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Research Paper

A Comparative study of morphological , physiological and chemical properties of leafs and steam samples of (*E.gomphocephala*) (Tuart)plant growing at coastal (Derna city) and Mountain (Al-Bayda city) regions

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ABSTRACT
*A comparative of morphological , physiological and chemical study was carried out on (**E.gomphocephala**) Plant growing at two different regions of coastal (Derna city) and Mountain (Al-Bayda city) locations.Leafs and steams of each plant were selected in this study. Some of morphological , physiological and chemical properties (leafs area, fresh weight, dry weight, leafs color , plant length steam diameter , chlorophyll a,b and starch) beside some of chemical constituents (minerals and metals) were estimated .The studies which designed on the estimate the effect climate changes on the selected properties in this study , where the same plant is grow in different regions) One at the coastal area and the anther one at the mountain regions of Al –Bayda city). The results showed different values of the most selected properties , the study concluded that , these changes in the properties are mainly attributed to the effect the different climate in the two regions. Therefore the study highly recommending to study other plants which growing in two different area (as semi desert and coastal or mountain locations) especially of Al –Gabal Al –Akhder region which have a huge number of these plants.*

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I. Introduction:

Plants have been playingafundamental partwithinthe advancementof humanculture.Asa source of pharmaceutical. Therapeuticplantshavecontinuously beenatbleedingedgeforallintents and purposes all societies of civilizations. Therapeutic plants are respected as wealthyassets ofconventional solutions and fromthese plants numerous oftheadvanced drugsarecreated.Forthousands ofa long-timerestorativeplant have beenutilizedto treatwellbeing disarranges,toincludeflavorandmoderate nourishmentandtoavoid illnessesplagues.Theauxiliarymetabolitesdeliveredbytheplantsareas aruledependableforthenaturalcharacteristicsofplantspeciesutilized allthroughtheworld (Dar*et,al*.,2017).

European settler's benefited from Tuart, using them for cattle grazing,fuelandtimber(Cunningham,1998;Fox&Curry,1980;Kay, 1985).Tuartwasoneofthefirstmajortimbersexportedfrom Western Australia(circa1800)toEnglandFavoredfor itsinterlocking grainand tight textureitis one of Australia'sstrongestandheaviesttimberswitha density around1020kt^3(Boland*etal*.,2006;Fox&Curry,1980).Tuart usesincludedwagonwheels,toolhandles,railway carriagedeckingand propeller shafts(Hunter, 2000).

Tuartremainsimportantforplantations, beingeasily cultivatedfrom seedandcoppicewithfullestablishmentwithin 30years (Keighery, 2002).PlantationTuart hasbeenusedforfuel,flooring,framing, manufacturedboardsandposts .Tuartbeing usedfor sand stabilization,wheatbeltwindbreaksandafforestation in semiarid lands, becauseitistolerant tocalcareous, salineandwaterloggedsoils.Inaddition,Tuartflowersareknowntoyieldgoodquality nectar, producinglightcolouredhoney withpleasingflavorandfinegrain (Gardner, 1987).This study aims to comparative some of morphological , physiological and Chemical studies of leafs and steams of plant to observe the effect of the different climate on the selected properties.

Experimental Part:
The area of study:

Thestudy area (Figure ,1) islocatedat AGabalAl-Akhadar MountainintheeasternregionsofLibya (Derna and Al-bayda) regions.Itlies betweenlatitudes22°38′0″Nand32°46′0″E.(El-Barasi& Saaed, 2013). TheDernaarea hasmoderateclimaticconditions dominantyear- around.Astheareaislocated ontheMediterraneanSeafrom northand northeastononesideandhightopographyontheother,whileitisopen tothe semidesserttopographyfromitssoutherndirection. AlJabalAlAkhdarisalimestoneplateau700to870m above sea levelwithanundulatingsurfacewhichtipsgently tothesouth stretchesbetweenthelongitudes20°,35′ Eto23°,15′ Eandlatitudes30°, 58′ Nto32°56′ N.ThebasicconfigurationofAl-Gabalisa step-like arrangementofalternatingbenchesandescarpmentsrising to850abovesea level. There are two mainescarpments,further apartinthe west butdrawinggradually closer togethereastward, bothroughly parallel to thecoast.A largeportionofthetwobenches,especially thesecond,is dissectedby wadis,givingthe Jabalapredominantly hilltomountainous appearance (Motawil ,1995).

Figure(1).The studiedarea.

Sampling:

Differentsampleso f (l e a f s a n d S t e a m s) werecollectedfrom t w o d i f f e r e n t r e g i o n s Al–GabalAl- Khder and Derna regions duringspring(2022) of (*Eucalyptus gomphocephala*)plant, the locations were selected are Costal and mountain locations for the selected plants, (Figures2 and3).

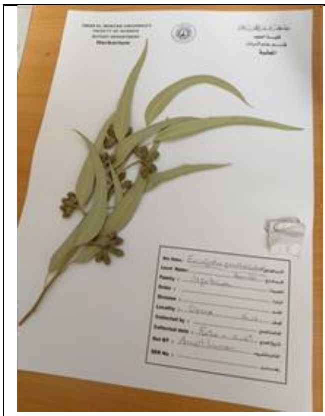


Figure (2):*(mountain*) **Figure (3)**:*(Costal*)

Plants Taxonomy:

ThecollectedsampleswereidentifiedinSeliphiumherbarium,Botany Department,Facultyof Science, Omar AlMukhtar University.

Samplespreparation:

The leafsandstemsof thestudiedplantswere separatedand washingseveraltimeswithdistillingwater. The samplesthendriedin darkanddryplace withintwoweeks. Thenthesamplesweregrindedby mortar andstoredinpolyethylenebottlesuntilanalysis.

Meteorologicaldata:

Station	JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DES.
Al-bayda	128.0	91.0	63.0	28.0	7.0	2.0	1.0	2.0	12.0	59.0	63.0	113.0
Derna	66.0	38.0	20.0	11.0	4.0	5.0	0.0	0.0	5.0	39.0	25.0	48.0

Monthlytotalamountof raininmillimeters (1980-2010)

Station	JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DES.
Al-bayda	78	74	71	61	56	55	66	70	70	72	73	76
Derna	71	69	65	65	70	72	72	72	72	69	66	67

The average relativehumidity (1980-2010)

Station	JAN.	FEB.	MAR.	APR.	MaAY.	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DES.
Al-bayda	9.4	9.9	11.5	14.9	18.6	22.0	22.7	22.9	21.3	18.4	14.5	11.1
Derna	14.3	14.2	15.6	17.9	20.7	23.8	25.9	26.7	25.5	23.1	19.4	15.9

average temperature (1980-2010)

Station	JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DES.
Al-bayda	11.3	11.4	11.1	10.7	8.3	7.0	6.5	6.4	6.3	7.9	9.9	11.6
Derna	12.7	13.0	12.6	12.0	10.4	11.4	14.3	13.9	11.2	10.0	11.4	12.9

average windspeedinknots (1980-2010)

Station	JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DES.
Al-bayda	2.5	3.1	4.3	6.8	7.4	7.5	5.6	4.6	4.5	4.6	4.4	3.3
Derna	5.2	5.7	5.7	6.3	6.0	6.2	6.6	6.2	5.9	6.1	6.2	6.0

Average amountof evaporationinmillimeters (1980-2010)

Physiologicalstudies:
Thephysiologicalstudieswerecarriedoutby comparing betweenthemorphologicalcharacteristicsofplantcollectedfrom Derna and Al-Bayda regions include:

1. Freshanddryweightfor leaf.
2. Colour of leaf
3. Colour of stems
4. plantlength
5. Leaf area.
6. Diamter of stems.

Estimation of Leafarea:

The Leaftobemeasuredwereplacedona graph paper, traced its outline using Pen/Pencil and calculating thesurfaceareaandexpressedinsquarecentimeters.(multiply thenumber of full squaresby1cm^{2}and partialsquaresby0.5cm^{2}and addthem together).

Estimation of Leaffresh weight(plant):
Weightoffreshleafwastakenfromeachplantdirect6leafand recordasfreshweightfollowinginthe table (g\plant).

Estimation of Leaf dry weight(plant):
Weight of dry leaf each plant was dried using over at 40c° for 72h. and recorded as dry weight. (g\plant).

Estimation of plant length:
There are several methods used to measure the height of trees based on the calculation of triangles as well as the tangents of the angles. There are also devices used to estimate the height directly. The heights were measured using the Abeny level device, which is considered one of the best machines used for this purpose.

Measure the diameter of trees:
Tree diameterswere measuredwithatape measureof diameter atchestheightdb /h(diameter atchestheight) (Badr El-Din.,2006).
Measurement The crown coverage:
The crowncoverageof castortreesinbothstudiedlocationswas estimatedusingameter tape (Shaltut , 2002)

Estimate the Chlorophyll aand Chlorophyll b :
Leafsamples(0.2g)harvestedfromcontrolandtreatedplantlets were homogenizedin acetone 80% (v/v) .Extract was centrifuged at 5,000rpm for 15min and absorbancewasrecordedat646and 663nm forchlorophyll(aandb) andat470nm forcarotenoids.Pigmentcontentwas calculated ($mg g^{-1}FW$) accordingtothe followingformulae asreportedby(Lichtenthaler & Wellburn, 1983).

Chlorophyll a= $12.25A_{663}–2.79A_{646}$
Chlorophyll b= $21.21A_{646}– 5.1A_{663}$Carotenoids=($1000A_{470}$– 1.8Chla–85.02Chlb)/198

Estimationofstarchofleafplantstudy:
Estimationofstarchwascarriedoutfollowingmethod.Where(0.1g)fromdriedsamplewasre-suspendedin2.5mlofdistilledwaterandsubsequently3.5mlof52% (v/v), then perchloricacid(PCA)wasaddedtotheresidueafterstirringthe mixture,the content was centrifuged for 15min at 4,000rpm.The supernatant was decanted,collected and the whole procedure was repeatedtwice.Supernatantofeachstepwasthenhydrolyzedpouredand the total volume was made up to 15ml with distilled water. After filtration,1.0mlofthealiquotofthisfiltratewasanalyzedforstarch contentfollowingthesame procedure asthatoftotalsoluble sugars Quantity ofstarchwascalculatedintermsofglucoseequivalent. The quantityof starchwasexpressedmgglucose/gdry weight.

Chemicalstudies:
Inthisstudythestudiedsampleswere expressedasthe followingnumbers (1 – 4) as following :

Sample No	Sample Plant	organ	location
1	***Eucalyptus gomphocephala***	leafs	Derna
2	***Eucalyptus gomphocephala***	stems	Derna
3	***Eucalyptus gomphocephala***	leafs	Albayda
4	***Eucalyptus gomphocephala***	stems	Albayda

Determination ofmetalsand minerals of plantand soilsamples:
Themetalsof (Cu, FeandNi) weredeterminedwithanAtomic absorption(PerkinElmer800)accordingto the methoddescribedby (Lorenz*etal*.,1980).Solublesodiumandpotassiumcontentsmeasured by aFlamePhotometer(JENWAYFlamePhotometer)accordingtothe methoddescribedby standard method atcentrallabofFaculty ofScience, OmarEl-Mukhtar University.Total phosphoruswas determined spectrophotometricallyusingtheprocedureof(Watanabe& Olsen, 1965).Where0.5gateachsample wasdesignedwith5mlofnitric acidsuntilneardryness, then10mlofdistilledwaterwasadded, the mixture then heated to reduce the volume, then the samples were filtrated,thevolumecompletedto100mlby distilled water,afterthe contentsofsodium andpotassium weredetermined ofplantleafsand stems.

Estimate the E.C ,p H and TDS in the soilsamples.

Onegramofsoilsamplewasmixedwith 100mlofdistilled waterfor10minutes, then themixturewasfiltered,thepH valueswere measurementbyused bypHmeter(TypeJENWAY),TDSandEC,were measuredby (TDS&EC equipment)atcentrallabofchemicalanalysis (Type JENWAY).

II. Results and Discussion

Physiologicalstudyresults:
The results of the physiological parameters were given as following:
The comparison between the morphological characteristics of the studied plants was shown in theTables of(1) .
Table (1): Morphological and Physiological Characterizations of *Eucalyptusgomphocephala*plant in this study.

Characterizes	Derna	Elbayda

Fresh weight (g)	1.6	0.86
Dry weight (g)	0.96	0.26
Colour leaf	Green dark	Green
Colour stems	brown 27.15m	brown
Leave area (cm)²	28.33	30.92
Plant lengh (m)	27.15	22.96
Diameter stems(cm)	16.20	31.36

The results showed variations intheleafs area betweentheoftheplant growingin the two studied regionsindifferentclimaticconditions,the results showedthat the leaf area of the mountain plants is larger (30.92cm²) thanthe coastal ones of(28.33cm²).Through themorphologicalcomparisonof thetwo*Eucalyptus*plants growninacoastalandmountainousareas,theweightof thefresh leafsofthecoastal *Eucalyptus*plantwas(1.6 g) andafterdryingata temperatureof40°Ctheresultwas(0.96 g) ,ontheotherhandthe weightofafreshleafofthemountain*Eucalyptus*plantwas(0.86 g) and after drying,theresultwas(0.26 g) .Hence,the obtained thatthefreshanddry leafs were higherincoastalplants. Whereasthe comparativemorphological results in termsof plant height, coastal plants werehigher than mountainplants,wherethe valueswere (27.15 and 22.2cm), respectively.

The results also showed that the higher plants had the lowest thickness in the diameterofthestemswherethediameterofthecoastalplantswas (16.20 cm) andthediameterofthemountainplantswasthelargestintermsof diameter (31.36 cm). Theleafsweregivengreencolorformountain*Eucalyptus*anddark greenforcoastal*Eucalyptus*leafsinproportiontothecolorofthestems, itwasbrownforbothplantswithmore cracksinthe coastalplant.It was reported that ,Plantenvironmentoftenexertsits greatestinfluence overherbage quality byalteringleaf/stems ratios,butitalsocausesothermorphological modificationsandchangesinchemicalcomposition of plantparts.andto influencetherelative proportionsofleafsandstemsdirectandindirect effectsonplantphysiology,morphology,growthandyieldimpactin many aspects, ofwhichphotosynthesisisthemostseverelyaffected process(Jing*etal.* ,2016).

Also some studies recorded that the wide range of environmental conditions includes the deeply incised valleys of the plateau margin and the several granitic monadnocksin addition togeographic and topographic variation, considerableedaphic variationexists.Muchoftheregioniscovered by ferruginousgravelswithsandy clay subsoilsatdepthbutun weathered granite outcrops,zonesofkaoliniticclaysandregionsofbleachedsandy soils these environmental conditionsprovide considerable scope for diversityinthefloristiccomposition,adaptivecharacteristicsdisplayed bytheplants,patternsofgroupings ofplantspeciesandthestructural featuresofthe plant communities (Byrne *etal.* ,2016).

The results showed variations in the leafs area between the leafs area of the plant growing in two regions in different climatic conditions, the results recorded that the leafs area of (433) cm² of the coastal plant is larger than the mountainous ones (400) cm². By comparingthecastorplants,theweightof thefreshleafsofthemountainplantwas(13.3g) andafterdryingitbecame (4.64 g) andtheweightofthefreshleafs ofthecoastalplantwas (8.14 g)and afterdryingwas(2.18 g) . Whereas,themountainplantwas recordedhighest value intheweightof the leafs, the mountainousplantwasgiventhe highestvalue,of (9.12m),and for coastal plant was(6.65m).Regardingthe colorof leafs themountainplantwasgreenandgreen reddish,andthecoastalplantwas green,eveniftheleafsofthemountainplantweregreen,whilethe leafsofthe coastalplantwere darkgreen. It was reported that the environmentalstressestriggerawidevariety ofplantresponses, rangingfrom alteredgeneexpressionandcellularmetabolism tochanges in growthrate andplantproductivity.Plantreactionsexist tocircumvent thepotentiallyharmfuleffectscausedbyawiderangeofbothabiotic andbiotic stresses,including light, drought,salinity,and high temperatures (Shao *et al.*, 2008). Also the climatechangeiscausing noticeable effects on thelifecycle, distributionand phyto-chemicalcomposition of theworld'svegetation, includingmedicinalandaromaticplants. Thechanging temperaturesand windpatternsassociatedwithclimatechangeare affecting precipitation andthereby plantarchitecture,flowering,fruiting,phyto-chemical compositionandinsitucompetitionwithotherspecies (Kumar*etal.* ,2017).

Photosynthetic pigment contents:

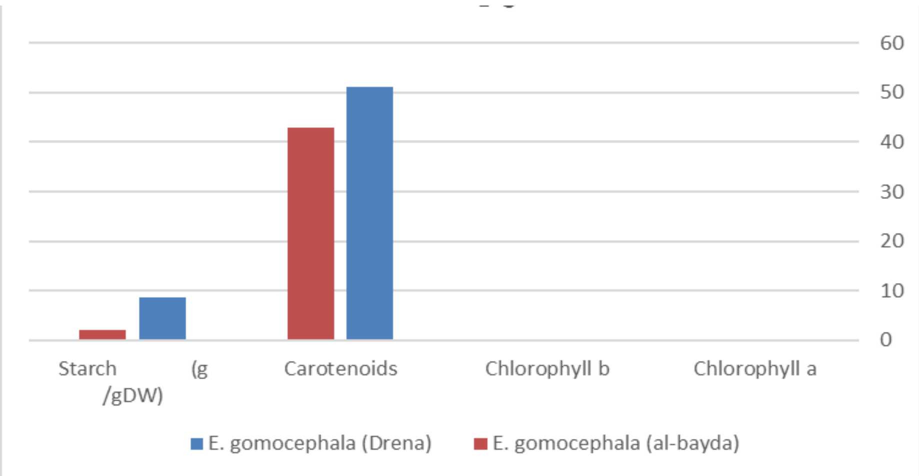
The contents of Chlorophyll a , Chlorophyll b, Carotenoids and Starch were recorded in Table (2) and Figure (4).

Table (2): Photosynthetic pigment and starch contents of the studied plants.

Photosyntheticpigments(mg/ gFW)				Starch contents
Parameters	Chlorophyll a	Chlorophyll b	Carotenoids	Starch (g /gDW)
E. gomocephala (Drena)	0.120	0.071	51.090	8.64
E. gomocephala (al-bayda)	0.110	0.068	42.919	2.04
Average ±SD	0.15 ± 0.07	0.056 ± 0.027	38.71±18.60	5.29± 3.68

The changes in photosynthetic pigments in the leaf values of the studied plantsinacoastalandmountainousregionasaresultof the differencein climaticandphysiologicalconditions betweenthetworegions, The contents of (Chlorophylla,bandcarotenoidsmgg^{-1}FW)inleavesplantstudiedshowed increasingof leaves of *Eucalyptus gomphocephala*of coastal region (Derna) .Therefore, the starch storage rate ishigher Chlorophyllisavitalphotoreceptorinplantsand isindicative of plantmetabolism aswellasgrowth.Itdiffersfrom speciestospeciesand issignificantly affectedby environmentalstresses.Any changein chlorophyllcontentcanconsiderably affectthemorphologicaland physiologicalstatusof plants (Mishra *et al.*,2021).Onthe other hand, the lower values were recordedinthesame plantincoastalareas , The Chlorophylldegradationbecauseofstressmaybeapossiblecause ofthedeclineiscarbonassimilationratebecauseofchlorophyllphoto- bleaching. Duetothesuppressionofspecificenzymes,responsibleforthe synthesisofphotosyntheticpigmentssuchasδ –aminolevulinicacid dehydratase and protochlorophyllide reductase, associated with chlorophyllbiosynthesis (Mishra e*t al.*,2021).

PhotosyntheticPigmentsare thesubstanceswithvery different chemical structure;they are present in the form ofporphyrin pigments (chlorophyll a, b and c), carotenoids, anthocyanins and flavones. Total leaf pigment includes chlorophyll-a,chlorophyll-b and carotenoids that are necessary for photosynthesis process. The contents offoliar pigments variesdependingonspecies. Variations inleafpigments(chlorophyllsandcarotenoids)can bedue to internal factors and environmental conditions. (Shaikh &Dongare,2008) reported that chlorophyll and carotenoids contents varied withmicroclimatic conditions in Adiantumspecies. The ratio ofchlorophyll-a andchlorophyll-bin terrestrialplants has beenused asanindicator ofresponsetolightshadeconditions(Vicas*et al.*,2010). The smallproportionofchlorophylla/bisconsideredas sensitive biomarker ofpollutionandenvironmentalstress. Plantslivingundernaturalconditionsareexposed tomany adversefactorsthatinterferewiththephotosynthetic process, leadingto declines in growth, development,and yield (Kalaji *et al.*, 2016).



Figure(4): Concentrations(ppm) of Chlorophyii a,b - Carotenodies and total starch of thestudied plants.

It was concluded that the Chlorophylla,chlorophyllband carotenoids aremain photosyntheticpigmentsanditsplayimportantroleinphotosynthesis. Thechangesin theamount of pigmentswereevaluatedasthechangesin photosynthesis.Carotenoidsare necessary forphotoprotectionof photosynthesisandthey playanimportantroleasaprecursor insignaling during theplantdevelopmentunderabiotic/bioticstress. Decrease in carotenoids lead to degradation of*B*-caroteneandformationof Zeaxanthins,whichareapparentlyinvolvedinprotectionagainstphoto-inhibition(Sharma& Hall, 1991).Nowadays, enhanced carotenoids contents inplants areof considerableattentionforbreeding aswell as genetic engineeringindifferentplants(Li*&* Vallabhanen , 2008).

Starch accumulations play a leading role in osmoprotection, osmotic adjustment, carbon storage, andradical scavenging(Parida*etal.*, 2002). (Ashraf&Harris,2004) and (Parida&Das, 2005)suggested that carbohydratessuchassugars(glucose,fructoseandsucrose) andstarch accumulationunder anylowstresslevelswastoaccommodatetheionic balance inthevacuoles.

Chemical Results:

Mineraland metal contentsof thestudied plants:

Themineralsandmetalcontents ofthestudiedplantswereshown inTablesof(3 and 4)andFiguresof(5 and 6): Theconcentrationsofthe elementsofthestudiedplantswerefluctuatedasfollowing:The high sodium content(44.93ppm)wasrecorded inleafof*Ricinuscommunis*(Derna) followedby theother samples of leaves of *Eucalyptus gomphocephala* (Derna), leaf *Eucalyptusgomphocephala* (Albayda), stems *Eucalyptusgomphocephala*(Derna), stemsof*Eucalyptus gomphocephala* (Albayda),) and leavesof *Eucalyptusgomphocephala* (Albayda).

Onothersidethehigherconcentrationsofpotassiumwererecordedinlleaves *Eucalyptus gomphocephala* (Derna), leavesof*Eucalyptusgomphocephala* (Albayda),stems*Eucalyptus gomphocephala* (Derna), stemsof*Eucalyptusgomphocephala*(Albayda) which their contents were as following: (126, 47.71, 47.17 and33.4ppm),respectively.

The results of phosphors contents showedhigh concentration oftotal phosphorus which recorded in leavesof of *Eucalyptus gomphocephala* (Derna), leavesof *Eucalyptus gomphocephala*(Albayda), stemsof *Eucalyptus gomphocephala* (Albayda) and stems of *Eucalyptus gomphocephala*(Derna), where theircontents wereasfollowing: (6, 3.65, 2.86 and2.86ppm*)*, respectively.

While theNitrogen showeddifferentlevels, higher concentration of nitrogenwasrecordedin leaves of leavesof*Eucalyptusgomphocephala* (Albyda),leaves ofstems*Eucalyptusgomphocephala*(Albyda),stemsof*Eucalyptus gomphocephala* (Derna) and leafof *Eucalyptusgomphocephala* and (Derna), theircontents were (0.364, 0.236,.and 0.187 ppm), respectively.

Thehigherconcentrationsofthe Copperwaspresentinleavesof*Eucalyptusgomphocephala*(Albayda)(3.77ppm)follow ingby stemsof *Eucalyptus gomphocephala*(Albayda), leafEucalyptus gomphocephala (Derna),stems*Eucalyptusgomphocephala*(Derna) (3.26, 3,1.88 and1.86ppm).

The Nickel was present in higher concentration of stemsof *Eucalyptusgomphocephala*(Albayda),followedbyleavesof *Eucalyptus gomphocephala*(Albayda), stems of *communis*(Albayda), leaf*Eucalyptus gomphocephala* (Derna), stems*Eucalyptusgomphocephala*(Derna) (11.13, 9.13, 2.57 and1.86ppm).

Theironwas presentinhigherconcentrationwasfound, stemsof *Eucalyptusgomphocephala*(Derna) leaf*Eucalyptus gomphocephala* (Derna), leavesof*Eucalyptusgomphocephala*(Albayda), stemsof*Eucalyptus gomphocephala* (Albayda), (0.215, ,0.25 and 0.25 ppm) ,respectively.

Onothersidethehigherconcentrationsofcalcium (58.66ppm), stemsofEucalyptusgomphocephala(Albayda),followingby leavesof *Eucalyptus gomphocephala* (Albayda), leavesof *Eucalyptus gomphocephala* (Derna)stemsofstems*Eucalyptusgomphocephala* (Derna) whichtheir contentswere as following: (52.94, 50, 27.23 and 13.65ppm).

Table (3): The mineralandmetal contentsof studiedplant samples.(ppm).

Element	K	Na	p	Fe	Cu	Ni	Ca
1	126	26.18	6	0.215	2.57	6.35	32.8
2	47.17	19.31	2.69	0.245	1.86	5.41	27.23
3	33.4	5.97	2.86	0.25	3.26	16.10	58.66
4	47.71	26.18	3.65	0.25	3.77	10.26	52.94

Also the contents of Nitrogen of the plant samples were shown in Table (5).

Table (5) : The Nitrogencontentsofstudiedsamples(ppm).

Samples Plant	**Nitrogen**
1	0.187
2	0.236
3	0.356
4	0.542

SampleNo	**SampleType**
1	E. gomphocephala leaves (Derna)
2	E.gomphocephala stems (Derna)
3	E. gomphocephala stems (Albayda)
4	E. gomphocephala leaves (Albayda)

The mineralsandmetalcontents ofthesoil samples of the studiedwere showninTables(4) andFigures (5&6):

Table (4) contentsthe majormineralsofsoils of samples locations (ppm).

Minerals / Locations	Ca	K	Na	P	Ni	Fe	Cu	N
Derna	1.57	8	19.9	5.34	0.20	20.93	1.27	0.67
Albayda	0.57	9.85	2.11	4.95	0.55	47.19	0.157	0.120

Bycomparingthemineralcontentsofthesoilbetweenthetwo studiedareas,wenoticeadiscrepancyinthepercentageofminerals,as thesoil sample of the cityof Derna recorded a high content of the followingminerals,namelycalcium,sodium,phosphorous,copperand their contentswere respectively(1.57, 19.1, 5.34 and 1.27) Onthe otherhand,thesoilsampleofthecityofAl-Baydarecorded thehighestcontentofpotassium,nickel,iron,andnitrogen,andtheircontentswere, (9.85, 0.55, 47.19 and 0.120).respectively

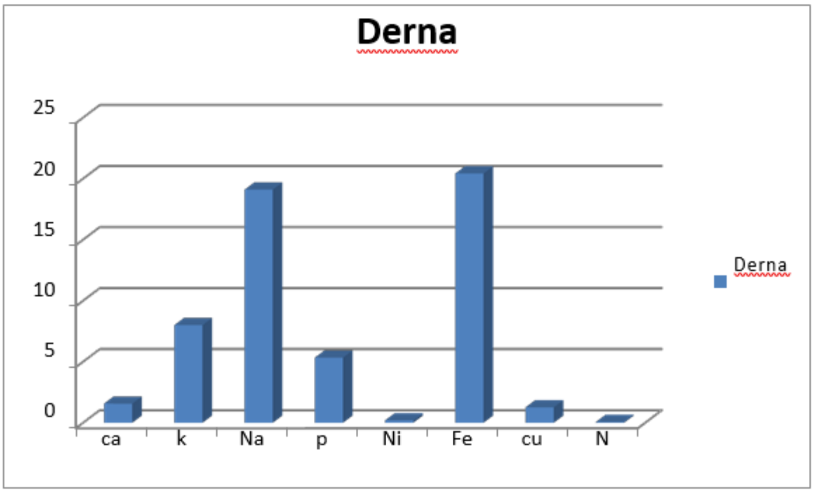


Figure (5):Concentrations(ppm) the contentsof the major mineralsof thestudiedsoil samples.

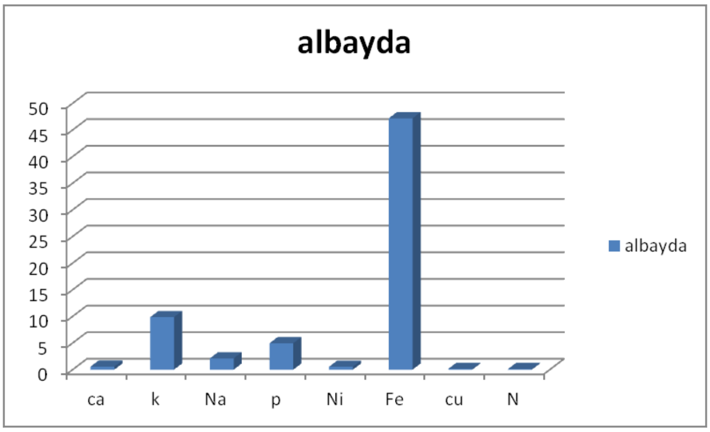


Figure (6):Concentrations(ppm) the contentsof the major minerals of thestudiedsoil samples.

III. Conclusion

According the results obtained inthis study there are variations in the morphological and physiological properties which selected in this study , also the contents of metals and minerals showed different values comparing between the same plant growing in the different locations (Coastal and Mountain ones).

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