on proteins and enzymes Interacts with bases on DNA	Toxicity problems with mercurials in particular. PMN incompatible with a number of common excipients Activity of silver depends on presence of Ag ⁺ ion	PMN and PMA limited use as preservatives Silver used as topical antiseptic and wound treatment
Organic acids	Benzoic acid Sorbic acid	Mainly active against fungi More limited activity against bacteria	Uncoupling agents Prevent uptake of substrates requiring proton motive force for transport	Activity highly pH dependent Only active at pH lower than 5	Used as preservatives particularly in the food industry
Peroxygens	Hydrogen peroxide Peracetic acid	Broad spectrum activity Sporicidal	Oxidation of functional groups on proteins	Hydrogen peroxide unstable	Used as antiseptics and disinfectants

(continued)

اللي عليه ✓ هو المطلوب ٨٨

موجودين بكثرة، اسم المجموعة اله علاقة بالتركيبه الكيميائيه: esters
للمجموعة، ال benzyl بطل مسموح نستخدمه، الباقي عادي
بنستخدمهم ، اكثر شي بنستخدمهم ضد الجرام نيجاتيف، كثير مهم
نعرف ال formulation issues، هاي المجموعة بتستخدم اكثر اشوي
كمواد حافظه والاكثفيتي تبعها كبيرة داخل المواد ال water soluble،
بس لما استخدمها في emulsion, رح تكون موجوده اكثر في ال oil
. phase
سلسله الالكيل رح تزيد كل ما زدنا كربونه ابتطاء من الميثيل ووصولاً
للبروبيل، فكل ما زادت الاكيل تشين رح تزيد الاكثفيتي.

halogens: iodophors: معه عبارة عن ايوداين
الهم broad antimicrobial spectrum, وبتقدر تقتل ال spores
مشكلتهم انهم بخربوا اللون يعني اليود بيصبغ والكلور بيمسح اللون.

isothiazolones: عليها تقييم كبير لاستخدامهم لانهم بيعملوا
irritaion لكتير ناس، وحساسيه

biodegradable: مش زي degradatiin لحالهم بيصيرلهم
البلاستيك مثلا ما بنقدر نتخلص منه.

metals: احفظوا الاختصارات

مهم الفورمليشن اشوز، وضروري نعرف انه الاكتفيتي بتكون مع

Ag الايون مو الذرة العادية.

وهاد الايون كتير بنستخدمه كمطهر

organic acid: كتير مستخدمات حتى بالمعلبات

uncharged مشكلتهم انه عشان يشتغلوا لازم يكونوا

nonpolar عشان يقدرنا يمرروا عبر غشاء الخلية ويكونوا

peroxygens: free radicals مشكلتها بتطلع

اللي هي ذات أوكسجين أحادية أو مركب هيدروكسيل OH

ناقصة منه الكترون

فلما بدنا تعوض الالكترون الناقص رح تاخده من اي خلية قدامها

وتخرب الخلايا

الهيدروجين بيروكسايد بسرعة بيتأكسد عشان هيك هو

unstable

Table 16.1 (Continued)

Biocide group	Examples	Spectrum of activity	Mode of action	Formulation issues	Commercial uses
Phenols	Phenol Chlorocresol Chloroxylenol Triclosan	G + ve and G - ve cells. Slowly active against spores and acid-fast bacteria	Disrupt cell membranes Cause general cytoplasmic coagulation	High concentration exponents Some have limited solubility and can be adsorbed to polymers	Used as antiseptics, disinfectants and preservatives
Quaternary ammonium compounds	Benzalkonium chloride Benzethonium chloride Cetrimide Cetylpyridinium chloride	Broad spectrum antibacterials More active against G + ve than G - ve Some antiviral and antifungal activity Not sporicidal	Disrupt cell membranes	Incompatible with negatively charged excipients Benzalkonium chloride can cause sensitization	Widely used as antiseptics, disinfectants and preservatives
Quinolines	8-hydroxyquinoline Dequalinium chloride	Active against G + ve bacteria Less active against G - ve cells Some antifungal activity	Rapid uptake into cells Disrupt nucleic acid function	Some have low water solubility	Used as antiseptics and formulated in lozenges for throat infections
Anionic surfactants	Sodium lauryl sulphate	Weak antimicrobial properties	Disrupt cell membranes	Can interact with positively charged excipients in formulation	Limited use as antibacterial agents Used for detergent properties

- phenols: عليه تقييد استخدام triclosan ال
مشكلتهم انهم بغلبوا بموضوع ال solubility, وكم ان ما
بشتغلوا مع دوا على شكل polymers لانها رح تلتصق
على سطحه وهاد الاشئ بقلل فعاليتها .

BKC اول واحد اختصاره : NH_4^+

اي اشئ شخنته سالبة ما بستخدمه معه ، ال BKC هو اول واحد
بيعمل sensitization .

يعني ملبس بخفف التهاب : lozenges: quinolines:
الحلق

بيشتغلوا بانهم بيزيدوا : anionic surfactent:
antimicrobial تبع الغشاء فبساعدوا انه ال permeability
يدخل لجوا، وطبعاً هدول شحنتهم سالبة فلانم انتبه

sarah khader



Artery Academy