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RESEARCH ARTICLE

Antimicrobial Action of *Allium sativum* and *Elettaria Cardamomum against Streptococcus Mutans and Lactococcus Raffinolactis* Detachment of Tooth Rot

Ashraf Sami Hassan[1*], Afrah Abdulridah Ajeel[1], Rabab Saleh Mohammad[2], Raghad Akram Fadel[3]

1. *Department of Biology, College of Science, Mustansiriyah University, Baghdad- Iraq.*
2. *Biologist, Laboratories department, Imamein Kadhimein medical city, Baghdad, Iraq.*
3. *B.Sc. Biologist, department of biology, College of science, university of Mosul, Mosul-Iraq.*

***Corresponding Author: Ashraf Sami Hassan**

Abstract

Twenty specimen from individuals endure tooth rot in various age from Hospitals of the city of Baghdad, segregate analyze of the phenotypic qualities by development of these microorganisms on the way of life media, minute determination and tests biochemical depending on a framework vitek 2 ,where the outcomes demonstrated the microscopic organisms that cause tooth rot is *Streptococcus mutans* and *Lactococcus raffinolactis* in equivalent extents, natural adequacy of watery concentrates of *Allium sativum* and *Elettaria cardamomum* against the microbes, from the outcomes demonstrate that disengages of *Streptococcus mutans* was the most touchy to the fluid concentrate comparator with microbes *Lactococcus raffinolactis* that indicated less impact towards our concentrates under review, On the other hand, the outcomes demonstrated that the fluid concentrate of the *Elettaria cardamomum* it is best against the development of bacterial species under review contrasted and fluid concentrate of *Allium sativum*.

Keywords: *In vitro, Herbal extracts, Antimicrobial activity, Dental pathogens.*

Introduction

Dental caries is an irresistible illness caused by acidogenic microorganisms, may prompt to disintegration of lacquer and dentin, [coronal caries] and cementum and dentin (root caries). Patients shift in their powerlessness to caries prepare and in overseeing dental caries. There is either a gentle or a direct test to caries assault, normally influencing profound pits and crevices and a proximal surfaces [1] Caries can be arranged by area, etiology, exercise rate, and hard tissue influences [2, 3].

Side effects may be associated with agony and eating problems [4, 5].Disadvantages may include tissue irritation around the tooth, tooth misfortune, and arrangement for disease or boiling [6]. The microscopic organisms separate the hard tissues of the teeth (veneer, dentin and cementum) by making corrosive from nourishment flotsam and jetsam or sugar on the tooth surface [7]. Straightforward sugars in sustenance are these microscopic organisms 'essential vitality source. Approximately 2.43 billion people around the world [36% of the population] have dental caries in their long-lasting teeth [8,9] .The mouth contains a wide variety of oral microorganisms, but only a few specific species of bacteria are accepted to produce dental caries, including Streptococcus mutants and Lactobacillus.

After the aging of dietary sugars, these life forms can create large amounts of lactic corrosive and are impervious to the antagonistic impacts of low pH, the basic properties of cariogenic microscopic organisms [9, 10].

As root surface cement is more effectively demineralized than lacquer surfaces, a wider range of microbes may result in root caries including *Lactobacillus acidophilus, Actinomyces spp, Nocardia spp*., and Streptococcus mutants.

In a sticky, rich shaded mass called plaque, microorganisms gather around the teeth and gums, filling in as a biofilm. These strains of bacteria, most notably S. Mutants can be purchased by a child from a guardian's kiss or by pre-masticated nutrition [11].Oral microbes incorporate specifically *bacteroids streptococci, lactobacilli, staphylococci, corynebactiria*, and various anaerobes. With the presence of the teeth in the midst of the main year, *Streptococcus mutans* and *Streptococcus sanguinis* colonize the dental surface and gingiva [12].

The worldwide requirement for options for anticipation and treatment alternatives and oral disorders that are protected, powerful and conservative stems from the rise in disease frequency, the expended resistance of pathologic microscopic organisms to currently used anti-infection agents and chemothirapeutics, the delicate contamination of immunocompramised individuals and contempllative maneuvers [13, 14]. Despite the fact that some operators are monetarily accessible, these chemicals may change oral microbiota and have undesirable symptoms such as heaving, loose intestines and recoloring of the tooth [15, 16].

For example, bacterial impermeability to most (if not all) of the anti-infection agents generally used to treat oral contamination (penicillins and cephalosporins, erythromycin, antibiotic and metronidazole) has been recorded [17]. Other antibacterial operators utilized as a part of the aversion and treatment of oral maladies, including cetylpyridinium chloride, chlorhexidine, amine fluorides or items containing such specialists, are accounted for to display lethality, cause recoloring of teeth or on account of ethanol regularly found in mouthwashes have been connected to oral disease[18].

Henceforth, the look for option items proceeds and normal phytochemicals detached from plants utilized as a part of conventional drug are considered as great contrasting options to engineered chemicals [19].

Current medication, however, makes use of many plant-inferred mixtures as the reason for proven pharmaceutical drugs, and attempts by phytotherapy to apply current adequacy testing measures to herbs and drugs obtained from characteristic sources. In some cases, the extent of the natural solution involves contagious and honey bee items, as well as minerals, shells and certain parts of the creature [20].

Today there are no less than 120 unmistakable concoction substances got from plants that are considered as imperative medications right now being used in at least one nation on the planet. A few of the medications sold today are straightforward manufactured alterations or duplicates of the actually got substances [21]. *Elettaria cardamamum* ordinarily known as cardamom is a lasting herb, indigenous to India, Pakistan, Myanmar and Sri Lanka [22].

Notwithstanding its wide use for culinary reason, cardemom has been utilized as a part of conventional prescription for asthma, blockage, colic, looseness of the bowels, dyspepsia, hypertension, epilepsy and is viewed as valuable as antibacterial, antifungal, antiviral, carminative, diuretic and stomachic [23, 24].

Phytochemical ponders uncovered that cardamom contains α-terpineol, myrcene, heptane, subinene, limonene, cineol, menthone, α-pinene, ß-pinene, linalol, nerolidol, ß-sitostenone, phytol, eugenyl acetic acid derivation, bisabolene, borneol, citronellol, geraniol, geranyl acetic acid derivation, stigmasterol and terpinene [25, 26].

The seeds contain unstable oil, utilized for enhancing cakes, curries, bread and other culinary purposes, such as seasoning espresso and ice cream parlor [27]. Garlic has been utilized for quite a long time worldwide by different social orders to battle irresistible malady. Garlic can be given as cases and powders, as dietary supplements, and therefore contrast from ordinary nourishments or sustenance fixings.

Louis Pasteur was the first to portray the antibacterial impact of onion and garlic juices [28]. Allium sativum, usually known as garlic, is one of proposed other options to antibiotics, with anti-bactirial impacts against an

extensive variety of microbes, including Escherichia metal Details, Lactobacilli, *Helicobacter pylori*, *Pseudomonas aeruginosa*, *Klebsiella pneumonia*, and *Mycobacterium tuberculosis* [29, 30]. *Streptococcus mutans* are receptive to garlic separate, with the base restraint fixation extending from 4 to 32 µg/ml [31].

In correlation with antibiotic medication, unadulterated garlic extricate demonstrates more productive antimicrobial movement against cercal microbes [32].Garlic remove likewise displays antifungal and antiviral movement [33, 34].

For example garlic is accounted for to a viable fungicidal operator against *Candida albicans*, a parasite that is normally present in the oral pit , Garlic is additionally recommended to act synergistically with anti-infection agents [35].These pharmacological properties have been ascribed to the nearness of allicin and thiosulphonates [36,37].Elnima et al [38].Have demonstrated that 25% garlic separate has great antimicrobial action against human oral microorganisms and have recommended that mouthwash containing 10% garlic concentrate can essentially decrease the level of oral microbes.

Materials and Methods

Test Microorganisms

Twenty isolates of *Streptococcus mutans*, *Lactococcus raffinolactis*, were collected from Hospitals of the city of Baghdad from individuals experience the ill effects of tooth rot of various ages and both genders, the life forms were recognized by standard microbiological strategies including provincial attributes, morphological qualities and biochemical attributes [39], and the microorganisms Identifications by VITEK 2 smaller framework.

The VITEK 2 conservative framework is exceedingly robotized and takes into account the fast, precise distinguishing proof of some bacterial strains in as meager as two hours. Altogether, the framework's database is fit for recognizing an assortment of microorganisms introduced in Tables 1 and 2.

Table 1 Diagnosed *Streptococcus mutans* by Vitek2 compact system.

Identification information			Analysis time: 8.25 hours			States: Final		
Selected organism			90% probability *Streptococcus mutans* Bionumber: 045131324200011					
ID analysis massage								
Biochemical details								
2	AMY	-	4	PIPLC	-	5	dXYL	-
8	ADH1	-	9	BGAL	-	11	AGLU	+
13	APPA	+	14	CDEX	-	15	AspA	+
16	BGAR	+	17	AMAN	-	19	PHOS	-
20	LeuA	+	23	ProA	+	24	BGURr	-
25	AGAL	+	26	ByrA	-	27	BGUR	-
28	AlaA	+	29	TyrA	+	30	dSOR	-
31	URE	-	32	POLYB	+	37	dGAL	-
38	dRIB	-	39	ILATk	-	42	LAC	+
44	NAG	-	45	dMAL	+	46	BACI	-
47	NOVO	-	50	NC6.5	-	52	dMAN	-
53	dMNE	-	54	MBdG	-	56	PUL	-
57	dRAF	(-)	58	O129R	-	59	SAL	-
60	SAC	+	62	dTRE	-	63	ADH2s	-
64	OPTO	+						

Table 2 Diagnosed *Lactococcus raffinolactis* by Vitek2 compact system.

Identification information			Analysis time: 5.00 hours			States: Final		
Selected organism			98% probability *raffinolactis* Bionumber: 043011344711511			*Lactococcus*		
ID analysis			massage					
Biochemical details								
2	AMY	-	4	PIPLC	-	5	dXYL	-
8	ADH1	-	9	BGAL	-	11	AGLU	+
13	APPA	+	14	CDEX	+	15	AspA	-
16	BGAR	-	17	AMAN	-	19	PHOS	-
20	LeuA	+	23	ProA	-	24	BGURr	-
25	AGAL	+	26	ByrA	-	27	BGUR	-
28	AlaA	+	29	TyrA	+	30	dSOR	-
31	URE	-	32	POLY B	-	37	dGAL	+
38	dRIB	-	39	ILATk	-	42	LAC	+
44	NAG	+	45	dMAL	+	46	BACI	+
47	NOVO	+	50	NC6.5	-	52	dMAN	-
53	dMNE	+	54	MBdG	-	56	PUL	-
57	dRAF	+	58	O129R	-	59	SAL	+
60	SAC	+	62	dTRE	-	63	ADH2s	-
64	OPTO	+						

Plant Sample Collection

Natural specimen consisting of two unique plants: Allium sativum and Elettaria cardamomum. They were collected, recognized, and described by a taxonomist from the neighborhood advertisement. Gathered plants were completely washed, dried and crushed in powdered form to separate chilly water readiness and put away at 4C° in water / air proof jugs.

Preparation of the Cold Water Extract

About 100 grams of plant powder was broken down into 100 mL of refined water, placed in the hatchery at 28-30C° for24 hours, then separated by channel paper. The blend was then centrifuged for 10 minutes at 3000 rpm; the supernatant separated by Whitman No.1 channel paper, then disappeared at 37 C° for 48 h in the hatchery to get the unrefined concentrate, kept at 4 C° in a clean vial. For both plants, the strategy was connected [40].

Test the Sensitivity of Bacteria to Antibiotics

Standard technique utilized by the trial of the affectability of the secludes to anti-microbial utilizing Miller Hinton Agar. At that point it has perused the outcomes measuring the restraint zones in mm, and translated the outcomes as expressed in NCCLs2002 [41].

The Antimicrobial Activity

The antimicrobial movement of concentrate was controlled by agar well dissemination technique against five detaches of every *Streptococcus mutans* , and *Lactococcus raffinolactis* isolate as depicted by Magmmod *et al*.[42].In this strategy, the Muller-Hinton Agar plate [Hi Media, Mumbai, India] refined an immaculate 24hour development separate.

The plates were allowed to dry and a measurement 8.0 mm sterile stopper borer was used to exhaust five wells in each plate of agar. Five rough concentrate convergences was achieved by dissolving 1 gram of unrefined concentrate in 2mL of refined water to get 500 mg/mL separated in

Millipore channel paper and used as stock to set up alternative fixations [100,200,300,400] mg/ml. A volume of 10µL of each fixation was connected to the Muller-Hinton Agar plate by micropipette in the wells. Controlled filled in refined water [43].

Results and Discussion

The outcomes appeared after the specimens culture and analyzed that the most

imperative bacterial reasons for tooth rot are *Streptococcus mutans* and *Lactococcus raffinolactis* in equivalent extents, they contain every one of the examples on these sorts of microscopic organisms, where it originated from such a result.

The asymptotic to the specified [44] where it was expressed that the biggest extent of the microorganisms that cause tooth rot back to microbes *Streptococcus mutans* took after Lactobacillus likewise concurred these outcomes with Thompson, who said that the nearness of these microorganisms in people when dull sustenance's and sugar admission and subsequently help dismissed teeth which prompts to corruption of the teeth and that demonstrated Dental caries is the most widely recognized irresistible illness influencing people.

The essential causative specialists are a gathering of streptococcal animal groups by and large alluded to as the mutans streptococci of which *Streptococcus mutans* and *Streptococcus sobrinus* are the most critical operators of human caries [45]. The utilization of these anti-infection agents were a test affectability of these microscopic organisms to anti-infection agents, as appeared in the Table 3 to show contrast these outcomes and the aftereffects of the impact of plant concentrates under review.

Through the outcomes that we have risen which show the effect of plant concentrates under review we reason that both concentrates had an unmistakable impact against development the bacterial species contrasted and the impact of anti-microbial on the same bacterial appeared in Tables 4 and 5.

Table 3 The effect of antibiotics on the bacterial species and diameters of inhibition zones in mm.

Antibiotics / Bacterial isolates	No. isolation	AZM	AX	CRO	F	TPZ
Streptococcus mutans	1	2.5	0	0	0	23
	2	0	0	0	0	0
	3	30	0	0	0	20
	4	0	0	0	10	0
	5	33	20	15	24	20
Lactococcus raffinolactis	1	28	28	20	27	30
	2	36	30	0	30	30
	3	33	0	0	0	24
	4	30	0	0	0	24
	5	32	0	0	0	22

AZM (15): azithromycin; AX (25): Amoxicillin; CRO (30): ceftriaxone; F (300): Nitrofurantoin; TPZ (110): Piperacillin/tazobactam.

Table 4 The effect of aqueous extract of *Allium sativum* (garlic) on the bacterial species and diameters of inhibition in mm.

Concentrations of aqueous extract	Diameters of inhibition zones (mm)									
	Streptococcus mutans					*Lactococcus raffinolactis*				
	1	2	3	4	5	1	2	3	4	5
500	15	25	28	30	20	12	14	13	16	11
400	12	23	25	28	18	10	13	12	15	10
300	10	20	23	25	15	9	12	9	12	9
200	0	17	22	23	14	0	11	0	10	0
100	0	12	15	18	12	0	10	0	9	0

Table 5 The effect of aqueous extract of *Elettaria cardamomum* (green cardamom) on the bacterial species and diameters of inhibition in mm.

Concentrations of aqueous extract	Diameters of inhibition zones (mm)									
	Streptococcus mutans					*Lactococcus raffinolactis*				
	1	2	3	4	5	1	2	3	4	5
500	22	30	28	33	20	19	20	17	20	17
400	18	25	23	32	18	16	12	12	14	16
300	13	22	18	30	15	10	11	10	12	15
200	12	20	15	25	14	9	9	10	11	12
100	10	15	10	10	12	0	0	0	0	0

It additionally concurred with the review directed by Behzad Houshmand *et al* [46]. Completed Antibacterial exercises of four unique concentrate of garlic [5%,10%,20%and100%] were evaluated against *Streptococcus mutans, Streptococcus sanguis, Streptococcus salivarius, Pseudomonas aeruginosa and lactobacillus* spp. Use strategy for plate dispersion. Papers were individually used as positive and negative controls to absorb 0.2 percent chlorhexidine gluconate and saline concentration. The information was subjected to numerous tests of one-way ANOVA and the Tukey at a centrality level of 5 percent. Comes on: All test materials have repressed every single bacterial strain. For the restraint zones of the various garlic concentrate centralizations were not entirely extraordinary. *mutans, S.* Blood, and *S. salivarius.* For *P. aeruginosa* and spp. *lactobacillus.* This review coincided with Ghada A. Ibrahim and Wesal A. Al-Obaidi's discoveries of 2013 [47] which demonstrated that Herbs are by and large broadly investigated to discover alternatives to synthetic antibacterial agents.

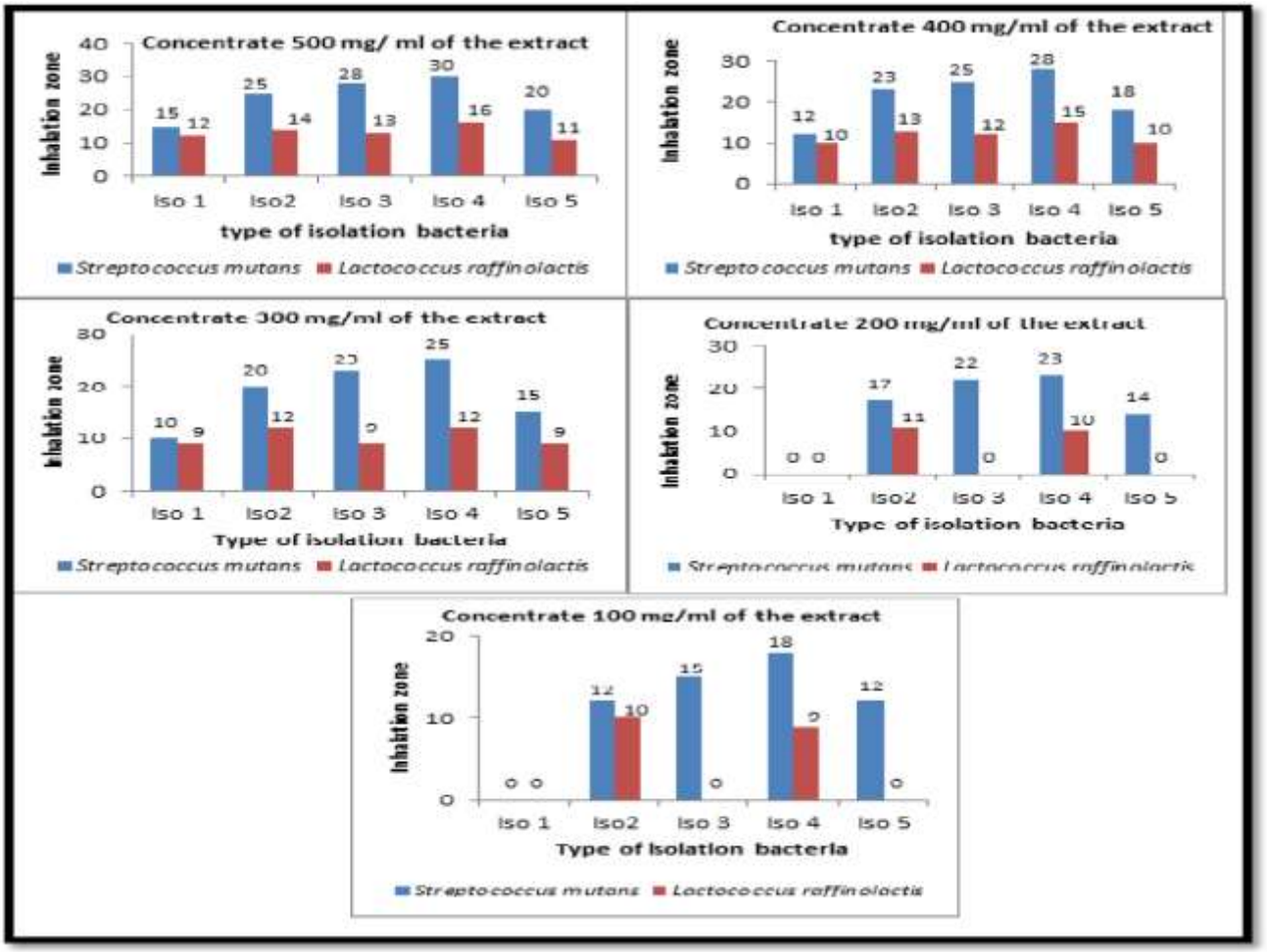

Fig.1: The impact of fluid concentrates of *Allium sativum* [garlic] on the bacterial species

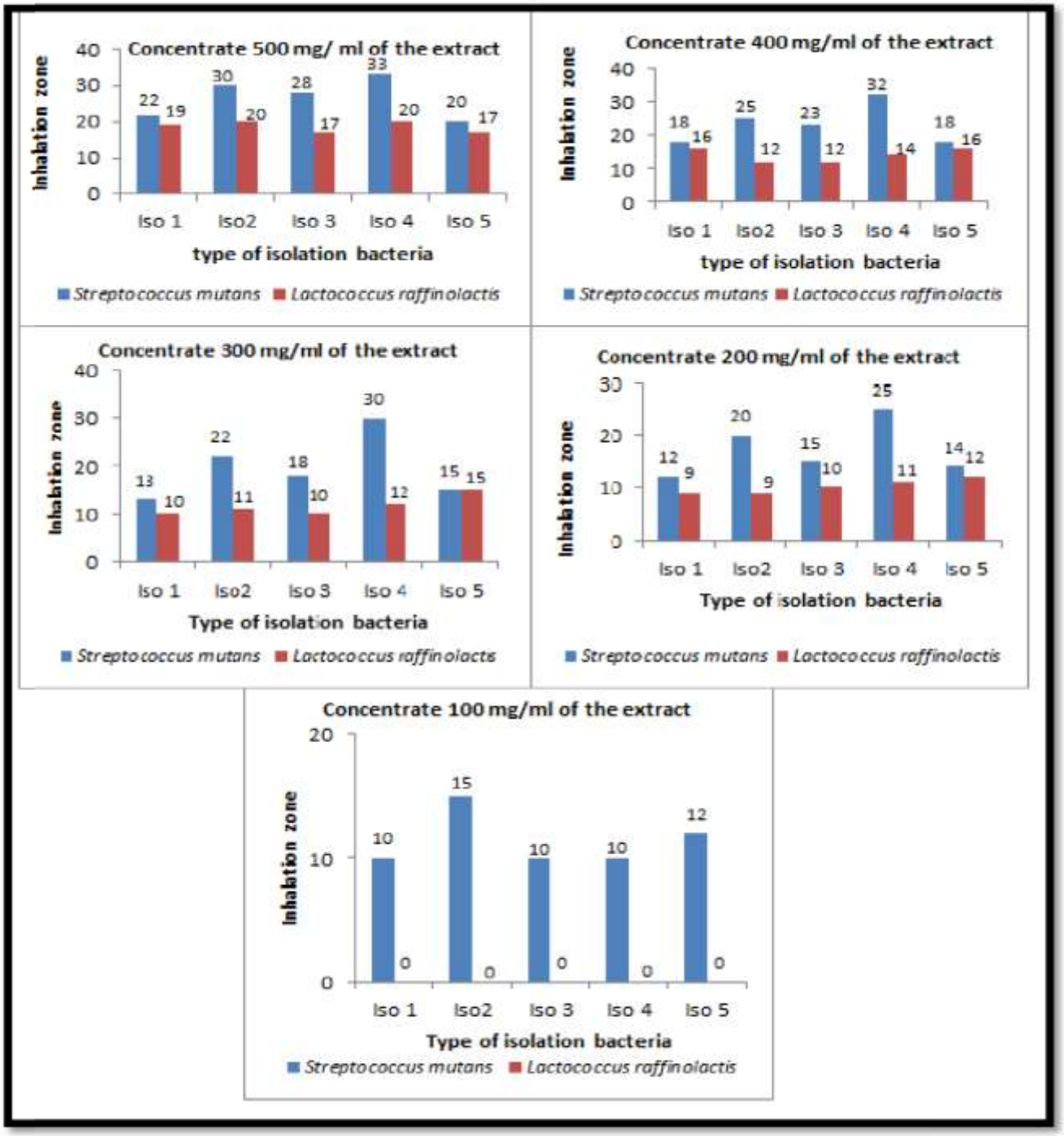

Fig.2 The impact of fluid concentrates of *Elettaria cardamomum* on the bacterial species

Conclusions

The most vital bacterial reasons for tooth rot are *Streptococcus mutans* and *Lactococcus raffinolactisin* square with extents through the outcomes that we have developed which demonstrate the effect of plant concentrates under review we presume that both concentrates had an unmistakable impact against development the bacterial species contrasted and the impact of anti-microbial on the same bacterial.

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